Trust and Environmental Valuation: The Impact of Culture as System

By

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I, Lee Jian Ming, Kelvin, certify that this dissertation is my own original work. No part of this thesis has been submitted for any degree, or is currently submitted for any other degree. To the best of my knowledge, any help in preparing this thesis and all sources used have been duly acknowledged. This dissertation is 98,492 words long including in-text citations, but excluding footnotes, tables, figures, appendices and references.

Lee Jian Ming, Kelvin — 14 October 2018

Signature and Name — Date

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Abstract

Economists use various contingent valuation schemes to assess how the environment should be factored in development issues. A standard critique of economics is that it takes preferences as given and does not question where attitudes come from. The thesis examines how contextual factors, institutions, rules, and culture affect people's valuation of environmental goods and services. Drawing on previous literature this thesis examines a set of contextual factors that help determine different attitudes toward environmental evaluation across different countries using specific questions from the World Values Survey.

Two of the central figures in this area are Elinor Ostrom and Toshio Yamagishi. Through public goods experiments Ostrom demonstrates the importance of trust for reciprocity for collective action but equally important are the rules that govern the regulation of interpersonal exchanges. There is a large body of work from cross-cultural psychologists who emphasize that there is an individualism-collectivism dimension of culture and that helps explains how much trust there exists in different countries. Building on Ostrom's work, Yamagishi critiques this work. He builds on Ostrom's account arguing that innate motivations driven by culture are not important; rather, it is the mutual formal and informal monitoring and sanctioning that impacts upon individuals' reputations for trustworthiness.

The thesis examines Yamagishi's claims in comparison to those of the cross-cultural psychologists' thesis with regard to individuals' environmental valuation measured in terms of their environmental attitudes. Using specific questions that have been posed in the World Values Survey the effects of two groups of independent variables in particular are examined: institutional

variables represented by a state's rule of law as proxy for monitoring and sanctioning other actors; and cultural variables operationalized in terms of an individual's cultural orientation and a state's cultural frame. Multilevel ordered logistic regression is utilized to analyze cross-country data by comparing results from the wave 5 dataset against those from the longitudinal dataset of the World Values Survey.

The thesis demonstrates that a state's rule of law has a positive impact on one's environmental attitudes when interacted with interpersonal trust and trust in institutions. However, culture's impact on individuals' environmental attitudes seems to contradict expectations of the cross-cultural psychologists; rather, Yamagishi's arguments provide a better explanation. This study further supports Ostrom's and Yamagishi's arguments for the importance of legal institutions and interpersonal trust in influencing one's valuation of the environment.

Table of Contents

List of Tables …… 10

List of Figures ……... 13

List of Abbreviations ……..... 14

CHAPTER 1 INTRODUCTION 16

1.1 Introduction ……..... 16

1.2 Justification for environmental valuation: Policymaking ……. 22

1.3 Conclusion…… 28

CHAPTER 2 DISCUSSION OF VALUATION METHODS AND MICRO CONTEXT 31

2.1 Introduction ……..... 31

2.2 Process of environmental valuation ……..... 31

2.3 Environmental valuation approaches ……... 36

2.3.1 Stated preference approaches ……... 37

2.3.2 Revealed preference approaches …….. 40

2.4 Discussion: micro context …… 43

2.4.1 Strategic bidding as a sign of strategic behavior showing strategic interdependence among individuals ……..... 43

2.5 Conclusion ……... 58

CHAPTER 3 DISCUSSION OF MACRO CONTEXT: NORMS AND CULTURE 60

3.1 Introduction ……..... 60

3.2 Norms and culture influence individuals' valuations as they cannot be divorced from one's social context ……..... 63

3.2.1 The role of culture ……. 72

3.3 Conclusion ……... 85

CHAPTER 4 DISCUSSION OF MACRO CONTEXT: INSTITUTIONS AS RULES 87

4.1 Introduction ……..... 87

4.2 Individuals do not act independently of others' decisions but as a group …….. 90

4.2.1 The 'expressive' quality of institutions ……. 109

4.3 Conclusion ……... 119

CHAPTER 5 THEORY 121

5.1 Introduction ……..... 121

5.2 Ostrom's arguments for the role of interpersonal relations as context ……..... 122

5.3 Cross-cultural psychologists' suggestion that valuation is "cultural" ……... 139

5.4 Yamagishi's "institutional view" of culture" as a "system of formal and informal mutual monitoring and sanctioning" …… 158

5.5 Conclusion ……... 180

CHAPTER 6 HYPOTHESES AND MEASUREMENT 183

6.1 Introduction ……..... 183

6.2 Hypotheses ……... 183

6.3 Methodology …… 197

6.3.1 Dependent variable ……... 197

6.3.2 Independent variables: individual level …… 200

6.3.2.1 Cultural orientation …… 201

6.3.2.2 Trust in strangers …… 210

6.3.2.3 Trust in institutions …… 215

6.3.2.4 Control variables at individual level …….. 219

6.3.3 Independent variables: country level …… 220

6.3.3.1 Rule of law ……. 221

6.3.3.2 Cultural frame …… 225

6.3.3.3 Control variables at country level …….. 232

6.4 Model ……... 235

6.5 Conclusion ……... 245

CHAPTER 7 RESULTS 246

7.1 Introduction ……..... 246

7.2 Hypothesis 1: weak support ……..... 263

7.3 Hypothesis 2: weak support ……..... 275

7.4 Hypothesis 3: qualified support …… 297

7.5 Hypothesis 4: partial support …… 317

7.6 Description of results by levels of analysis ……... 343

7.6.1 Individual level, i.e. micro contextual, variables …….. 343

7.6.2 Country level, i.e. macro contextual, variables ……. 345

7.6.3 Cross-level interaction effects …….. 347

7.7 Conclusion ……... 386

CHAPTER 8 DISCUSSION 388

8.1 Introduction ……..... 388

8.2 Three puzzles …… 389

8.2.1 Puzzle one: do contextual factors affect an individual's environmental WTP? ……... 389

8.2.2 Puzzle two: does rule of law impact more on one's WTP than culture? …… 402

8.2.3 Puzzle three: The counterintuitive impacts of 'culture' …… 413

8.3 Concluding remarks ……. 428

Appendix A ……... 434

Appendix B ……... 442

Appendix C ……... 445

Appendix D ……... 451

Appendix E ……... 457

Appendix F ……... 460

REFERENCES ……. 467

List of Tables

Table 1. Descriptive statistics for all models using the wave 5 dataset of the World Values Survey. …… 248

Table 2. Descriptive statistics for all models using the longitudinal dataset of the World Values Survey. ……. 252

Table 3. Results from multilevel ordered logistic regression on both wave 5 and longitudinal datasets of the World Values Survey. …….. 256

Table 4. Marginal effects of interaction between an individual's cultural orientation and his/her country's rule of law for both wave 5 and longitudinal datasets of the World Values Survey. ……..... 266

Table 5. Marginal effects of interaction between an individual's cultural orientation and his/her country's cultural frame for both wave 5 and longitudinal datasets of the World Values Survey. …….. 278

Table 6. Marginal effects of interaction between an individual's trust in stangers and his/her country's rule of law for both wave 5 and longitudinal datasets of the World Values Survey. …… 301

Table 7. Marginal effects of interaction between an individual's trust in institutions and his/her country's rule of law for both wave 5 and longitudinal datasets of the World Values Survey. …… 312

Table 8. Marginal effects of interaction between a country's rule of law and its cultural frame for both wave 5 and longitudinal datasets of the World Values Survey. …… 330

Table 9. Marginal effects of interaction between an individual's trust in strangers and his/her country's cultural frame for both wave 5 and longitudinal datasets of the World Values Survey. …….. 356

Table 10. Marginal effects of interaction between an individual's trust in institutions and his/her country's cultural frame for both wave 5 and longitudinal datasets of the World Values Survey. …….. 374

Table 11. Questions on an individual's environmental attitudes that appear in most of the survey waves of the World Values Survey. …… 434

Table 12. Questions on an individual's cultural orientation from wave 5 of the World Values Survey. ……..... 435

Table 13. Questions on qualities that respondent feels are desirable to be instilled in his or her children from the all six waves of the World Values Survey. …... 437

Table 14. Questions on an individual's perceived trust in social groups from wave 5 of the World Values Survey. ……..... 438

Table 15. Question that measures an individual's trust in other people generally in all six waves of the World Values Survey. ……... 438

Table 16. Questions on an individual's perceived confidence in institutions from all six waves of the World Values Survey. ……..... 439

Table 17. Question on an individual's perception of respect for human rights in his/her country in wave 4 of the World Values Survey. ……... 440

Table 18. Questions on an individual's education level in wave 5 of the World Values Survey. …… 440

Table 19. Questions on an individual's household income in wave 5 of the World Values Survey. …… 441

Table 20. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *direct income payments* and an individual's trust in the military is *included.* ……. 445

Table 21. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *taxation* and an individual's trust in the military is *included.* ……..... 446

Table 22. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *government spending* and an individual's trust in the military is *included.* ……. 447

Table 23. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *direct income payments* and an individual's trust in the military is *excluded.* …… 448

Table 24. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *taxation* and an individual's trust in the military is *excluded.* ……... 449

Table 25. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *government spending* and an individual's trust in the military is *excluded.* …… 450

Table 26. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *direct income payments* and an individual's trust in the military is *included*. …… 451

Table 27. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *taxation* and an individual's trust in the military is *included*. ……..... 452

Table 28. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *government spending* and an individual's trust in the military is *included*. ……... 453

Table 29. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *direct income payments* and an individual's trust in the military is *excluded*. ……... 454

Table 30. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *taxation* and an individual's trust in the military is *excluded*. …….. 455

Table 31. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *government spending* and an individual's trust in the military is *excluded*. ……..... 456

Table 32. List of countries/territories that are included in and excluded from wave 5 of the World Values Survey. …… 457

Table 33. List of countries/territories that are included in and excluded from the World Values Survey longitudinal dataset for each wave 2, 3, 4 and 5. ….. 460

List of Figures

Figure 1. Marginal effects of the interaction between an individual's cultural orientation and his/her country's rule of law for all three payment vehicles in wave 5 and longitudinal datasets. ……. 273

Figure 2. Marginal effects of the interaction between an individual's cultural orientation and his/her country's cultural frame for all three payment vehicles in wave 5 and longitudinal datasets. ……... 291

Figure 3. Marginal effects of the interaction between an individual's trust in strangers and his/her country's rule of law for all three payment vehicles in wave 5 and longitudinal datasets. ……..... 305

Figure 4. Marginal effects of the interaction between an individual's trust in institutions and his/her country's rule of law for all three payment vehicles in wave 5 and longitudinal datasets. ……. 315

Figure 5. Marginal effects of the interaction between a country's rule of law and its cultural frame for all three payment vehicles in wave 5 and longitudinal datasets. ……... 337

Figure 6. Marginal effects of the interaction between an individual's trust in strangers and his/her country's cultural frame for all three payment vehicles in wave 5 and longitudinal datasets. ……... 363

Figure 7. Marginal effects of the interaction between an individual's trust in institutions and his/her country's cultural frame for all three payment vehicles in wave 5 and longitudinal datasets. ……... 380

List of Abbreviations

CBA	Cost-benefit analysis
CPR	Common pool resource
CV	Contingent valuation
CXN	Collective action
DMV	Deliberative monetary valuation
ES	Ecosystem service
GDP	Gross domestic product
GLM	Generalized linear model
GLMM	Generalized linear mixed model
HP	Hedonic pricing
I-C	Individualism-Collectivism
IBM	International Business Machines Corporation
IPCC	Intergovernmental Panel on Climate Change
ISSP	International Social Survey Programme
MRI	Magnetic resonance imaging
NGO	Non-governmental organization
NIMBY	Not-in-my-backyard
OECD	Organisation for Economic Co-operation and Development
PCE	Perceived consumer effectiveness
PD	Prisoner's dilemma
PEB	Pro-environmental behavior
SWIID	Standardized World Income Inequality Database

TCM	Travel cost method
TEV	Total economic value
VAI	Value articulating institution
vmPFC	Ventromedial prefrontal cortex
WAVES	Wealth Accounting and the Valuation of Ecosystem Services
WGI	Worldwide Governance Indicators
WTA	Willingness-to-accept
WTP	Willingness-to-pay
WVS	World Values Survey

CHAPTER 1 INTRODUCTION

1.1 Introduction

The thesis examines how contextual factors as institutions, rules, and culture affect people's valuation of environmental goods and services. The environment is critically important because of the need to ensure sustainable development; that is, the need to balance between human beings' needs and wants for goods and services, and a viable ecosystem to ensure survival of the human species and commercial viability of enterprises (Costanza et al, 1997: 253; Costanza et al, 1998: 68). Environmental economists such as Hotelling (1947), Ciriacy-Wantrup (1947) and Krutilla (1967) first conceive environmental valuation approaches in the 1960s as Pearce (2002) outlines. However, valuation techniques rose to prominence in the 1989 Exxon Valdez oil spill case which saw Nobel Laureate economists Kenneth Arrow and Robert Solow convened to advise the legal proceedings that ensued. Since then, interest and development in these techniques have endured alongside further environmental disasters, the latest being warnings from the Intergovernmental Panel on Climate Change (IPCC, 2014) of disastrous, enduring changes to global climate. As a result, governments worldwide expressed greater interest in regulating the environment with various policy tools, among which include environmental valuation tools proposed by environmental economists. An example of such a tool is contingent valuation which Arrow and Solow employ to gather data for the Exxon Valdez case and which Mitchell and Carson (1989) advocate to assess how the natural environment should be factored in economic development when the market is unable to price the environment and thus cannot allocate natural resources efficiently.

However, a standard critique of economics is that it takes individuals' preferences as given and does not question where their attitudes come from. Critics of economic methods have long

bemoaned the fact that preferences are assumed and that there is no theory about how preferences are formed (Sen, 1982; Hickerson, 1987). Despite these criticisms there are few studies that try to examine the reasons for variations in individuals' preferences. A large literature examines how actors come to value or price environmental goods through various valuation methods. Current explanations rely on direct 'stated preferences' (e.g. contingent valuation) and indirect 'revealed preference' methods (see Chapter 2). These can allow governments to price such goods outside of market mechanisms, but they do not tell how individuals come to value goods or why such valuations might vary across communities. However, scholars observe that different societies have different preferences which suggest the importance of non-economic factors behind individuals' valuations, such as institutions (Ostrom, 1998a, 2005b) and culture (e.g. Nikolakis, Grafton and To, 2013). However, such institutional and cultural explanations have traditionallly been the foci of the political science discipline (for instance, see Almond and Verba, 1963; Ross, 1997; Skocpol, 1979; Katznelson, 1997) which are beyond the economics discipline that are now invoked here to suggest that they can explain the bases for individuals' valuations of the environment.

It is in this light that this thesis examines a set of contextual factors that help determine different attitudes toward environmental evaluation across different countries. This thesis demonstrates that a state's institutions have a positive impact on one's environmental attitudes when interacted with one's trust in strangers and institutions. Specifically, I argue that the quality of a country's rule of law exerts a more consistently positive impact on individuals' valuations expressed as willingness-to-pay (WTP) to conserve the environment in contrast with the mixed effects of individualism-collectivism dimension of culture on WTP, after accounting for individuals' trust in strangers and governing institutions. However, culture seems to exhibit lesser independent impact on

environmental attitudes as the effect of individualism-collectivism on WTP is unclear and even counterintuitive (see Chapter 7), although there is an interaction effect between a country's cultural frame, and an individual's trust in strangers and institutions. A country's cultural frame seems to interact with its quality of rule of law as well. Rule of law interacts with one's trust in unfamiliar others defined as *interpersonal*, or more broadly, as *generalized* trust, to produce a mostly positive relationship with WTP across the three payment vehicles tested: voluntary income contributions, compulsory taxation and government spending. These observations are derived from comparing results between wave 5 and the longitudinal or multi-wave dataset of the WVS (World Values Survey Association, 2017). The unit of analysis is the individual. Analysis is conducted by nesting individual level independent variables (i.e. one's trust in strangers and institutions) within the context which are country level independent variables (i.e. rule of law and culture). These results largely vindicate arguments made by Elinor Ostrom and Toshio Yamagishi who are two central figures in this research. In contrast, the results support to a lesser extent arguments made by cross-cultural psychologists whose theories are also central to this inquiry.

This dissertation contributes to the debate above by showing that institutional, and to a lesser extent, cultural, contexts influence individuals' valuations of the environment. This is done through an analysis of survey data from over 50 counries carried out by the WVS Association over four waves. This study differs from preceding studies which tend to evaluate the impacts of these influences either through the researchers' specific knowledge domains or studies that are unfortunately restricted in scope. To overcome these difficulties, this dissertation has attempted to integrate views from diverse disciplines including economics, political science, sociology, psychology, law, philosophy and environmental sciences in a closer re-examination of existing

survey data from the WVS that this dissertation argues remains the only dataset that permits such a multi-disciplinary, cross-societal inquiry to be carried out. Of course, this dissertation does not rest solely on the claim that context matters which economists and rational choice theorists have long recognized; the main selling point of this investigation is to decipher the nature of the context—how institutional rules and/or culture encourage individuals to reveal their true preferences and these individuals interact with and within these contexts. If the analysis is correct as will be shown later, this will not only advance the field of valuation but also the larger disciplines in which valuation is situated down to their intellectual foundatations, *viz.* neoclassical economics. It will also advance the environmental cause that should be seen as a matter of how insititutional and social rules respective to each society influence individuals in those societies to trust one another to manage the natural environment.

The above findings are made based on the following definitions and assumptions which I adopt from the following scholars as I will analyze their arguments in subsequent chapters (see, especially, Chapter 5). Below are concepts at the individual level or micro context (Ostrom, 2010a: 70). The definition of *valuation* is taken from Costanza (2006: 169; 2000: 6-7; see also Costanza et al, 1997: 69) as his research relates directly to my study, defining it as "the process of assessing the contribution of a particular object or action in meeting a particular goal...As long as we are forced to make choices, however, we are doing valuation". While a simpler definitino of *context* is provided by Engelmann and Hein (2013: 216) who define it as "the circumstances that form the setting for an event", I adopt Ostrom's (2010a: 70) definition as her definition is sharper. She defines *context* at two levels as "micro" context and "macro" context: the former refers to the "experimental design created by the experimenter to test theory", while the latter refers to "the

broader context outside the experiment that may affect the individual". I also adopt Yamagishi and Yamagishi's (1994: 131-132) definition of trust as "an expectation of others' benign behavior under circumstances where people do not have control over others" which Ostrom concurs. Yamagishi and colleagues distinguish trust, however, from *assurance*, the latter which they define as "an expectation of others' benign behavior within stable and mutually committed relationships where people have control over each other" (Hayashi et al, 1999: 34). What differentiates trust and assurance is the amount of risk the trustor is willing to take in expecting the trustee to cooperate with the former.

I adopt the following definitions of concepts which are at the "macro context" level. North's (2005: 22) definition of *institution* shall be adopted in this dissertation defined as "rules of the game—both formal rules, informal norms and their enforcement characteristics". Or, in short, institutions are *rules* as Ostrom and colleagues define which can include formal and informal rules (see Ahn and Ostrom, 2008: 74; Evans et al, 2008: 111), and which Yamagishi et al (1998a: 168-169) concur. I also follow Ostrom's (2014a: 11) definition of *norms* which she differentiates from rules, the former defined as "shared prescriptions known and accepted by most of the participants themselves involving intrinsic costs and benefits rather than material sanctions or inducements", or simply as "standards for behavior" as the cross-cultural psychologist Schwartz (1977: 231) defines. However, norms are different from *culture* which another cross-cultural psychologist, Triandis (1994: 16), defines as unspoken, shared prescriptions of social appropriateness, that is, "unstated assumptions, standard operating procedures, ways of doing things that have been internalized to such an extent that people do not argue about them". Individualism-collectivism as one aspect of culture which is of interest in this dissertation is drawn from Hofstede (2001b: 225)

who pioneers these concepts. He defines individualism which "stands for a society in which the ties between individuals are loose: Everyone is expected to look after him/herself and her/his immediate family only". The opposite, collectivism, "stands for a society in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty".

Following Ostrom (2003: 20), I assume the environment as an "open-access" common pool resource (CPR) in the absence of individual property rights over wildlife and natural resources. Benefits from harvesting these finite resources are non-excludable to all actors but rivalrous as one actor benefits at others' expense. Ostrom describes management of natural resources as a "social dilemma" in the context of game theory (Ostrom, 2003: 393). Thus, my inclusion of Ostrom's concept of trust as an explanatory factor influencing environmental valuation is justified as the management of environmental goods and services is, in fact, a social dilemma.

This inquiry is organised as follow. This chapter, Chapter 1, shall proceed to introduce the reason for environmental valuation. This is followed by Chapter 2 which describes how valuation is typically conducted outlining more widely practised approaches to valuation before discussing how the micro context at the individual level affects one's WTP. Chapter 3 subsequently reviews arguments that norms including cultural norms as part of Ostrom's macro context mediate individuals' WTP. Chapter 4 follows up by discussing criticisms that environmental valuation neglects the role governing institutions play as valuation is implemented through them—these institutions constitute the other part of Ostrom's macro context. Chapter 5 presents theories from scholars aforementioned that argue that context affects one's WTP: Ostrom who is a new

institutional economist; cross-cultural psychologists such as Hofstede, Triandis and Schwartz; and Yamagishi as an evolutionary psychologist. Chapter 6 suggests several hypotheses for testing drawn from these theories using hierarchical linear modeling to analyze WVS data. Chapter 7 compares the results obtained from testing these hypotheses between those from wave 5 against those from the longitudinal dataset comprising of waves 2, 3, 4 and 5 of the WVS. Chapter 8 discusses the conclusions and implications inferred from these results to assess criticisms that environmental valuation neglects the micro and macro contexts as discussed in Chapters 2, 3 and 4 which thus validates the strength of arguments made by Ostrom, Yamagishi and the cross-cultural psychologists.

1.2 Justification for environmental valuation: Policymaking

Policymaking appears to be the broad reason to conduct environmental valuation based on neoclassical theories in order to ensure sustainable stocks of natural resources for development whilst conserving the natural environment. However, contestation over these claims shows not just a lack of consensus over whether valuation is the most appropriate approach to environmental conservation. It also foreshadows various problems that arise from the neoclassical assumption that individuals' preferences are exogenous when the impact of contextual factors on individuals' valuations are further examined in Chapters 2, 3 and 4.

Valuation has been argued to aid the 'objective' formulation of public policy. Scholars (e.g. Spash et al, 2009: 955, 963; Jacobs et al, 2016: 214; Chee, 2004: 550) recognize that it is increasingly important that policy takes into account the value of environmental goods and services. Costanza and Daly (1992: 41) argue that valuation is necessary to aggregate and determine the "optimal

scale" of human activities given the natural resource constraints and negative effects of environmental degradation. Even prominent critics of environmental valuation recognize this, such as Sagoff (2007: 10) who favors conceptualising environmental pollution as "social evil to be minimized" over "social cost to be optimized" so as not to "slow or impair the growth of the economy on which social well-being or the standard of living primarily depends". Sagoff (2007: 10, 11) proposes identifying "acceptable" levels of pollution—what he terms "resting points" or "stopping points"—so that environmental conservation is not 'overly' burdensome to the economy, such as by factoring in law "de minimis risk" (i.e. negligible risk to one's health and wellbeing from environmental damage) and best or 'state-of-the-art' practices of industries (i.e. "benchmark" and "best method" standards). Others such as Ring et al (2010: 21, 23) argue that valuation complements market-based instruments by helping to create new markets such as emissions trading; identify future benefits as opposed to current costs; help solve poverty and other social problems by identifying the beneficiaries and losers of policy measures; and identify harmful policies such as subsidies to economic sectors harmful to ecosystem maintenance, e.g. housing. In particular, two market-based instruments undergird environmental policy in recent years: markets for ecosystem services such as emission trading schemes and payments for ecosystem services such as paying farmers to conserve wildlife (Neuteleers and Engelen, 2015: 253). Data from valuation can be utilized by governments according to four arrangements (Phelps et al, 2017: 17): "decentralized, voluntary and/or private" arrangement (e.g. inform payments for ecosystem services); "institutionalized" arrangement (e.g. producers and consumers internalizing environmental values); an arrangement when valuation is "embedded in government agencies" (e.g. inform multiple stakeholders in deliberating over priorities and management options

concerning environmental conservation); and "formally institutionalized" arrangement (e.g. as law with regards to non-compliance and compensation).

More specifically, numerous scholars advocate valuation to aid policymaking in three ways (e.g. Chan et al, 2012: 8; Daly, 1998: 23; Costanza et al, 1997: 69; Sagoff, 2007: 37; Norgaard, 1994: 151)[1]: 1) communication of policy to relevant stakeholders; 2) formulation of 'better' decisions; and 3) illustration of impact of environmental conservation to local stakeholders. Firstly, it has been overwhelmingly argued that valuation is useful to policymakers by communicating using the language of dollars and cents to the public in a bid to produce "objective" analysis in terms of cost-benefit analysis (CBA) and prioritize policy goals systematically. Marre et al (2016: 53) note that valuation of ecosystems is "informative" to raise awareness among the public, justify policies and for accounting purposes. Pritchard et al (2000: 37) note that valuation is used to justify or critique a decision, especially in governmental organisations such as civil service and the courts. Liekens et al (2014: 14) aver that valuation employs the universal language of money to communicate the "value" of nature to different people "using a language easily understood by dominant economic and political views around the world".

Secondly, Laurans and Mermet (2014: 99) contend that valuation enables making "better" policy decisions about the environment which is carried out by identifying and searching for a political norm (i.e. the "collective optimum") calculated as the collective demand for ecosystem services

[1] Other scholars supporting this point include Bauler and Pipart (2014: 127-128); Marre et al (2016: 56-57); Schokkaert (1995: 71-84); Phelps et al (2017: 17); Schaeffer (2008: 149); Edwards and Abivardi (1998: 242-243); Howarth and Farber (2002: 422); Ring et al (2010: 21); Munasinghe (1992: 233); Baarsma and Lambooy (2005: 460); Stithou and Scarpa (2012: 2); Schuhmann and Mahon (2015: 57); Frank (2014: 103); Spangenberg and Settele (2016: 104-105); and Meinard et al (2016: 73).

which is a "commonly shared and manageable metric" as a rational agent would do. In doing so, the decision-maker—and decision-making—become "relays" who should translate "as faithfully as possible" the results of the CBA process into policy choices with CBA providing both the method to organise and express data and values and the model to make decisions (Laurans and Mermet, 2014: 99). Emphasis has been given to valuation's role in ordering policy priorities amidst scarce government resources (e.g. government revenue, manpower, time) to achieve these goals (Schröter et al, 2014: 517; Neuteleers and Engelen, 2015: 254; Toman, 1998: 59). Market prices can not only inform decision-making by ordering priorities, but also reflect scarcity of a commodity (Schaeffer, 2008: 149; Edwards and Abivardi, 1998: 240; Daly, 1998: 21). That environmental resources besides governmental resources are also scarce has led Marre et al (2016: 53) and Costanza et al (1998: 68) to argue that economic valuation of ecosystem services is "decisive" in judging whether to conserve a natural resource by measuring trade-offs, which is "the 'amount' that has to be given up in order to get something else" (Kontoleon et al, 2002: 177-214). Costanza et al (1998: 68) argue for the need to consider trade-offs. This is especially so when considering that whenever a society makes decisions about ecosystems, it implies valuation as it includes the opportunity costs of using ecosystems for alternative uses (Costanza et al, 1997: 255; Pritchard et al, 2000: 36). Pritchard et al (2000: 36) remind us that the environment cannot be taken for granted as "natural systems are indisputably linked to human welfare, even when they are priced at zero", and further to measure the relative importance of various ecosystem types (e.g. wetlands) which can go towards legislating their protection in "legal and institutional systems".

Economists insist then, that nothing is exempt from trade-offs if resources are scarce and yet economic expansion is still desired, even for so-called "taboo trade-off" between

secular/instrumental value (e.g. money) and sacred/non-negotiable value (e.g. ethics) (Tetlock, 2003: 320; Stikvoort et al, 2016: 253). This is all the more so considering that economists have debunked traditional understandings of macroeconomic management by recognizing that manmade capital (i.e. goods such as machinery and factories used to produce end-consumer goods) cannot substitute for natural resources when manmade capital is made out of the very thing it is supposed to substitute for (i.e. natural resources); if not, it would obviate the need for natural resources to be factored as an input in the production process if manmade capital is its close substitute (Costanza and Daly, 1992: 40-41). This contradicts earlier economic thought (Gatto and De Leo, 2000: 354). Thus, economists argue for the 'internalisation' of external costs of industrial production that employs manmade capital (Spangenberg and Settele, 2016: 104-106). Internalisation includes measuring the monetary costs incurred by development resulting from "marginal" changes (i.e. as one unit of change) to ecosystems (Chan et al, 2012: 745). Prominent economists like Kenneth Arrow et al (1996: 221-222) argue internalisation of such costs can potentially inform many policy decisions, such as cost-effective policy instruments for nature restoration and management and in impact assessments in CBA and payments for ecosystem services schemes by incentivizing stakeholders through monetary inducements to 'reward' them for undertaking particular conservation efforts (Liekens et al, 2014: 13-14). Such thinking on constraints imposed by natural resources on economic growth can be traced back to classical economists such as Adam Smith, Thomas Malthus and David Ricardo, and are advanced by contemporary environmental and ecological economists (Costanza and Daly, 1992: 40).

Thirdly, environmental valuation shows the impact of environmental conservation on local stakeholders (Costanza and Daly, 1992: 40). This is especially important when accountability of

public officials to locals is paramount. Scholars such as Ascher and Steelman (2006: 78) are aware that policymakers risk being accused of ignoring the public interest if they ignore valuation—and advocate for valuation conducted by experts as a solution. The demonstration of the impact of natural resource extraction and exploitation is important when considering that the ordinary citizen is divorced from the background processes that involve the extraction, processing and manufacturing of goods derived from natural resources, especially if they live in urban areas far away from nature. Valuation acts as feedback to society on the consequences of human actions on ecosystems (Liekens et al, 2014: 14). Valuation thus reflects the interdependency between ecosystems and human civilization by revealing the structure and functioning of ecosystems and the complex roles of ecosystems in supporting human welfare—especially when institutions are not functioning well to reflect the costs to society (i.e. social costs) of environmental degradation—by acting as inputs into the construction of indicators of human welfare and sustainability (Daly and Cobb, 1989; Howarth and Farber, 2002: 421-422). Such a view is warranted when humans can enact irreversible changes on the environment which can affect current and future generations (e.g. causing species to go extinct); increased uncertainty on the environmental impact of economic activities; and the sudden loss of biological productivity as environmental changes can drastically reduce the capacity to support human life (Arrow et al, 1995: 93). These prompt Arrow et al (1995: 93-94) to conclude that economic liberalization and economic growth are not substitutes for environmental policy, but it is the process ("content") of economic growth that matters which is dictated by economic institutions: the choice of inputs including environmental resources and the management of outputs, including waste products. Valuation contributes to the "technical" aspect of public accountability by calculating damage compensation in a court of law or setting prices of environmental goods and services in policy (Marre et al, 2016: 53), as seen in 1989 when Nobel

economists Kenneth Arrow and Robert Solow were tasked by Exxon and the Alaskan government to estimate the monetary damages caused by the oil spillage from the oil tanker Exxon Valdez in Alaska.

1.3 Conclusion

This chapter commences by briefly examining the reasons for environmental valuation. While mainstream economists advocate environmental valuation using principles of neoclassical economics, it is not without controversy. One reason for its use is that expressing the value of the natural environment in dollars and cents enables communication to a diverse audience both domestically and internationally comprised of different stakeholders as money is depicted as a universal language or denomination of most countries which are mostly capitalist economies. Furthermore, policymakers tout valuation's ability to produce 'objective' analysis which enables prioritising of government's policy objectives. Such 'objectivity' then, should lead to better decisions made by policymakers using a shared and manageable (i.e. tractable) metric as any rational decision-maker would, which is the second reason. Proponents such as mainstream economists argue that limited public funds and natural resources call for trade-offs to be made. Thirdly, money as a metric enables illustration of consequences of environmental change such as degradation to stakeholders by quantifying these changes. Such feedback is necessary when changes to the natural environment can be irreversible, such as extinction of particular species.

The above reasons make this dissertation useful and urgent all the more. Such urgency is compounded by the dearth of studies that examine the impact of the context on one's WTP. To date, Yogo's (2015) study is the closest as it employs WVS data to examine the impact of context

on one's environmental WTP, but he limits the scope of this study to the impact of the micro context confined to generalized trust. Another study on individuals' environmental attitudes by Axel and Meyer (2010) goes beyond the micro context to account for the macro context using multilevel analysis which this dissertation also employs, but it does not investigate the impact of culture and is restricted in its timeframe of analysis up to year 2000 using data collected from another cross-national dataset, the International Social Survey Programme (ISSP). Considering the widespread citation of Ostrom's works, there has been a surprising lack of empirical analyzes to assess the generalizability of her arguments across countries. This dissertation seeks to plug this gap. Moreover, environmental valuation continues to be given prime importance by policymakers through their endorsement of CBA. For instance, Presidents Ronald Reagan's Executive Order 12291 and William Clinton's Executive Order 12866 are extant but stipulate that all US government agencies should consider all significant costs and benefits of any policy decision including those that cannot be easily quantified, consider all alternatives and select one that minimizes net costs or maximizes net benefits (Hahn and Dudley, 2007: 195). The Australian government, in another instance, has as recent as 2014 published a series of policy guides from several federal agencies advising on how to conduct environmental accounting (Office of Best Practice Regulation, 2014; Bureau of Meteorology, 2013; Baker and Ruting, 2014); serious repercussions can ensue for commercial investments in the country if they neglect these considerations (Geoscience Australia, 2017: 32-33). Other major economies such as the European Union and China are also leaning towards environmental valuation with the support of international organisations such as the World Bank, also termed by policymakers as "natural capital accounting" in mainstream media (Liu and Costanza, 2010: 1387-1388; Delegation of the European Union to China, 2017; WAVES Secretariat, World Bank, 2018). The widespread

adoption of environmental valuation by major economies in both the West and increasingly the East attests to the importance of this research, as well as its urgency when outstanding problems in environmental valuation remain. It is with this view that the next chapter, Chapter 2, reviews the process of environmental valuation and its more commonly applied approaches. A more thorough understanding of this process enables examination of one criticism of environmental valuation which is economists' neglect of the interpersonal element or micro context when eliciting individuals' WTP in the form of monetary bids.

CHAPTER 2 DISCUSSION OF VALUATION METHODS AND MICRO CONTEXT

2.1 Introduction

This chapter explains the process of environmental valuation and reviews arguments for Elinor Ostrom's micro context. This follows from the previous chapter which highlights policymaking as the main reason for environmental valuation—though not without controversy. Thus, describing how environmental valuation is applied using different approaches—stated and revealed preference approaches—at this juncture is apt as it helps to set the stage for discussing the criticisms of environmental valuation in revealing individuals' true preferences from the angle of context which can be divided into micro and macro contexts. Critics will argue that a chief problem of environmental valuation is that it has overlooked the problem of strategic bidding when WTP bids are elicited from individuals. Individuals can factor in the possible bids of other individuals in a community such as a country when they should not do so as they should evaluate the value of a natural resource based on the utility the individual obtains from it; accounting for other individuals' bids distorts calculations of the utility of the environmental good or service measured in terms of monetary WTP as a proxy measure. To explain this further, the next section will briefly summarize the process and approaches to environmental valuation. This is followed by a critical examination of the criticism that environmental valuation has neglected the micro context, specifically the phenomenon of strategic bidding. This chapter concludes with a debate that shows that some scholars suggest interpersonal trust and reciprocity as explanations and solutions to the problem of strategic bidding although others dispute their usefulness.

2.2 Process of environmental valuation

The inefficient allocation of environmental goods and services in the economy has been a prime reason for justifying economic valuation of these goods and services. Such inefficiency stems from the inability of the market to price such environmental commodities and functions to account for their negative spillover effects when people use them. An absence of market prices for environmental goods and services has been explained as a matter of "missing or incomplete property rights" assigned to these goods and services (Schaeffer, 2008: 147), property rights which are necessary in order to determine their prices from their owners' viewpoint (elaborated below). Hence, this explains the main objective of environmental valuation of ecosystem functions and the natural resources generated from them, which is "to generally indicate the overall economic efficiency" of their various competing uses. The underlying assumption is that the main criterion for determining such allocation is whether resources in a given way "yield an overall net gain to society, as measured through valuation in terms of the economic benefit of each use adjusted by its costs" (Kumar and Kumar, 2008: 810). Achieving efficiency defined in this way applies also to CBA in which environmental valuation provides inputs in terms of monetized benefits and costs (Soma, 2006: 31). The technical application of calculating such value specifies that a particular concept of value in environmental economics ought to be calculated known as the "total economic value (TEV)" of a natural resource or an ecosystem (Liekens et al, 2014: 14; Soma, 2006: 33). While discussion on TEV is beyond the scope of this paper, it suffices to note that TEV is actually made up of many components of value that include the various types of values based on how the resource or ecosystem is currently used: in its direct (direct use value) and/or indirect (indirect use value) usage, as well as values that do not depend on mere usage (i.e. non-use values) which include their reservation for future generations' appreciation (bequest value), the intrinsic value of

these environmental entities (existence value) and value based on as yet undiscovered usage (option value) (see Plottu and Plottu, 2007).

Economic valuation is essentially predicated on the treatment of the environmental good or service as a commodity, since their 'values' or monetary worth is essentially determined in the context of an exchange in the market that possibly or actually occurs. Hence, some scholars have argued that economic valuation in this respect is useful to calculate the opportunity cost of conservation as mentioned previously; this approach is applicable until people stop treating the ecosystem functions and the natural resources generated, i.e. nature, as a commodity (Azqueta and Delacámara, 2006: 531). The economists' conception of "nature", specifically when applied in CBA, is treated as synonymous with the term "natural goods", which is "generally understood to be a bundle of commodities that can be assigned monetary value" (Soma, 2006: 32). This conception is contingent on more assumptions. One is assuming an accounting price for such environmental entities known as "shadow price" (see Dasgupta, 2001: C5; Stern, 2015: 153) since they are not normally traded on the market but are implicitly traded off against one another as a result of human expansion into the biosphere in order to calculate the utility gained from using one additional unit of the environmental good or service (Daly, 1998: 21). Another assumption is the adoption of a particular view of human behavior: an individual is assumed to have "purely individual consumer interests, wants to maximise individual utility, and is characterised by individual rationality"; in short, collectively described as *homo economicus* (Soma, 2006: 32). The full value of the natural resource or service is calculated by aggregating these "preference values" of relevant individuals (Soma, 2006: 32), as measured according to TEV abovementioned. To elicit these individuals' underlying "preference values", respondents are typically asked via surveys to

state their WTP for conservation as in stated preference techniques, and/or are observed from the prices of goods and services they paid in actual markets that proxy for the target environmental good or service as with revealed preference techniques. Commodity as a concept, in this context then, is defined simply as "an object (or service) produced for exchange and sale" (Soma, 2006: 33).

Economists see the market in the context of environmental valuation as distinct from the political sphere. This is noted in the "anti-politics" stance of mainstream economists who argue that valuation done by economics experts is necessarily consequentialist as opposed to deontologically based; who are suspicious of political activism as a poor measurement of "intensity of commitment" to environmental conservation; and assure that valuation does not precede timeless non-negotiable rights (e.g. the right to clean air) (Ascher and Steelman, 2006: 81-82). More specifically, the economic process of decision-making—relying on the *homo economicus* assumption of human behavior—is viewed as superior to the political process as economic "voting" in terms of prices is preferable to political voting in terms of referenda as the former is "closer to voters' intentions" such that the voter need not buy something that he/she does not like while referenda on the other hand cannot be held every day on every economic decision even if desirable; and that money can be used to express one's underlying "intensity of preference" (Pearce and Nash, 1981: 7). In situating their defense of the economic process, economists define the market as "any context in which the sale and purchase of goods and services takes place" (Chee, 2004: 551), which is an "institutionalized voluntary trade" (Neuteleers and Engelen, 2015: 254): people's relationships are based on "voluntary exchange" as participants in the market. Each

individual obtains what he/she wants by offering some "equivalent benefit in return" (Miller, 1989: 18).

From a more technical angle, the concept of the marginal is integral to environmental valuation in calculating impacts in monetary terms resulting from a unit of change in ecosystems. Economists aver that marginal valuation is used to mimic markets and obtain values that can be compared with the economic measure of value (Daly, 1998: 21; Costanza et al, 1997: 253; Pritchard et al, 2000: 36; Farber et al, 2002: 388). Costanza et al (1997: 255), in particular, justify that marginal changes in quality or quantity of ecosystem services "have value insofar as they either change the benefits associated with human activities or change the costs of those activities". As the full impact from environmental change (i.e. degradation) is hard to envisage, let alone quantify, economists recommend that marginal change instead of total change in ecosystems be inputted into CBA (Schuhmann and Mahon, 2015: 57, 58; Ninan and Inoue, 2013: 147). Such changes to the environment are anthropocentric arising from either conserving or degrading the environment, with the impacts from one unit of change in environmental conditions calculated as monetary impacts on individuals. Money thus becomes the standard unit of measure as value can be determined by utility measured in monetary WTP to effect a particular hypothetical change in the environment if individuals do not possess prior ownership over the environment, or as willingness-to-accept (WTA) compensation for a hypothetical change in the environment if they already own the ecosystem or natural resource (Farber et al, 2002: 378). Thus, the marginal utility theory of money is significant to the evolving concept of ecosystem valuation as it can be used to measure use values and not just exchange values in monetary units where such values are determined by the prior private ownership of the resource (Farber et al, 2002: 378). These values denominated in

monetary prices are then inputted into a formal mathematical model to determine the optimal allocation of resources which is seen as a necessarily "reductionist" process in order to be 'objective' in determination of policy as opposed to the 'subjectivity' that the political process is prone to (Zafirovski, 2008: 801).

2.3 Environmental valuation approaches

This section introduces briefly the various approaches that environmental valuation employs. Their methodological advantages and disadvantages are not discussed, however, as they have been addressed extensively elsewhere.[2] It is also beyond the scope of this chapter which aims to focus on valuation in general, particularly on the problems with the exogeneity of individuals' preferences (see further below). Chee (2004: 553-556) has identified three main categories of valuation approaches[3]: "simulated market" approaches or stated preference approaches; "surrogate market" approaches or revealed preference approaches; and "market-based" approaches.[4] Only the

[2] See, for example, Gatto and De Leo (2000: 348) and Schuhumann and Mahon (2015: 57-58) for a list of environmental valuation methods; Meinard et al (2016: 71) on stated preference and revealed preference methods; and Munasinghe (1992: 228, 229) on taxonomy of valuation methods according to actual versus potential behavior, and conventional market versus implicit market versus constructed market.

[3] See Chee (2004: 553-556) on market-based (production approach, e.g. production function, replacement cost), surrogate market (revealed preference; e.g. travel cost method, hedonic pricing) and simulated market (stated preference; e.g. contingent valuation) valuation techniques. See also Liekens et al (2014: 17); and Ascher and Steelman (2006: 75-76) for stated and revealed preference approaches.

[4] Market-based approaches can be split into two sub-classifications: 1) one relying on how negative changes in ecosystems affect consumer's expenditures in the market to combat these changes; and 2) relying on the revenue producers lose as a result of reduced output or increased production costs as a result of these changes. Two approaches belong to the former category: avoidance cost approach also known as averting or preventive expenditure approach, and restoration cost/replacement cost approach. The production function approach belongs to the latter category.

For a sample of the literature on the avoidance cost approach, see Field and Field (2002: 145); Gilpin (2000: 191); Pearce and Moran (1994: 70); Tietenberg and Lewis (2012: 92); and Kolstad (2011: 179).

For some information on the restoration cost approach, see Connelly and Smith (1999: 137); Hufschmidt et al (1983: 266-268); O'Connor (2000: 6); and Wittmer and Haripaya (2012: 64).

stated preference/simulated market approaches and revealed preference/surrogate market approaches will be discussed in this chapter as environmental valuation has been critiqued mostly with respect to these two approaches. Note that this is not the only way to classify the various approaches,[5] but it is the more common way.

2.3.1 Stated preference approaches

Stated preference methods are approaches that are used when economic values of the good are "not directly observable" (Tietenberg and Lewis, 2012: 82). They are also known as "simulated market" approaches because a hypothetical market is constructed for the purpose of simulating the act of buying the environmental good or service as if it were traded on actual markets. The stated preference approaches introduced here are the more common ones which are contingent valuation, discrete choice experiments and deliberative monetary valuation.

Contingent valuation (CV) is a stated preference approach where monetary values of the resource that have not been observed are obtained by asking respondents about their preferences in hypothetical scenarios (Hufschmidt et al, 1983: 233). The method is "contingent" because of its reliance on placing respondents in certain hypothetical or contingent situations (Field and Field, 2002: 151; Munro, 2010: 103). It involves directly surveying respondents on their valuation estimates, whether in terms of their WTP to accept or prevent a change to the environment, or

For some reference on the production function approach, see Perman et al (2011: 451); Vincent (2011: 38); Garrod and Willis (1999: 21-23); Madhoo (2010: 36); Sinden and Worrell (1979: 283); Field and Field (2002: 140); Spash (2000: 8); and Connelly and Smith (1999: 137).

[5] For other typologies such as "demand curve" approaches as opposed to "non-demand curve" approaches, see, for example, Turner et al (1994: 114-115). Suggestion of other categories can also be found in Munasinghe (1992: 228, 229) on taxonomy of valuation methods according to actual versus potential behavior, and conventional market versus implicit market versus constructed market as mentioned above.

WTA compensation in forgoing or tolerating a change in an environmental good or service (Pearce and Moran, 1994: 50; Field and Field, 2002: 151). Three parts make up a CV survey: description of hypothetical scenario and environmental good or service; elicitation of monetary values from respondents; and questions on socioeconomic and demographic characteristics of the respondents (Pearce and Moran, 1994: 51; Haque et al, 2011: 31-32; Kolstad, 2011: 204). CV is not a single method but a class of methods (Haab and McConnell, 2002: 114) as a variety of questions have been utilized to elicit values from respondents: dichotomous ("yes or no"); open ended; payment cards with pre-specified ranges of amounts: bidding games; convergent direct questioning involving narrowing upper and lower bounds to an "equilibrium value"; trade-off games involving ranking varying amounts of money and environmental attribute in pairs to the point of indifference; money-less choice method specifying commodities in lieu of cash payment; and priority evaluation methods where respondents distribute a given sum of money over environmental attributes at varying levels (Pearce and Moran, 1994: 51-52; Field and Field, 2002: 152; Gilpin, 2000: 194-195). Later versions of CV surveys incorporate follow up questions on respondents' WTP or WTA to cross-check their valuations against their motives or attitudinal beliefs (Garrod and Willis, 1999: 192; Perman et al, 2011: 416).

Discrete choice experiments are stated preference methods as individuals are asked about their valuations by stating their preferences from among the alternative bundles of goods and services (Spash, 2000: 10). Respondents are presented with alternatives including a baseline alternative that acts as a status quo option and are asked to choose their most preferred alternative. Status quo alternatives are necessary to translate relative values in choice modeling approaches to absolute values useful for CBA (Bateman et al, 2002: 251). However, monetary values for environmental

goods and services are obtained not from respondents' stated values, but from the implicit trade-offs that individuals make in response to changes in environmental attributes in the profiles of each alternative presented. Single or repeated choices from various sets of valuation reveal the trade-offs individuals make (Garrod and Willis, 1999: 203-206). The main objective of choice experiments is to determine the trade-offs between differences in the levels of attributes and costs (Perman et al, 2011: 430). Economic values of environmental attributes are calculated from the trade-offs individuals make among alternatives in terms of monetary and non-monetary attributes and their levels as they select their most preferred alternative (Wittmer and Haripaya, 2012: 67). Analysis utilizes the random utility model on the assumption that respondents select their best alternative which can give them the maximum utility among alternatives (Perman et al, 2011: 432; Grafton et al, 2004: 264).

Deliberative monetary valuation (DMV) is a stated preference approach that is more pluralistic than individual-based approaches like CV above. People are assembled in groups to discuss the environmental issue or good of interest in order to subsequently arrive at a monetary value, whether independently or consensually. Also known as participatory approaches, it has three main goals: "to frame policy issues in broad terms, including all sectors of society and the natural environment"; "to render the style of decision-making more responsive to democratic principles"; and "to improve the quality of decisions by incorporating different perspectives and accessing a variety of resources" (De Marchi and Ravetz, 2001: 16). Such a method allows respondents to bring to fore individual interests before the group in at least six different formats (De Marchi and Ravetz, 2001: 7-9) ranging from focus groups to coercive dialogue varied according to the purpose of the group (e.g. for research, legitimation, voice), size of participants (ten individuals in focus

groups to protest crowds in coercive dialogue) and degree of spontaneity. Another technique focuses on consultations solely with epistemic communities, i.e. knowledgeable "experts", to deliberate in successive rounds in order to ultimately arrive at a consensual value known as the "Delphi technique" (Gilpin, 2000: 196; Hufschmidt et al, 1983: 251-252). Questions asked in the DMV process concerning the value of the environmental good are directly tabled to individuals. Deliberative bodies may be mobilized when authorities are uncertain in their policy formulations or desire to canvass broad consensus prior to policy implementation (Munda, 2000: 13).

2.3.2 Revealed preference approaches

Revealed preference methods are those approaches "based on observable choices that allow resource values to be directly inferred from those choices" (Tietenberg and Lewis, 2012: 82). These are also known as "surrogate market" approaches as monetary values of the environmental good or service are observed from prices consumers paid for these goods or services (e.g. timber), or other goods and services treated as proxy or surrogate for the target good or service as they are made from them and traded in actual markets (e.g. entrance fees to a nature reserve). Commonly used revealed preference approaches are covered here which include travel cost method, hedonic pricing and market price.

The travel cost method (TCM) is a revealed preference approach as it relies on travelling expenditures individuals incur to proxy for the value of an environmental site. Consumer surplus is calculated from the demand function based on aggregated information on respondents' demographical characteristics, their travel and recreational expenditures, frequency of visits and their motivations for visiting (Wittmer and Haripaya, 2012: 65). It relies on "observed expenditures

on the travel to recreational sites to estimate the benefit arising from recreational experience" (Pearce and Moran, 1994: 65). Two premises underlie TCM. Firstly, weak complementarity is assumed between demand for an environmental good which is the recreational site and the private good which is the travel, computed in terms of frequency of visits and costs of travelling (Haque et al, 2011: 31-32; Kolstad, 2011: 26; Garrod and Willis, 1999: 55). Changes in the quality and availability of the site do not affect utility if the site is deemed too expensive and no trips are made (Perman et al, 2011: 435). Secondly, costs in terms of money and time spent can be assumed to be the economic values individuals place on the environment (Kirkpatrick, 2000: 118). Several models of TCM exist, but three primary models have been oft-noted: the zonal travel cost model with geographic zones as basic unit of observation; the individual travel cost model with observations of the behavior of individuals; and the random utility model to account for substitute sites (Kolstad, 2011: 191-192).

The hedonic pricing (HP) model is a revealed preference approach as preferences of individuals are inferred through their WTP for goods in proxies or "surrogate markets" where the environmental good or attribute is actually traded (Palmquist, 1999: 765; Pearce and Moran, 1994: 71-72; Al-Kandari, 1994: 372-373). HP models are applied to markets with "differentiated products" that possess same characteristics but vary in attribute levels (Palmquist, 1999: 765). Specifically, the HP model is applied to residential property and labour markets by measuring the value of the environmental good or service in terms of increments in premium individuals pay through housing purchases, or salaries received for an incremental change in the environmental characteristics of the occupation (Haque et al, 2011: 27-31). The hedonic property model identifies the measure of environmental amenities by comparing property prices at different locations while

the hedonic wage model calculates the environmental "bad" such as exposure to pollution in terms of the wage "premium" workers accept in return for exposure to pollution (Connelly and Smith, 1999: 133-134). Hedonic price theory estimates the value of an environmental good or service as one of the attributes influencing the observed price of the housing commodity or job (Kolstad, 2011: 164; Hanley et al, 2007: 352). Two steps are essential to valuing the environmental attribute: firstly, calculating the marginal prices of the environmental characteristics in the hedonic price function, followed by linking these prices to the socioeconomic and wealth attributes of respondents to measure consumer preference for the environmental attribute (Palmquist, 1999: 766-767; Hufschmidt et al, 1983: 197, 201, 202; Garrod and Willis, 1999: 93). HP models operate on the assumptions of individuals possessing perfect information on prices and attributes of different properties and jobs, perfect mobility in terms of relocation and job search, as well as perfect markets free of price and wage controls (Perman et al, 2011: 445; Gilpin, 2000: 193; Hufschmidt et al, 1983: 213-214). Weak complementarity between expenditures made on a market good (e.g. particular characteristics of property or occupation) and utility gained from the environmental good is also assumed (Hanley et al, 2007: 353).

The market price approach is a revealed preference approach as the value of an environmental good or service is calculated from the products or services derived from ecosystems that are bought and sold in markets (King and Mazzotta, 2015). The market price approach is a direct approach as value of the environmental commodity is calculated from goods and services that are directly traded on the market, such as timber, fish, and greenhouse gas emissions (Wittmer and Haripaya, 2012: 61). Consumer and producer surpluses as benefits gained over and above the price and cost of the good, respectively, are measured to calculate the change in the TEV of an environmental

good or service as a result of the change in the supply of the traded good (Mishra, 2015; Madhoo, 2010: 36; Hanley et al, 2007: 356). This approach assumes that total consumer expenditure is a measure of total benefits (Sinden and Worrell, 1979: 278).

2.4 Discussion: micro context

This section examines the criticism of strategic bidding against environmental valuation which relate to Ostrom's micro context (further elaborated on in Chapter 5). I view that current research does not explain how individuals within a homogenous group such as a country or even in a village or tribe arrive at different valuations. Theoretically, significant variations among individuals' behaviors such as values elicited should not be observed in a group that is driven by a dominant culture (Bachmann, 2010: 90). However, respondents demonstrated a variety of responses when asked of their preferences via values elicited such as through CV. Variations in responses have been observed through strategic bidding which is a sign that individuals engage in strategic behavior thus demonstrating strategic interdependence among individuals (Shepsle and Bonchek, 1997: 202). Such a criticism is further critically examined below.

2.4.1 Strategic bidding as a sign of strategic behavior showing strategic interdependence among individuals

The endogeneity of one's preferences is observed when the context exerts an influence on one's monetary bids through the bids of other actors involved. When monetary bids are forthcoming, the phenomenon of strategic bias is observed where some respondents bid values *in situ* not (just) due to their appraisal of the good or service in question but also their expectations of other respondents' WTP; which is characteristic of "free-rider" situations (Pearce and Moran, 1994: 50, 52-53;

Kriström, 1999: 784-785; Gilpin, 2000: 195; Hufschmidt et al, 1983: 253; Madhoo, 2010: 41; Tietenberg and Lewis, 2012: 83; Perman et al, 2011: 425; Hanley et al, 2007: 341; Grafton et al, 2004: 259; Al-Kandari, 1994: 374). Paul Samuelson (1954: 387-389) was the first to mention the risk of strategic bias when using surveys to elicit responses. However, free-riding as a problem can be traced back to Hume, Hobbes and Rousseau who were among the first scholars to address it (Dougherty, 2003: 240, 250). Strategic bias suggests that environmental goods and services possess an interdependency quality that stems from its public good character. Public good has two features. Non-rivalry is one feature that generates interdependence as consuming it does not decrease the supply for others to consume (i.e. "joint consumption"). Non-excludability as the second feature creates the risk of free-riding as agents can use a resource without paying for it which increases other actors' costs of paying for the resource; this in turn decreases the latters' willingness to contribute to the joint provision of the resource (Paavola and Adger, 2005: 356).

Some explanations have been proposed to explain this disparity—as opposed to uniformity—in valuation bids across individuals for jointly-provided environmental goods and services. One explanation is the relative income hypothesis which posits that it is not necessarily that non-satiation in terms of having more of a good as proxied by one's income necessarily equates with greater satisfaction, "utility" or "happiness". This is because individuals vie for status goods to distinguish themselves from the rest of the population (Sagoff, 2007: 75-76; Spash, 2011: 359). People's relative incomes affect how they value the environment through paying less or none at all believing that others who are richer should "bear the burden" by paying more as their 'fair share' as experiments on primates suggest (Gowdy, 2008: 636). Gowdy (2008: 641) suggests that people would be more inclined to pay more if they obtain public recognition for their contribution.

Spash (2011: 359) submits that an individual's pleasure, however defined, cannot be divorced from his/her social context as to divorce it is to treat *homo sapiens* as hedonists and deny the "human potential and richness of human relationships", or the "uniqueness" of humans as "highly intelligent social animals" as Gowdy (2008: 636) puts it. Several scholars contend that human beings cannot be reduced to the "economic man" or *homo economicus* as neoclassical economics has been accused of. Siebenhüner (2000: 17, 18) argues that it is not that *homo economicus* is necessarily an egoist or a utility maximising consumer in Söderbaum's (1999: 164) and Nyborg's (2000: 305) views. This is because they may have preferences for "social states" beyond their "consumption preferences" as Arrow (1963: 17f) demonstrates, but that *homo economicus* cannot be assumed to have an interest in sustainable development as he/she gains nothing from it. In fact, their interests in common welfare (e.g. democracy, sustainable development) can ironically lead to "suboptimal and critical" outcomes, such as growth of government bureaucracy and greater inefficiency in the welfare state (Faber et al, 2002: 325). This is because *homo economicus* should not abide by fixed rules (Faber et al, 2002: 324) but be opportunistic and calculative in order to maximise personal welfare (i.e. "welfare optima") via market exchange (Debreu, 1959).

Suboptimal and critical outcomes are actually observed when money is used to induce desired behaviors which can ironically reduce cooperative behavior by crowding out such behavior as individuals are primed to act in more self-interested ways in order to reduce their dependency on others as well as wanting others not to depend on them (Gowdy, 2008: 635). That experiments on human behavior have shown that it is impossible for human beings to abandon their proclivity to bargain such as sharing in ultimatum games suggests reciprocity as experimental evidence (Gintis, 2000: 319), but also that the *homo economicus* model of human behavior is neither deterministic

nor definitive as the only model of human behavior (Faber et al, 2002: 325). In fact, Gowdy (2008: 637) ventures that human behavior is "culturally conditioned" by rewards and punishments that is dictated by social (i.e. cultural or institutional) norms, notwithstanding that such norms vary across societies and can conflict with other norms. As a corollary, incentives from environmental conservation (e.g. reduction in costs to businesses or pricing future costs and benefits to future generations to achieve "competitive equilibrium") are also culturally (institutionally) determined by adhering to social norms (Gowdy, 2008: 639). Gowdy (2008: 639-640) sees that consumerism and materialism have culturally conditioned human behavior to attain "social status through conspicuous consumption" but argues that this pattern of behavour is no more "natural" than the other myriad patterns in history. Thus, to ensure interpersonal cooperation given the global scale of climate change, Gowdy (2008: 641, 642) advocates fostering interpersonal trust in cooperative institutions, punishment of free-riders, payment of "fair share" (e.g. taxing rich countries to transfer money and technology to give to poor countries) and embracing others as fellow citizens. However, mainstream economists such as Shogren (2012: 355-356) argue it will be difficult for the policymaker to design a mechanism based on who is susceptible to effects of crowding out "willingness to do the good deed" or individuals who are intrinsically motivated to conserve the environment, and likewise those who are susceptible to the effects of "crowding in" efforts to do good deeds or who possess an extrinsic motivation (e.g. monetary rewards) to protect the environment. Shogren (2012: 356) concludes that the interaction between intrinsic and extrinsic motivations matter to environmental policy.

Strategic interdependent behavior is also influenced by the choice of policy instruments such that interpersonal trust and reciprocity may be as important as individual rationality and strategic

behavior in explaining outcomes, with normative motivations playing a parallel, crucial role in influencing individuals (Vatn, 2005a: 212). Reciprocity, or "a reciprocal relation", can be defined as "a series of bidirectional transfers, independent of one another yet interconnected. Since independence here implies that each transfer is in itself voluntary; thus a transfer from one side is reciprocated by another from the opposite side. Therefore, by analogy, a reciprocal relation is one that takes "an intermediate position between market exchange and pure altruism"" (Zamagni, 2004: 19). The policy instrument takes the form of payment mechanism such as an income tax or a trust fund, and is influenced by the institutional arrangement which administers the payment mechanism, such as a government or charity (Spash, 2002: 668-669). Thus, besides one's perceptions of any change to the natural environment, the payment mechanism can also account for framing effects which may arise from the absence of a psychological anchor for individuals to measure changes in the environmental good or service (Spash, 2002: 668-669). Together with the task factors that are general characteristics of a decision problem (e.g. number of alternatives) and context factors that describe differences among these alternatives (e.g. similarity of alternatives) that Payne et al (1992: 108, 129-130) mention, the policy instrument can influence how alternatives are framed, i.e. presented, to the decision-maker.

The policy instrument is important *not* because it may affect one's preferences for framing effects may have "nothing to do" with preferences as scholars such as Vriend (1996: 275) allege, but because "opportunities may be perceived differently when the choice is framed differently" even for the same individual who applies the same preferences for different policy instruments such as different payment mechanisms, e.g. tax or donation (Vriend, 1996: 275). In short, the policy instrument affects how one expresses one's pre-existing preferences when affected by framing

effects (Alevy et al, 2011: 375), such that framing effects can lead to violations of axioms of invariance, dominance, independence and transitivity as have been observed (Vriend, 1996: 275). The typical method to overcome the problem of strategic bids is to remove them (or "laundered out") before calculating welfare benefits and costs of the project based on the retained responses, as are protest responses which are outlier monetary bids submitted not as intended bids but as expression of one's opposition to monetising the environment (Willis et al, 1996: 390; O'Neill, 2001: 1866; Ludwig, 2000: 34). Christian Becker (2006: 18) argues that this exclusion of protest bids and strategic responses is unfair as the "crucial question" is not whether the conception of the human being as *homo economicus* can be disproved as it is a "construct" or "abstraction", but whether *homo economicus* can be adopted as a "suitable" construct and if not, whether other alternative conceptions of the human being might be possible. Becker (2006: 19) implies the latter by drawing evidence from modern biology, psychology and experimental economics to demonstrate the interdependent nature of human beings. Instead, Becker (2006: 19) advocates for a *homo ecologicus* conception of the human being that not just emphasizes human beings' dependency on nature for sustenance, but also outlines human beings' "responsibility for nature" drawing from romantic natural philosophy (one identifies with nature as self via sympathy with "natural beings" as humans depend on nature for creative ideas and products in an economy; Becker 2006: 20) and virtue ethics (nature offers practical lessons to human beings through personal encounters with nature that constitute "environmental education"; Becker, 2006: 20, 21).

Strategic bidding manifests in several ways. Firstly, strategic interdependent behavior may be seen in individuals who underbid or overbid which obscures their underlying preferences. Several scholars (e.g. Veisten, 2007: 222; Gatto and De Leo, 2000: 350; Munda, 1996: 163-164) observe

that the non-rivalrous and non-excludability features of public goods like nature parks may prompt individuals to underbid in their actual payments by paying only part of their "true" WTP or nothing at all to see if others would pay enough to have a project implemented, or overbid in hypothetical payments in CV surveys to push for a conservation project but do not expect to pay for the amount they stated in these surveys. Farley et al (2015: 244) contend that most environmental problems can be characterised as prisoner's dilemmas "best solved through cooperation, not competition". They advance cooperation as the best solution as no market will trade in goods that are non-excludable which is freely available and non-rival which prices economic surplus for such a good at zero (Farley et al, 2015: 249). Strategic bidding appears to account for the endowment effect among other factors due to one's strategic considerations in not revealing weakness during bargaining over giving up ownership of the product (Sunstein, 1993: 228).

Secondly, strategic behavior is observed in some protests against natural resource extraction on grounds of health or inequity interpreted or framed as "Not In My Back Yard" (NIMBY) responses (Avci et al, 2010: 230, 234). NIMBY-ism can rear its head when sites of least political and legal resistance are chosen for hazardous waste facilities because of the economic disenfranchisement of minorities who lack the will to resist such siting plans (Hamilton, 1995: 111), a phenomenon which Hamilton (1995: 109) terms as "environmental racism".[6] From a Coasean perspective, environmental racism occurs when profit maximizing firms choose to locate waste processing sites and other sites producing negative externalities in neighborhoods where individuals are poor, lowly educated and often identify with a particular ethnicity and thus unable to elicit high WTP

[6] Hamilton (1995: 109) defines environmental racism with respect to two distinct features: 1) "environmental outcomes are associated with minorities" that have their roots in the "disparities" they face in non-environmental institutions and markets; and 2) environmental outcomes are a result of "actions made with discriminatory intent", such as in housing or labour markets that ultimately affect where minorities choose to live.

which can depress legal compensation in cases of liability (Hamilton, 1995: 110). A CXN explanation of environmental racism, however, views that minority groups may not be able to overcome free-rider problems and CXN problems to collectively demand compensation from the hazardous waste facility through the political process (e.g. via public complaints) (Hamilton, 1995: 110, 117). An alternative explanation using the pure discrimination model argues that the owner of the waste facility, a politician, or constituents of a political ward gain utility by trading off profits for prejudice towards minorities (Hamilton, 1995: 109). The pure discrimination model, Coase theorem and theory of collective action are all encompassed in Hamilton's (1995: 111) notion of institutional racism. Hamilton (1995: 111, 122, 128) finds that siting facilities tend to contain a higher proportion of minorities, poor families, lower median household incomes and smaller proportion of the population with high school educational attainment, which is bolstered by the Commission for Racial Justice (1987) report.[7] Hamilton (1993) in an earlier study finds a negative relation between the proportion of nonwhite populations in an area and the likelihood to reduce commercial hazardous waste processing. It is only through political activity of the residents such as via voting at the local level that can reduce the likelihood of a facility siting there (Hamilton, 1995: 129). The emotions evoked during such NIMBY protests may generate feelings of outrage similar to that when people are asked their WTA compensation for giving up some part of the environment to be traded off for monetary compensation (Sunstein, 1994: 835; 1993: 249).

That the choice of policy instrument can influence individuals' choice behaviors but also expression of their underlying preferences—whether actual preferences or preferences expressed

[7] The Commission for Racial Justice (1987) report finds that hazardous waste facility sites in the United States had twice the proportion of minorities (24%) compared to sites without the facility, and that 60% of Hispanic and black communities live in communities with "an uncontrolled hazardous waste site".

in an opportunity set—comport with the cognitive aspect of institutions as they influence the type of logics underlying people's behaviors that in turn influence the "institutional frames" people apply to comprehend and act in a situation and how to influence these frames that people use (Vatn, 2005a: 215). The institutional frame forms the "context dependency" of the valuation instrument that is crucial to understanding the individuals' perceived incentives to misrepresent their pre-exising preferences via bids (Mitchell and Carson, 1989: 235-259). Thus, one solution proposed is to deliberately not specify "clear and credible implementation rules" of enacting a policy in order to avoid strategic responses (Schläpfer, 2016: 36). However, Sen (1995: 30) criticises the vagueness of CV questions as CV surveyors can just be as "strategic" as respondents in eliciting information by "shaping" CV questions. Yet, Bartkowski and Lienhoop (2017: 557) counterargue that concerns with strategic behavior is "less relevant" if the goal of stated preference valuation is to raise awareness of environmental issues and demonstrate calculations of relative values rather than to inform CBA. Some have even advanced that strategic behavior is not as endemic as neoclassical theory might predict and can be mitigated by eliciting bids in a more indirect way (such as using the dichotomous choice format of elicitation) (Bartkowski and Lienhoop, 2017: 558). Indeed, Mitchell and Carson (1989) as the pioneers of the CV technique argue that strategic bias is not a major problem for the following reasons: 1) CV requires large amount of information; 2) CV conveys the impression that the large number of respondents surveyed would mean that their WTP do not influence overall outcome; 3) payment vehicle reminds respondents of their budget constraint; and 4) respondents are under the impression that underbidding might discourage the provision of the public good. Indeed, Arrow et al (1993: 4606) propose that a dichotomous choice yes-no question can avoid strategic interdependence provided that referenda on provision of public goods are common in the locality surveyed and that the CV survey is taken seriously.

Yet, the threat of strategic behavior remains. Börger (2013: 156, 163), for example, argues that even if strategic behavior can be mitigated, valuation can elicit socially desirable responses in CV which are influenced by social or cultural norms perceived by the individual such as fear of social disapproval rather than desire for social approval, such as preserving the environment which is a socially desirable norm (Arrow et al, 1993: 157). This threat of socially desirable response is compounded by the hypothetical nature of CV survey questions and the costless consequences to the respondent who answers them (Börger, 2013: 157).

Another possible solution to attenuate the effects of strategic behavior is to inculcate trust among the valuers to encourage them to cooperate with one another based on their underlying preferences. Observers have noted that even markets also depend on "some level" of trust to honor commitments (e.g. deals, agreements) as businesses transacting based on purely strategic behavior may erode trust to the point of overly high transaction costs (such as over-regulation to ensure compliance) (Vatn, 2005a: 214; Soma, 2006: 39). Selfish agents' exploitation of situations based on individuals' goodwill or voluntary commitment can lead to free-riding (Vatn, 2005a: 214; Gatto and De Leo, 2000: 350). Trust in two forms benefits society: "vertical trust" between citizen and state by expanding the scope of problems that require governments to deal with (Scholz and Lubell, 1998: 399), and "horizontal trust" between one citizen and another which reduces the need for monitoring and punishment, i.e. costs of cooperation (Ostrom, 1990). Increased trust among individuals can lead to high levels of civic cooperation which, Owen and Videras (2006: 828) argue, are "more important" in "determining" support for environmental protection over economic growth in low income countries than high income countries. Such explanations are part of the social capital literature that can apply to differences in political and economic performances across

nations as well as across sub-national jurisdictions (Ostrom and Ahn, 2003: 7). Even *perceptions* of trust and duty among a sufficient proportion of citizenry can resolve social dilemmas while reducing the cost of enforcement (Scholz and Lubell, 1998: 413). Without trust, cooperation among individuals would have to rely on altruism or fear of punishment (Scholz and Lubell, 1998: 400), but violators in large groups are less likely to be caught because costs of monitoring and punishment are much larger (Hardin, 1982; Ostrom, 1990). To illustrate, Scholz and Lubell (1998: 411, 412; see also Farley et al, 2015: 249) show that citizens will meet their obligations to the country (e.g. tax compliance) as long as they trust other citizens and political leaders to honour their social contract obligations, even after controlling for effect of internalized sense of duty and fear of being punished for non-compliance.

Thus, institutional arrangements can affect WTP because whether respondents are willing to pay depends on their views about the institution's level of effectiveness, reliability and trustworthiness to honor individuals' commitments to pay for the public good based on their underlying preferences (Bateman et al, 2002). Institutions can affect WTP in two ways: low trust in the institution's ability to supply the good may lead to "institution-related bias" which can generate high protest response rates, and choice of institution can affect the accuracy of the estimated values of the good (Remoundou et al, 2012: 382). This is evident in the payment vehicle bias which shows that the payment vehicle—and thus, trust in government—is important to respondents in deciding whether they should bear the responsibility to pay rather than the government (Blamey, 1998: 63-64). Mitchell and Carson (1989: 237; see also Shogren, 2012: 355) define payment vehicle bias as "where the payment vehicle is either misperceived or is itself valued in a way not intended by the researcher". Symptoms of the bias include respondents' confusion between a purchase model and

a contribution model, insensitivity of WTP to the problem (e.g. a threat to species) and the intervention to alleviate it (e.g. provision of wildlife refuges), and correlation between WTP for public goods and importance and emotional impact of the problem (i.e. warm glow bias) (Kahneman et al, 1993: 311). However, it is also possible that government efforts to mitigate environmental damage can influence one's WTP for environmental protection via taxes such that governments which successfully mitigate environmental degradation may ironically lead people to perceive less need to pay more taxes to reduce environmental damage and thus may be less willing to pay via taxes (Torgler and García-Valiñas, 2007: 541).

Trust also manifests itself as "assurance" such that trust relies not on the goodwill of other individuals but on the expectation whether others will comply with institutional rules that dictate WTP. Individuals comply with rules such as mandating payment because they expect other individuals to do so, known as "convergent expectations" (Arrow, 1974: 72). Thus, trust in other citizens to pay is also important to respondents depending on whether payment is compulsory or voluntary (Blamey, 1998: 65). Interdependency can prevent individuals from satisfying their own preferences for ecosystem services when the ecosystems' statuses are determined by collective decisions (caps) or by "independent decisions of others (taxes or voluntary payments)" (Farley et al, 2015: 249). Assurance relies on coercion through institutions such as rules/laws stipulated by governments which, Blamey (1998: 53) argues, are necessary as individuals "may need to be assured that other parties or organisations involved in the 'policy bargain' are doing their bit, and/or that this is done in accordance with certain standards of fairness" as incentives to cooperate and assurances from others of their cooperation are not "sufficient" conditions for individuals to act (i.e. pay) based on their underlying ('true') preferences. Obedience to authority can be based

on legitimacy (arising from high respect for it) or on coercion (illegitimate but feared) (Huang, 2002: S249). In fact, Huang (2002: S253) argues that "perceived moral duty of compliance" can "change endogenously both expectations of potential violators and of the international community about behavior and that behavior itself" such that it creates self-enforcement. The government thus plays an important role in assurance for four reasons as Blamey (1998: 53) views: 1) government may be the source of environmental problems and thus needs help, i.e. government failure; 2) government can identify the problem and possible solutions; 3) government can coordinate the actions of individuals in a group, e.g. holding referendums, enforcement, information campaigns, trust fund; and 4) government can coordinate and implement outcomes of collective action. Or as Milton Friedman (2002: 25) puts, unless the "general customary and legal framework" are "accepted unthinkingly" as with custom or are obeyed most of the time by most participants "without external sanctions" as with social consensus, government is necessary to modify rules, mediate among individuals on the meaning of the rules and enforce rules. Trust in the government is necessary in this respect so that individuals do not feel that they are cheated of their contributions (Blamey, 1998: 53-54). Thus, Gintis (2000: 316-319) argues that humans do not behave as individual gain maximizers (*homo economicus* abovementioned) but as ready cooperators with propensity to reward cooperation and punish violators as demonstrated by ultimatum and public goods games. Such perceptions of trust and assurance have been linked to biases that motivate how individuals react to other individuals as Soma (2006: 39) argues, "In reality, preferences depart from pure self-interest: people often sacrifice money in retaliation against unfair treatment (i.e. social goal effects); or if somebody is being nice (or mean) to you or others, you are inclined to be nice (or mean) to him" which essentially describes the "reciprocity effect". Thus, Soma (2006: 39) views trust as a "social construction".

There is some empirical evidence that interpersonal trust and reciprocity is directly correlated with individuals' confidence in public institutions to supply CPRs such as environmental quality and accordingly affect their willingness to pay for such goods. Experimental evidence from Fehr and Gächter (2000) and Ostrom (2000a) have shown using finite-round experiments that participants were still willing to act reciprocally rather than strategically even in the last round of a sequence of finite games but monetary incentives paradoxically reduce individuals' voluntary contributions. Survey evidence likewise illustrates the importance of trust, such as Adaman et al (2011: 696) who find from surveys on households' WTP for carbon dioxide emissions reductions in 26 cities in Turkey that trust in government institutions is a statistically significant explanation. Kountouris et al (2015: 20, 29; see also Oh and Hong, 2012: 345-347) also find that political instability defined as "a period of politically motivated unrest that introduces uncertainty regarding the government's ability to implement policies and remain in power" may influence WTP into a "government managed fund" in the short term but "does not affect preferences for environmental quality" though their preferences towards the environmental good decreases after the protest—all of which results from decrease in government credibility post-protest. Corruption in public institutions can decrease trust in the political establishment (Kountouris et al, 2015: 21, 22), which in turn can affect citizens' WTP for public projects (Oh and Hong, 2012: 345-347) as well as increase citizens' distrust of information provided by the government which are important for stated preference valuation methods (Kountouris et al, 2015: 21, 22); all these suggest that political stability and quality of public institutions "are important for expressing environmental preferences and promoting environmental quality" (Kountouris et al, 2015: 32-33). Magnetic resonance imaging (MRI) evidence also shows various parts of the brain that explain behavior in game theoretic

conditions, such as the "trust game": the striatum which predicts social reward while forming one's reputation and which can be affected by social context such as others' opinions (Engelmann and Hein, 2013: 228); the ventromedial prefrontal cortex (vmPFC) which inhibits emotional responses and is responsible for self-control can be influenced by social contexts such as inequality (Tricomi et al, 2010: 1089-1091), threat of sanction (Li et al, 2009), and received sponsorship (Harvey et al, 2010: 9597-9602); and the insular cortex whose activity increases with decisions in economic games and the decision to help others (Engelmann and Hein, 2013: 229).

The evidence above is disputed, however. Firstly, some scholars (e.g. Bateman et al, 1995) argue that a compulsory payment regime such as taxation elicits higher WTP because compulsory payment reduces chances of free-riding via underbidding; however, a higher WTP also raises chances of project implementation by overbidding (Stithou and Scarpa, 2012: 2-3; Schläpfer, 2016: 37). Yet, others (e.g. Wiser, 2007) have found no effect in terms of different payment vehicles. Still, others such as Stithou and Scarpa (2012: 6, 7) find that a compulsory payment regime (e.g. landing fee) induces higher participation rates than voluntary donation but lower WTP than voluntary donation. Secondly, Dasgupta (2001: C6), as does Ostrom (2000a: 188), argues that it is difficult to measure social capital such as civic engagement and trust, and that the private and public dimensions of social capital are conflated (Dasgupta, 2003). Nevertheless, Paavola and Adger (2005: 363) argue social capital should be "integrated" into new institutional economics and ecological economics as social capital mediates the relationships among actors by facilitating the creation and implementation of rules, knowledge and obligations and creates "networks and cross-scale linkages" that make up environmental governance even as ecological knowledge is a form of human capital. Thus, social capital allows new institutional analysis to be applied to

relationships between culture, beliefs and behavior on one hand and institutional, economic, and environmental outcomes on the other hand (Paavola and Adger, 2005: 364). Social capital performs several functions: fosters trust and helps circulate information; helps coping with environmental stressors through networks of reciprocity; and fosters resilience in adapting to climate change through networks and sharing information among migrant communities fleeing from adverse effects of climate change (Paavola and Adger, 2005: 363). Paavola and Adger (2005: 363) define social capital as "density of networks and rate of these information flows [involving relationships among agents]", and also as the "capacity of social groups to act in their collective interest [which] depends on the quality of the formal institutions under which they reside" (Paavola and Adger, 2005: 363). Paldam (2000: 629) notes that there are three "families" of concepts of social capital: trust, network and cooperation, which interact with one another in the following way, "most people build trust in and networks to others and come to cooperate with them". Trust and reciprocity shall be explored further in Chapter 3.

2.5 Conclusion

This chapter has outlined the process of environmental valuation. Some of the more commonly used stated and revealed preference approaches are then introduced as various techniques to evaluate the environment. Following that, criticisms that environmental valuation overlooks strategic bidding suggests that the valuation literature ignores the role of the micro context, that is, at the individual level of analysis where one interacts with one's immediate community members. Strategic bidding is one sign that individuals do not elicit similar bids even as members of the same community, such as of a cultural group. Strategic bidding is influenced not just by the non-excludability characteristic that plagues contributions to both public goods and CPRs, but also by

the choice of policy instrument such as different payment vehicles, e.g. voluntary income payments or compulsory tax payments. Strategic bidding manifests itself when individuals under- or over-bid their WTP or engage in NIMBY behavior. Some scholars suggest solutions to overcome strategic bidding by not specifying the payment vehicle, promote trust among actors or provide assurance to them that others will contribute to the public good or CPR through enforcement. While evidence for the role of trust and reciprocity among actors is disputed, the debate is not conclusive as some scholars continue to advocate for the application of social capital to the study of new institutional economics and ecological economics. It is to these fields that Chapters 3 and 4 explore criticisms of environmental valuation with respect to the macro context which new institutional economics and ecological economics explore, that of norms and rules, respectively.

CHAPTER 3 DISCUSSION OF MACRO CONTEXT: NORMS AND CULTURE

3.1 Introduction

This chapter examines the arguments that norms and culture affect how individuals act on their underlying preferences such as via WTP in environmental valuation. Norms and culture—together with governing institutions examined in Chapter 4—constitute Ostrom's overarching macro context. An examination of the influence of macro context on WTP for environmental goods and services comes on the heels of Chapter 2. Chapter 2 describes the environmental valuation process but also discusses that valuation is influenced by strategic bidding which is related to the *micro* context and concludes with Paavola and Adger (2005: 363) arguing for the role of trust and reciprocity in bridging cultural explanations of institutional outcomes. In this chapter, I submit that norms and culture affect individuals' WTP because norms and culture cannot be divorced from the context one operates. Norms, particularly cultural norms, can be said to be the 'softer' meta-influences on WTP as they are standards of behavior as Schwartz defines but are *not necessarily* legally binding and thus lack legal enforcement. The italicised words are stressed as North's (2005: 22) definition of institution includes "informal norms" as well as their "enforcement characteristics". Ostrom (2005b: 17), on the other hand, tends to differentiate institutions from norms by defining institutions as rules closer to the "regulation sense" which are "the set of instructions for creating an action situation in a particular environment"; she did not mean rules in the cultural or "precept" sense as "one would not speak of enforcing, rescinding, or reinstating" them but defined these as "norms" instead. Institutions viewed as rules as Ostrom defines can be viewed as the 'harder' meta-influences impacting on one's WTP because of their legal enforcement which norms lack, whether as *de jure* rules (or rules-in-form) or as *de factor* rules (or rules-in-use) as Ostrom differentiates (see Chapter 5).

The following definitions clarify the concept of norms. More simply put in Knack and Keefer's (2005: 702; see also Ostrom, 2014a: 11) words, *social norms* "specify what actions are regarded by a set of persons as proper or correct, or improper and incorrect" and that norms and their accompanying potential rewards (for compliance) or punishments (for noncompliance) are *not* the sole determinants of decisions by rational actors, but they "affect the costs and benefits which individuals taken into account when exercising choice"; in fact, norms have no legal basis and can conflict with laws. Norms, hence, in contrast with laws possess normative elements as reflected in the socially appropriate actions that Knack and Keefer view, as "an internal valuation" which can be "positive or negative" that an individual "attaches" to "taking particular types of action" in particular situations that Ostrom and colleagues (Poteete et al, 2009: 346-347; Ostrom, 1998a: 9; Ostrom, 2009c: 59; Ostrom, 2010c: 160; Ostrom, 2010b: 4) conceptualize; as "standards for behavior" as Schwartz (1977: 231) defines which can be "self-reinforcing" if norms are internalized; and as what individuals "what they think others should or should not do" which Minkov and Hofstede (2011: 15) consider as "norms" in contrast with "personal values" which is what individuals "consider important to themselves". Triandis and colleagues (see Chen et al, 2007: 262) differentiate between implicit norms telling what individuals *ought* to do, and perceived norms, whether expected or actual, observed of others in a "given context". If norms concern appropriateness of individuals' actions in a given situation, then *culture* can be defined as unspoken, shared prescriptions of social appropriateness, that is, "unstated assumptions, standard operating procedures, ways of doing things that have been internalized to such an extent that people do not argue about them" in Triandis' (1994: 16) view. Ostrom (2005a: 841) subsumes norms as part of culture in defining culture as "the bundle of variables" that encompass the "attributes of a community that are important in affecting the structure of an action arena includ[ing] the norms of

behavior generally accepted in the community, the level of common understanding potential participants share about the structure of particular types of action arenas, the extent of homogeneity in the preferences of those living in a community, and the distribution of resources among those affected"; these manifest as "preferences or the 'habits and values' of individuals aggregated at a societal level" (Ahn and Ostrom, 2008: 83).

This chapter is important because current research does not detail how an individual's preferences can be viewed without judgment when other normative factors such as norms, culture, and institutional structure influence expression of individuals' underlying preferences, if not construct them. Some scholars argue that non-economic motives of valuation can affect one's preferences. Martín-López et al (2007: 67, 68) argue that CV responses "usually" reflect such motives for valuation, and that economists "cannot avoid considering such psychological issues" if CV data is used for policy purposes. They cite four reasons that explain human beings' attitudes towards biodiversity including culture and tradition playing a role in affecting how human beings react towards various species through their past and present interactions with them; the other three reasons have to do with universal human values towards nature, physical and behavioral characteristics of species that resemble humans through evolution, and knowledge about species (Martín-López et al, 2007: 68, 77, 79). Non-economic valuation is supported also by Beckerman and Pasek (1997: 78-79) who caution against "agent-relative" valuations which can hold society hostage without some means of adjudicating over them, which leads them to conclude that society's valuation (i.e. social valuations) do not—and "often" could not—simply be "the aggregation of individual agent-relative valuations". Instead, Beckerman and Pasek (1997: 78-79) advocate for public deliberation to find the "truth" and not "techniques to estimate which theory

arouses the most intense preferences among its advocates" albeit problems with public deliberation. Furthermore, Beckerman and Pasek (1997: 73) recognise that while "special moral status" need not be conferred on the environment, they argue that some form of ethical consideration can be attached to the environment that renders the environment subject to some "higher" modes of valuation that depend not on the instrumental gain derived from using an object as a private good but on one's "social relationship" between the "ideals of the valuer" and the object to be valued and/or the giver (such as based on sentimental value), as seen in Anderson's (1993) 'expressive valuation' theory.

The next section scrutinizes criticisms that environmental valuation underestimates the influence norms and culture have on individuals' valuations. A discussion over norms suggests that norms affect how individuals express their preferences via WTP, particularly with respect to how individuals perceive a situation and discern socially appropriate behavior required of them. The subseqent section then studies culture's impact on WTP and scholars' debate over the role of culture. Proponents of culture argue that culture impacts on individuals' WTP by requiring in-group members to agree on the group's or society's WTP to the extent of even overriding individuals' private (underlying) preferences. However, proponents also recognise that not all individuals in an in-group share identical cultural values and these values can change over time. Yet, this view undermines mainstream economists' assumptions of one's exogenous preferences as stable, given and similar across all individuals.

3.2 Norms and culture influence individuals' valuations as they cannot be divorced from one's social context

Social norms are a contextual factor that can regulate individual behavior by affecting whether individuals choose to act on their private preferences in order to maximize their self-interests (Sen, 1977: 332). An example of social norms is recycling, which is in fact a case of pure altruism or citizen behavior as individuals incur transaction costs in sorting, collecting, transporting and discarding recyclable wastes which is economically inefficient as added costs are incurred by the individual (van den Bergh et al, 2000: 48-49). Dasgupta (2001: C18) opines that social norms can be practised "only among people who expect to encounter one another repeatedly in similar situations". More than just attitudes as argued by Kahneman et al (1999: 203-235; 1993: 310-315; see also Chan et al, 2012: 10), Spash et al (2009: 962) argue that perceived behavioral control in terms of one's belief in the ease of carrying out a particular action and social norms also influence one's expression of his/her private preferences via WTP. Spash (2011: 361) even suggests dropping the assumption of self-interested utility maximization to allow for the exploration of the role of social norms as they provide a "link" between individual motivators and societal motivators for one's action and bring in the role of institutions that classical or critical institutional economists explore as opposed to the neoclassical "new" institutional economists. Perceptions concerning power, trust and control are invoked by including such social organizations which can influence how individuals respond to "requests and incentives" to adjust their behaviors. Sunstein (1994: 817) explains that norms can explain the presence of "implicit" tradeoffs that actors make to show "commitment to a certain set of judgments about how relationships and prospects should be valued" and that making such tradeoffs explicit would undermine the social norms that justify such implicitness by undermining or violating that commitment. Such norms are expressed as "duty" or the "norm-regarding" aspect of choice in contrast with "self-interest" as the "self-regarding" aspect and "love" as the "other-regarding" aspect of choice, according to Zsolnai (1998: 616). Zsolnai

(1998: 618) argues that choices based on norm-regarding, self-regarding and other-regarding aspects can generate "social-rational choice" which is similar to Sen's (1982) "goal right systems".

The basic point is that social norms generate diverse kinds of valuation as Sunstein (1994: 787, 788) notes that "[p]eople do not value goods acontextually" and "[d]istinctions among kinds of valuation are highly sensitive to the particular setting in which they operate", one social norm being the principle of equality. Equality aids the diverse kinds of valuations for which "particular goods typically do not admit of a single kind of valuation" as these goods are valued in relation to other actors (Sunstein, 1994: 784). For example, the liberal political system is crucial to allowing "diverse kinds" of valuation based on "social differentiation" (e.g. markets, families, religious groups, politics) to grant them their "appropriate" place in human life, and environmental law depends on the appropriate kind of valuation for environmental amenities (Sunstein, 1994: 860). Thus, reducing the economic value of an environmental good or service into a single number is not possible because not all social groups would agree to such a view when politics has to reconcile these various social groups, as Gatto and De Leo (2000: 351) argue. In fact, social norms can also explain incommensurability when social custom or law restricts or prohibits people from acting on their underlying private preferences on the basis of identifiable considerations that are ruled as "off-limits" rather than being just "insufficiently weighty" in the eyes of law (Sunstein, 1994: 801). Sunstein (1994: 805, 813) even argues incommensurability is "desirable" as it is "freedom-producing" by making "possible certain relationships, attachments, and attitudes that would otherwise be unavailable" as they define what a "good" life is by preventing their reduction into money, such as friendship. In such cases, Crocker et al (1998: 159) propose that alternative exchange institutions that operate "in addition" to the competitive market can overcome the

incommensurability criticism by providing for deliberation among ordinary people via "exchange and rational, critical value articulation" that "institutional arbitrage devices" such as public dialogue allow. Even economists such as Shogren (2012: 353) admit that while the market can as an institution provide feedback to participants and define which behavior is considered rational and utility maximizing, these are mediated by social norms as Bowles (1998; see also Shogren, 2012: 353) recognizes in his argument that social preferences are shaped by institutional transactions.

Thus, scholars such as Ninan and Inoue (2013: 139) argue that generalisation of valuation estimates from a point geographical location to the entire world neglects the norms specific to local contexts that influence the use of environmental goods and services, as well as individuals' elicited WTP in a geographical area that cannot be simply generalised from individuals in other locations. Moreover, Sunstein (1994: 791) qualifies his claim about "diverse kinds" of valuation that his claim "has largely been a claim about widespread current attitudes" but not "a transcendental or metaphysical claim about valuation" and that current kinds of valuation are not immutable as social norms and "prevailing social conceptions about kinds of valuation change as well". Sunstein (1994: 792-793) views that law, policy or social attitudes need not follow the diverse kinds of valuation that individuals adopt because there is "a difference between how people should value and how law should value". It does not follow that "because people now value relationships, events, objects, or each other in certain ways, it follows that law should adopt those diverse kinds of valuation" for social conventions need not be strictly abided by (i.e. individuals need not be social "conventionalists"), and law might very well adopt a particular kind of valuation if it were really "superior" to that adopted in public or private life. Furthermore, Sunstein (1994: 792-793)

acknowledges that incommensurability need not inhibit people from making choices among monetarily incommensurate goods as they make choices "all the time" in daily life. Law can also invoke "reasons" in making judgments in spite of monetary incommensurability such that law can "discipline democratic discussion" by restricting possible kinds of valuation to avoid sectarianism or adhere to principles of "civic equality" (Sunstein, 1994: 818).

It seems that social norms require corresponding institutions that reflect the social character of preferences. However, Vatn (2004: 11) submits that mimicking the social character of preferences by introducing repetitive games in a form of "reciprocal altruism" is "too narrow" as deliberation is necessary which calls for a forum rather than a market. This is all the more so given the "interdependencies constituting life" such as "interdependencies in nature" both through "the web of interconnected processes and the spatial relations" which follow from determining the "good or right way of living" and moral commitments which thus leads Vatn (2004: 11) to argue that it is "curious to individualize these issues". Gowdy (2004: 249; Ludwig, 2000: 32) concludes that if preferences can indeed be endogenous depending on the "social context of individual choice", he argues that models of human choice should describe human behavior "as it really exists" and not as it "ought to be" as neoclassical economists do in order to make these models tractable (i.e. calculable). Vatn and Bromley (1994: 139) further elaborate that it is not just that multiple social contexts can invoke different *in situ* valuations from the individual depending on which social context because the social context shapes one's preferences through society socializing an individual into identifying himself/herself with a social group which then forms or solidifies his/her "preferences" rather than possessing acontextual preferences as blank slate (i.e. "tabula rasa"), It is also that social contexts as "status quo institutions" influence not just externalities but

also the transaction costs that "allow" externalities to exist in the first place (Vatn and Bromley, 1994: 140).

However, it is possible that individuals can choose from among these many social contexts to form a basis for valuing environmental goods and services. Vatn and Bromley (1994: 142) observe two kinds of "choice processes" in society which can complicate reality by their "interrelatedness": one concerns making "decisions from within sets of given values or constraints" as consumers involving their "preferences", and the other is about "choosing these sets of norms and common values" as citizens using their "judgments". Gowdy (2004: 252) suggests that game theory illustrates the relevance of "social processes" such as "community norms about fairness" as outcomes of games such as ultimatum game and prisoner's dilemma give different results depending on how individuals perceive the social context in which the game occurs. For example, labelling a prisoner's dilemma game as "Wall Street Game" as opposed to "Community Game" can yield different results, which show that preferences are "socially conditioned" which are "at odds with the neoclassical welfare model in which ends are given", i.e. consequentialism. This has led to calls for deliberative processes of valuation, such as discursive ethics, deliberative democracy, and stakeholder negotiation (Gowdy, 2004: 252). Historically, norms are "instruments" used in dealing with particular complex policy issues as Vatn and Bromley (1994: 142) aver emphatically by taking a "look at history" to cite "evidence" that societies rely on "underlying norms, conventions, and taboos in the human struggle for social order and survival" by deliberately inventing such norms, or creating them for a particular function, or chosen by sheer accident (i.e. "by luck"). Vatn and Bromley illustrate their point using Douglas' (1986: 124) example of justice who argues that the "most profound decisions" about justice are not made by

individuals alone, but individuals "within and behalf of institutions" as individuals delegate ("off-load") issues of justice to institutions—thus "choosing rationally" is neither "private ratiocination" nor "choosing intermittently among crises or private preferences but choosing continuously among social institutions".

Thus, criticisms of stated WTP as a measure of value arise such as from Brown (1984: 240-241) who point out that there are context related problems, such as one's constituency being a social one but WTP is made in a private capacity even if an agent is "acting as agents for others" but not for himself/herself; that price does not reflect one's feelings of conditions that ought to exist such as concerning preferences of addicts and the accompanying "intrapersonal collective action problem" as well as habits that reflect sheer inertia to change (see also Sunstein, 1993: 238-239); and trivial choices which reflect contextual choices such as social setting and problems of held values (i.e. consumption as a means to compete with others for social standing rather than for personal welfare gain as explained by the relative income hypothesis) behind "individual market-related actions or opinions", assuming that "any ill effects of lack of competition can be adjusted for". This supports Sunstein's (1993: 240) prognosis that government can use laws to encourage individuals to act on their preferences for activities (e.g. recycling) which can induce social norms that turn hedonic costs of recycling into hedonic benefits as such activities become habitualised. Gary Becker (1993: 15; see also Sunstein, 1993: 240) supports Sunstein arguing that manipulating others to influence their preferences may be "inefficient" and "fraught with uncertainty" but it can be the "most effective way" to secure commitment from actors and thus argues for the incorporation of attitudes (e.g. guilt, affection) into game theory. Brown (1984: 244) doubts that held values are always consistent with welfare as "individual preferences and value systems are

influenced by the process of socialization" as Veblen (1899) and Boulding (1970) can attest as reflected in consumption just to achieve higher social standing among peers. This involvement of individuals' relative rather than absolute gains leads Brown (1984: 244) to conclude that there is "no such thing as *the* value of an object" (author's italics) because the assigned value of an object is a "relative" and "not an absolute" concept which "reflects the context in which the valuation took place and the perception and held values of those assigning value". Thus, for any given group of people, it is possible that there are "as many possible assigned values for something as there are valuation contexts and held value systems" and that each assigned value is "only an indication" of value, and "one may be more appropriate than another in a given decision-making situation" (Brown, 1984: 244). Such 'appropriateness' of value parallels Sandel's (2000: 89, 94-96) arguments against commodification as it denigrates the thing being exchanged for cash when it should be based on the "essence" of the good which is the "Essentialist" argument (Cohen, 2003: 691-693) similar to environmental economists' arguments for including existential value on the basis of an object's mere existence in TEV. Inappropriateness can also be assessed based on the "appropriateness" of an exchange depending on the social norms of the time known as "Conventionalist" argument (Walzer, 1983). Questionable exchanges can involve objects that are considered outside the market sphere of valuation but are considered fungible (e.g. welfare of future generations, friendship, bodily organs) (Soma, 2006: 34).

Doubts have been raised concerning the influence social norms have on individuals' expression of their underlying preferences via valuation. Cohen (2003: 693-695) raises three objections to the "Conventionalist" opposition towards commodification: 1) relevance of social norms across societies; 2) the origins of conventions and the composition of the community that endorses such

conventions; and 3) the permanence of social norms as they reflect social preferences that are 'malleable' susceptible to influences via advertising, tax incentives, etc. Nevertheless, Cohen (2003: 708) defends that norms are still relevant in valuation by treating the object and money exchanged for it *not* as mutually fully substitutable for each other such that a "value *equilibrium*" (italics added) is achieved between the two. Rather, the exchange contains "an expressive element" which reflects the "prevailing social norms of a given time period" such that there is a "value *disequilibrium*" (italics added) between the item and money exchanged for it leading to a "value *remainder*" for which actors in a society recognise that money is "never presumed to substitute for the thing that has been given up". Examples of "expressive" exchange include compensatory damages in lawsuits for wrongful death and life insurance payouts (Cohen, 2003: 705-707; Ludwig, 2000: 31-32). Value disequilibrium applies to goods that belong to a "sphere of valuation" that lies outside the sphere of monetary fungibility, such as a gift which is accorded a "higher" mode of valuation (Cohen, 2003: 708-709). This justifies Sunstein's (1994: 846) reasoning for not making implicit preferences explicit in order not to violate or undermine them as individuals may possess implicit preferences for objects outside the monetary sphere of valuation. It also supports Sunstein's (1994: 846) argument that monetary compensation from damages to natural resources ought not to be seen as fungible with the natural resource itself because diverse kinds of valuation can be used to value natural resources; instead, compensation is a symbol of redress and a signal to deter future intent to injure and as a nod to public opinion on how it views the environment. Sunstein (1994: 786, 826) notes the importance of law to forbid exchanges that are inappropriate such as trading in Vatn's (2004: 11-12) ethical goods for which trade-offs are blocked or rights-based goods for which trade-offs are restricted even as they may be acceptable in other contexts (as in a typical commercial transaction involving a private good), such as inappropriate

compensation which may be appropriate in one sphere of valuation but not in the other depending on social norms. Even so, Sunstein (1993: 253) acknowledges that an "infinite valuation" of "pristine areas" (e.g. mountains) "would be an irrational allocation of scarce social resources" as it is not that pristine areas cannot be degraded, but that it affects how people use the legal system to calculate compensation for environmental damages as law adopts a more instrumental value (i.e. "use value") approach towards nature (Sunstein, 1994: 839). Sunstein (1994: 786-787) thus questions the usefulness of indifference curves and the rational choice axioms of continuity and convexity based on the substitutability (i.e. fungibility) of the natural resource if people are not "indifferent" between two goods (e.g. having money versus keeping the mountain) even though they may think otherwise. Still, Sunstein (1994: 820) concedes that law is a crude weapon by adopting instrumental valuation as the legal system "has to work" with money in deciding compensation which can render arguments of commensurability moot or assumed and is unable to take into full account the diverse kinds of valuation.

3.2.1 The role of culture

Culture expressed through social norms, i.e. cultural norms, is a contextual factor that can influence how individuals express their underlying preferences through valuation. The omission of culture is one criticism that Turner et al (1998: 62, 63) level at Costanza et al's (1997: 253-260) valuation of the world's ecosystems in the latter's neglect of valuation contexts that lead to "scaling problems" by generalising from the monetary worth of one hectare of land to cover all ecosystems but neglects "the temporal, spatial and cultural specificity of economic value estimates". This affects how valuation estimates are 'scaled' up from one typical geographical region to generalise to the entire world's ecosystems, and valuation estimates via revealed preference that depend on

localised usage of the ecosystem, as well as affects the calculation of monetary value of environmental commodities harvested from nature over time. Scholars such as van den Bergh et al (2000: 49) argue that valuation can be culturally determined. For example, culture is included in the ecosystem service (ES) framework because non-material aspects account "for a great part" of why humans value nature, and act to "complement or counterbalance" the utilitarian aspects of value (Pröpper and Haupts, 2014: 29-30). Fourcade (2011: 1735) supports this view by arguing that nature as a concept is a "cultural formation, or a social assemblage" not so much implying that the natural world is unreal or a figment of human imagination but is coloured by human beings' expressions of nature rooted in their "own values and cultural assumptions", i.e. worldviews, that "can never be separated" from descriptions of the world. For example, "wilderness" is "a cultural invention" as it is shaped by the idea of "wild, untouched nature" that emerged at the end of the 19th century when "urban, educated, upper middle class East Coast Americans, who rarely, if ever, confronted the harsh reality of "living in the wild" in their everyday lives, reinterpreted the experience of the frontier as a primordial national experience to be cherished and preserved" (Fourcade, 2011: 1735-1736). This is made possible by the US federal government owning most of the land at that time in contrast with the French in which land ownership is more distributed and fragmented among the citizens. What the French defend, however, is not nature as centuries has seen manmade intervention on most landscapes in France but "rural civilization" against an encroaching state where man's place in the environment is given a "de facto place" where nature and human identity "intertwine" compared to the sharper distinctions between man and nature in US conservation (Fourcade, 2011: 1737-1739). The role of the environment in cultural transmission is explained by O'Neill (2001: 1867) who notes how the environment, as gleaned from in-depth discussion groups about the Pevensey Levels surveys, is not a mere commodity but

is “a place that embodies particular relations of the past and through which relations to the future are expressed”; or in other words, “the environment is expressive of social relations between generations”. The environment “embodies in particular places our relation to the past and future of communities to which we belong” such that, for instance, the environment “expresses a particular set of relations to one’s children” that accepting a price is equivalent to ‘betraying’ future generations and thus the “treatment of the natural world is expressive of one’s attitude to those who will follow you” (O’Neill, 2001: 1867).

Hence, monetary transactions have ‘cultural meaning’ such as to O’Neill (2001: 1866) who argues that monetary transactions are “not exercises in the use of a measuring rod” but are expressive “social acts which have a social meaning” which “are constituted by particular kinds of shared understanding which are such that they are incompatible with market relations”, such as friendship and kinship ties. This “shared understanding” is consistent with Sunstein’s (1994: 805, 813) defense of incommensurability as “freedom-producing” by preventing aspects of the “good” life (e.g. friendship) from being reduced to monetary terms. Even environmental economists such as Shogren (2012: 353) admit that markets are not necessary “in certain situations” because of “efficient cultural and social rules governing resource allocation” in both developed and developing countries when cultural and individual traits can impact on exchanges and nonmarket allocations, and that behavioral “anomalies” such as preferences for others’ welfare can persist even if markets are integrated into local communities. Gowdy (2008: 633, 634) argues that the rational choice model seems, instead, to describe more fittingly the actions of animals with “limited cognitive ability” and “perhaps” humans making “the simplest kind of choices” as “the most important decisions” humans make requires taking into account “culture, institutions, and

give-and-take interactions" which are "critical and should be central to any behavioral model" such as adopting a "culturally conditioned sense of fairness" and willingness to enforce cultural norms even at their own economic expense. Culture can even impact on market price as Brown (1984: 239) concludes that price is a "social phenomenon, resulting from exchanges involving many individuals" because consumers act in their own interest which "is most often an atomistic one, each producer or consumer acting largely in his or her own interest", but operate within the constituency being "influenced by the group's common heritage and culture".

A cultural approach to valuation following the ES framework is based *not* on a simple aggregation of individuals' WTP in a community but on the value of services or benefits an ecosystem provides to the community *as a whole*. Small et al (2017: 61) supports this by reasoning that factors that affect how a community manages an ecosystem can be different from those that affect individuals' behaviors. Such an approach is deliberative as it entails gathering all stakeholders together to discuss how to manage ecosystems and the benefits derived from the latter (Chan et al, 2012: 754). The ES framework includes intangible services that ecosystems provide such as cultural uses including recreation, tourism, aesthetics and spiritual (United Nations Environment Programme, 2018) which environmental valuation approaches exclude, and uses a variety of methods including qualitative methods on top of quantitative approaches such as stated and revealed preference approaches associated with environmental valuation. This helps to compensate losers not just in terms of material (tangible) losses but also intangible (e.g. cultural) losses. Specifically, culture affects valuation in two ways. One is through the socio-cultural values of ecosystem services which Scholte et al (2015: 68) define as "the importance people, as individuals or as a group, assign" to bundles of ecosystem services. Socio-cultural values, however, are conceptually different from

cultural ecosystems which is the second way that culture can impact on valuation. Scholte et al (2015: 68) differentiate between the two concepts by explaining that socio-cultural values reflect both material and immaterial wellbeing while cultural ecosystems reflect only immaterial wellbeing. The material aspect of socio-cultural values is reflected in the material (i.e. terrestrial) factors that influence socio-cultural values, such as the quantity and geo-location of ecosystem service provision (Scholte et al, 2015: 70). On the other hand, Chan et al (2012: 745) define cultural ecosystem services as "ecosystems' contribution to the nonmaterial benefits (e.g., experiences, capabilities) that people derive from human–ecological relations"; or as the Millennium Ecosystem Assessment (2005) defines, is "the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g., knowledge systems, social relations, and aesthetic values".

The deliberative approach above suggests constant social negotiation among human beings as to what constitute cultural values. Pröpper and Haupts (2014: 31) see values as "culturally shared meanings" and the process of valuation as "actors' negotiated and *shared estimation* of objects and activities according to multiple goals, principles and conceptions of what is desirable in life (e.g. prices, religious convictions, norms, sense of place, and even feelings of love and the sense of beauty)". The temporality of cultural values is evident in valuation as an "ongoing human *activity*" (authors' italics) as Pröpper and Haupts (2014: 30) maintain who thus add that the "temporal challenge" of cultural valuation "needs attention" as values are "negotiated in social interactions and ascribed to objects and actions rather than inherent in them". Pröpper and Haupts (2014: 31, 33) refute the neoclassical economists' conception of individuals' exogenous preferences as being given, stable and "rather similar" across all individuals. Instead, they argue

that individuals' values as "culturally shared meanings" are changing as these values interact with exogenous factors such as surrounding landscapes and global influences which form "an integral part of endogenously evolving and transforming preferences — within a cultural context of other people and the surrounding world" when "the esthetics of landscapes, the spirituality of places, and the necessity of recreational and educational activities" are constantly being negotiated. Sagoff (2007: 79) echoes this suppression of individual characteristics using the "rather similar" preference assumption by opposing the aggregation of individuals' WTP to achieve a societal WTP as the recourse to compensation based on potential Pareto efficiency. Sagoff (2007: 80) argues that society cannot be reduced to "a single subject" such that properties of individuals in a society can be aggregated and are reflected as a community as this amounts to individualistic fallacy and merely demonstrates the relative changes from a change introduced. Moreover, doing so disregards the individual's autonomy as it is reduced to a constitutive unit of an aggregated WTP (Sagoff, 2007: 79).

The cultural argument against homogeneity of exogenous preferences above thus opposes George Stigler and Gary Becker's (1977: 76) view of preferences as given and similar, as well as Vriend's (1996: 279) advocacy of completely ascribing differences in individuals' actions based on "differences in perceived opportunities" to each individual—or the differences in "perceived opportunity set" according to Gary Becker (1962). Vriend (1996: 279) argues that it is "theoretically impossible to get the necessary characteristics of aggregate demand functions" necessary to show that the trial-and-error process ("tatonnement process") of reaching equilibrium in all perfectly competitive markets simultaneously for multiple commodities by assuming away the heterogeneity of individuals' motivations underlying their preferences, i.e. by "imposing more

and more restrictions upon individual characteristics". Vriend (1996: 268-269) defines "opportunities" such that "*all* perceived costs and benefits are taken into account" (author's italics), especially "information, decision-making and transaction costs" which go beyond monetary opportunity costs to include costs in searching for information, and costs in engaging in leisure activities such as talking with a friend or doing nothing. If "perceived opportunities" are defined as "perceived possible actions plus perceived consequences" (Vriend, 1996: 269), Vriend (1996: 268) explains why agents do not take advantage of "an apparently profitable opportunity" because of "the existence of costs, monetary or psychic, of taking advantage of these opportunities that eliminate their profitability—such costs that may not be easily "seen" by outside observers". However, such preoccupation with one's monetary profitability reduces the description of complex ecosystem services into dollars and cents which obscures the complexity of ecosystems through commodifying them (Gómez-Baggethun and Ruiz-Pérez, 2011: 621-622; Matulis, 2014: 156; Kallis et al, 2013: 99). Rather, Gómez-Baggethun and Ruiz-Pérez (2011: 621-622) argue that ecosystem services have "symbolic" value, which is all the more so when ecosystems cannot be discretely described and valued independently (i.e. Georgescu-Roegen's (1971) "artimo-morphic concept") when various ecosystems operate in interaction with one another (i.e. Georgescu-Roegen's (1971) "dialectical concept") which echoes the problem of functional transparency arising from interdependency of ecosystems. The symbolic value that the environment possesses can be observed in the aesthetic and spiritual values which are not "solely" individual preferences in terms of artistic taste and choice of religion but are "socially shared values, frequently intersubjective, and the outcome of historical processes in shared cultures" (Cooper et al, 2016: 225). The pursuit of symbolic value, according to Cooper et al (2016: 220), generates meaning in the human-nature relationship such that man is "no longer set apart as engineers and consumers"

contrary to proponents of ecosystem valuation, such as Ostrom (2009e: 419-422; for Ostrom's "Socio-Ecological Framework", see Ostrom, 2007: 15181-15187); such human-nature integration makes it difficult for man to value nature exogenously, i.e. instrumentally. Cooper et al (2016: 225) maintain that aesthetic and spiritual values are "independent of human preferences according to aesthetic theories of disinterestedness or the spiritual dimension of nature" and are "not primarily instrumental, for individual or group human benefit (though there may be some emotional benefits)".

If aesthetic judgment is "non-instrumental and objective to the extent that the interests of the observer are set aside and appeal is made to reasons and methods of proof appropriate to aesthetics, e.g., identification of aesthetic qualities and perceptual proof" (Cooper et al, 2016: 222), then preferences for environmental goods grounded in "aesthetic, scientific and communitarian judgments" cannot be treated the same way as preferences for commodities, as Eriksson (2005: 423) argues. Thus, contrary to the neoclassical conception of economic phenomena as "the collective outcome of the decisions of individual actors", Winthrop (2014: 210) argues that individuals are "neither autonomous nor wholly selfish" as they participate in "social systems—villages, tribes, communities, churches, associations, corporations—that shape their lives and inform their values". Environmental perceptions and values are "not simply exogenous, uninterpretable facts, but become intelligible in light of a community's ecological conditions and constraints, collective history, and way of life" as environmental knowledge to an American Indian, for example, is "multifaceted, encompassing both the qualities of a place and the associations that it holds for individuals, families, and communities, combining natural history with social history" (Winthrop, 2014: 210). Winthrop (2014: 211) maintains that environmental

value based on “utilitarian benefit” is “not consistent” with how American Indians understand human’s place in nature which view environmental value as “multidimensional, reflecting cultural schemata for rightly experiencing, honoring, conserving, and appropriating the physical and biological manifestations of particular places and landscapes. Knowledge of particular environments is gained through experience, which may include interaction with personified spirits or forces”. Thus, Winthrop (2014: 211) surmises that larger than the world of information that competitive markets require in order to operate efficiently is the “universe of cultural knowledge” that is “far larger than the world of information” as knowledge can be tacit and contextual as is found in tradition; these cannot be taught or learned in the abstract but rather must be expressed, transmitted, and understood by participating in a way of life, whether knowledge is explicit/semantic or tacit/symbolic as both are involved in the creation of environmental value.

This is not to say that all individuals in a cultural group share the same socio-cultural values. Iniesta-Arandia et al (2014: 46) note that socio-cultural values might differ among stakeholders as these values are “context-dependent and may also be related to different objectives, concerns and priorities for ecosystem management”, such as the factors which shape individuals’ perceptions of ecosystem services which “are related to the type of knowledge they hold (i.e., experiential or experimental), their place attachment and the way in which they interact with their natural surroundings”. While traditional practices of managing ecosystem services are “perceived as highly important and highly vulnerable by every stakeholder group”, Iniesta-Arandia et al (2014: 36) find that there are “contrasting perceptions of some ecosystem services among stakeholders and of the relevant drivers of change and wellbeing” which lead them to suggest that “[l]inking values to other stakeholder perceptions might be a useful way to move forward in ecosystem

services valuation". Thus, Iniesta-Arandia et al (2014: 47) recommend that trade-offs for conserving the environment in terms of gains and losses for particular groups of people can be enhanced by linking ecosystem service values to stakeholder perceptions because "it allows to make explicit: (1) context-dependency, as values exist within a specific setting, (2) value conflicts, as different stakeholders might value the same ES [ecosystem service] but for different purposes or with different decision outcomes and (3) power relations"; the role of such power relations is supported by Martinez-Alier and O'Connor (1999) who recognize the role of power, institutions and institutional change in influencing types of valuation (e.g. instrumental versus cultural) and its outcomes. Such differences among stakeholders are not captured by the monetary bids elicited from stakeholders.

The above arguments are contentious with several scholars challenging their robustness and highlighting their limitations. Firstly, Chan et al (2012: 746) admit that cultural ecosystem service values remain to be accounted for in monetary valuations despite recognition of their importance (e.g. Millennium Ecosystem Assessment, 2005: 40). This is because: 1) valuation is more amenable to "more navigable domains of provisioning, regulating, and supporting services, with the recognition that many cultural services could likely never be appropriately represented by such monetary valuation"; 2) the problem of attributing causation to ecosystem service change as it is "always difficult to distinguish the ecological from the social causes of ES change"; and 3) the lack of "participatory methods" to identify and catalogue priority ecosystem services as they seemed to be treated as "self-evident" in a geographical region despite their intangible nature. Small et al (2017: 57) support this view by noting that ES has hitherto framed "core concepts and approaches" only. However, Vriend (1996: 270-271) argues that "cultural factors, ruling morals,

social customs or duties, habits, herd behavior, etc.", can be easily incorporated into the economic framework by changing the perceived opportunities of behavior because "1) either agents do not perceive some objectively available options because they have never heard of such things; or 2) because they are not used to thinking about such things, or agents perceive the consequences to be different from those which they will in fact be, for example, because they are always told so; or 3) the consequences will indeed be different due to the behavior of other agents in their environment" and that such cultural norms and rules are themselves the product of the economic behavior of many agents. Vriend (1996: 270) argues that it is all about preferences and perceived opportunities and one should not confuse egoism with self-interest as it can be in one's self-interest to act altruistically which is not egotistical behavior. While Vriend's reply sounds promising for proponents of culture, Vriend ultimately alludes to the concepts of atomism (i.e. individual-based) and monetary profitability in arguing for inclusion of culture into the economic framework when, as shown above, cultural values is determined more at the ecological (i.e. group) level than at the individual level and profitability is only one goal—if ever—among stakeholders with different interests of varying degrees. Moreover, Farley et al (2015: 250) argue against 'atomizing' or reducing the decision making unit to the individual as this can lead to "more boundaries exist over which externalities can occur" and greater transaction costs of resolving them. Brown (1984: 245) is more optimistic about "more socially defensible values" which are "values that look to the good of the whole" while "detached, "scientific" values"" may not be obtainable using neoclassical economic analysis. He argues that refinements to valuation "should improve upon existing group decision-making procedures, or develop new procedures that force explicit quantification of value judgments on the part of individual valuators, and that encourage individual valuators to utilize

the best available information about the welfare of the true resource owner in the course of the valuation".

A second criticism is made by Hahnel and Albert (cited as O'Neill et al, 2002: 155) who argue for a consequentialist position as people are concerned about the "values humans attribute to the consequences of those choices" made which are "inevitably compared" and thus dismiss as "pointless debates" about the commensurability and inclusion of opportunity costs. Instead, the focus should be on is "what benefits and costs we do and do not want to take into account, who gets to estimate those benefits and costs, how they go about estimating them, whether or not the answers to these questions should depend on what the choice is, and who will be affected by the consequences of the choice". However, O'Neill (2002: 157) disputes this objection to opportunity costs on the basis that the very existence of plural values means that opportunity costs must be represented as "[c]ertain valued options that might be foregone will be either misrepresented or unrepresented" and refutes the consequentialist position by arguing that both the ends (as expressive rationality because choices "are themselves ways of expressing attitudes to people and things and not just instrumental means to valued consequences") and means (procedural rationality to accommodate value plurality and "unavoidable uncertainty concerning the consequences of actions") are important in the context of a "socialist community". Such a view echoes Gowdy's (2004: 247-248) argument for paying attention to *both* the ends (i.e. outcomes as benefits) and means (i.e. processes such as fairness considerations) as people "in reality" are also "concerned about the processes, particularly the issue of fairness" contrary to the rational-actor model focusing only on the outcomes in terms of "the quantities and qualities of goods exchanged".

Furthermore, such a utilitarian view above raises objections to the neoclassical framing of culture as "cultural [ecosystem] services". Winthrop (2014: 209) notes two different conceptions of culture that can entail "fundamental differences in what constitutes the objects of study in assessing environmental values": in economics, culture is "treated as a special category of commodities: those involving "the enlightenment and education of the mind", such as films, paintings, magazines, dance performances, and pop music recordings"; while in anthropology, culture "refers to a system of understandings through which social life is transacted". Winthrop (2014: 209) criticises the valuation of ecosystems in terms of the 'services' they provide (i.e. ecosystem services) from two standpoints: the ES framework from the standpoint of theory is narrow as it neglects "the socially transacted character of environmental knowledge, motivation, and values"; from the standpoint of practice, the use of tradeoffs in the ES framework is "both methodologically and ethically inappropriate" as regulation of ES using technology "less concerned individual benefit and rather more involved strengthening social and ritual relationships" which are "difficult to interpret within the ES framework". Even if culture were included in neoclassical economics as "cultural [ecosystem] services", Winthrop (2014: 209) lists five objections to such a neoclassical rendering of culture: 1) ethical beliefs are not economic benefits and are hence not amenable to measurement; 2) other communities may find it alien to conceive of nature as a "service provider"; 3) some categories of values are not able to be traded off with other things as they are incommensurate; 4) the focus on the individual as possessing self-regarding interest is at odds with the other-regarding behavior (i.e. "inherently social character") of many environmental practices; and 5) ideas of private property and ownership associated with valuation are incompatible with the communal basis of many indigenous systems of property rights. Such a critique resonates with Sen's (1977: 326) critique who differentiates individuals' actions based on sympathy which is

egotistical and those actions based on commitment which is "non-egotistic"; Sen (1977: 329) argues that commitment is "closely connected with one's morals", such as boycotting particular goods or eschewing holidays (Sen, 1977: 330). In refuting the gains-maximizing assumption of individual behavior, Sen (1977: 334) cites the Cultural Revolution in China as an example of morals being used to increase one's "sense of commitment with an eye on economic results", although Sen (1977: 335) cautions against universalizing commitment based on culture or morality. Moreover, even in the case of extreme incommensurability or "radical incommensurability" which dispenses with the possibility of comparability amidst incommensurability (Sunstein, 1994: 810), Sunstein (1994: 811) argues that extreme incommensurability is not present "most of the time" as individuals and societies make choices among incommensurable goods on the basis of "reasons". This, to Sunstein (1994: 811), is a "principal task for practical reason, especially in law" and thus he concludes that "we should not identify the existence of good reasons for action with the existence of a unitary metric" because "[s]ome choices among incommensurable goods are rational, and others are not, because of the connection between any particular choice and the achievement of good lives or good societies".

3.3 Conclusion

This chapter has sought to examine how norms and culture influence an individual's WTP. Arguments for non-economic motives behind environmental valuation trigger such a discussion. Various scholars have shown that norms as standards of behavior do impact on individuals' WTP, particularly with respect to how individuals perceive a situation and discern socially appropriate behavior required of them which is observed through game theoretic experiments. This is albeit some criticisms that the impact of societal norms may be overrated as some question their

relevance, origins and stability over time. Nevertheless, norms grant the fungibility of the natural environment an expressive element to the exchange. Culture has been depicted in this chapter as cultural norms. Of particular interest is how culture impacts on a group's valuation of the environment which goes beyond a simple aggregation of WTP elicited from individuals in this group promulgated by environmental economists as a cultural evaluation requires group members to deliberate and come to a consensus on the group or societal WTP as a whole. Not all individuals in an in-group share the same cultural values, however, and these values change over time creating an impermanence which is at odds with mainstream economists' assumptions of one's exogenous preferences as stable, given and similar across all individuals in an in-group. Still, some scholars doubt the role of culture in environmental valuation given problems with its inclusion in monetary valuation, and arguments made by some neoclassical economists that culture can still be accounted for. The concluding word left by Sunstein that individuals rely on "good reasons" such as pursuit of the 'good life' and continue to make choices among bundles of goods and services despite the incommensurability of their monetary worth prompts the consideration whether institutions embody this ideal(istic) goal that individuals would pursue through which will be discussed in the next chapter, Chapter 4.

CHAPTER 4 DISCUSSION OF MACRO CONTEXT: INSTITUTIONS AS RULES

4.1 Introduction

This chapter surveys the criticisms that environmental valuation neglects to account for the role of institutions as the second macro contextual factor that affects how individuals value the environment. This discussion continues from Chapter 3 which ended with Sunstein's (1994: 811) argument for individuals' reliance on "good reasons" to make decisions by abjuring the money metric and whether institutions enable individuals to pursue their objectives in accordance with their "good reasons". The main argument is that individuals do not act on their underlying preferences independent of others' choice behaviors but 'express' their preferences through institutions instead as institutions embody society's ideals as a whole. Recall that North (2005: 22) defines institutions as "rules of the game—both formal rules, informal norms and their enforcement characteristics". This chapter adopts Ostrom's definition of institutions, however, as her definition is more concrete. In line with North, Ostrom equates institutions with *rules*: 1) Ostrom (1990: 51) in her earlier work defines institutions as "the sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals dependent on their actions"; 2) in her later work, as "sets of rules that will be used to allocate the benefits derived from an organized activity and to assign responsibility for paying costs" (Ostrom, 2000: 178); and 3) more recently as "the rules that humans use when interacting within a wide variety of repetitive and structured situations at multiple levels of analysis" (Ostrom, 2008b: 24; 2012b: 130; see also Ostrom, 2005a: 831). Ostrom and colleagues (e.g. Ahn and Ostrom, 2008: 74; Evans et al, 2008: 111) argue that rules should encompass "formal and informal" sets of rules,

which Yamagishi et al (1998a: 168-169) agree. Besides rules, Ostrom and colleagues equate institutions with "prescriptions" which are "commonly understood, agreed upon, and enforced" within groups at different levels ranging from households to international regimes (Ahn and Ostrom, 2008: 84), and as "commonly understood codes of behaviour that potentially reduce uncertainty, mediate self-interest, and facilitate collective action" (Ostrom and Cox, 2010: 4-5).

However, Ostrom (2005a: 823-824) also views institutions in the abstract as "fundamentally shared concepts, they exist in the minds of participants and sometimes are shared as implicit knowledge rather than in an explicit and written form", and as "potentially linguistic entities . . . that refer to prescriptions commonly known and used by a set of participants to order repetitive, interdependent relationships" where "prescriptions refer to which actions (or states of the world) are required, prohibited, or permitted" (Ostrom and Cox, 2010: 4). That rules are "shared understandings" of the prescriptive and proscriptive rules and sanctions as Ostrom (1998a: 9-10; 2009c: 63) defines is similar to how Vatn conceptualizes institutions as cognitively shared concepts or cognitive models that enable—not constrain—individuals to act by providing shared mental frames of reference such as a worldview or context that is the source of an individual's identity. Vatn (2005a: 205, 207) defines institutions in terms of cognition in addition to rules as constraints on individual behavior ("rules of the game in a society") and normative structures that create common values in individuals and pressures to conform to these values such that rationality is about social appropriateness of an action (doing the morally "right" thing) rather than maximizing individual returns from alternative choices of action. Dowding (2001: 208-209) shares a similar view of institutions by defining them as formal rules or as norms and conventions with

"unspecified" sanctions; the "shared understanding" aspect of rules features in Dowding's argument that promising is "an institution, and so is trust".

Interest in the role of institutions is seen in several recent studies conducted in relatively culturally homogenous localities which have raised the lack of trust in government institutions as a statistically significant explanation of one's WTP. Studies include Chen and Hua's (2015: 46) examination of urban tree conservation in Guangzhou, China, and Adaman et al (2011: 696) on households' WTP for carbon dioxide emissions reductions across 26 cities in Turkey. Distrust in government institutions, however, is not necessarily endemic to particular cultural orientations and such studies serve more to validate (dis)trust as an explanatory factor than to explain the reasons or processes engendering such distrust. Hickerson (1987) critiques this relegation as exogenous of social factors such as trust in his review of instrumental valuation. According to him, orthodox economics adopts a "value neutrality" stance in instrumental valuation by treating cultural explanations of valuations as rational in itself or coincidental (Hickerson, 1987: 1130, 1136); this applies to environmental valuation as a subset of instrumental valuation. However, Hickerson (1987: 1131-1132) argues that individuals are not the ultimate point of reference in valuation studies as the "atomistic view" mentioned above in Chapter 3 subscribes to. Rather, individuals interact in groups which have already formed "existing pattern[s] of response to these environmental exigencies [of satisfying basic needs like food and shelter]". The individual valuations that arise are expressed in social life through "various kinds of institutions that organize and regulate individual behavior". Thus, valuations are more than just "value-neutral", i.e. instrumental, evaluations; they are "expressive" (see Brennan and Lomansky, 1993). Such

expressiveness has been suggested by proponents of CV from their observations of social responsibility and moral worth influencing individuals' WTP (Ryan and Spash, 2011: 684).

The above claims will be examined below in two sections. The next section scrutinizes criticisms of environmental valuation that scholars neglect to explain how institutions affect individuals' expressions of their underlying preferences through valuation as such evaluations cannot be divorced from the context one operates. This is followed by the subsequent section which examines a criticism that individuals do not bid independently of others' decisions but are instead mediated by commonly shared institutions that embody society's ideals as a whole at all levels of society. Raising this criticism challenges the conception of institutions as mere inanimate constraints on individuals' choice behaviors.

4.2 Individuals do not act independently of others' decisions but as a group

Presence of interpersonal interactions through institutions suggests that individuals do not operate independently as "optimizing units" but as a collective when it comes to decision-making (Pritchard et al, 2000: 38; Miljkovic, 2005: 633). However, modern microeconomic theory often does not take into account the psychological and institutional aspects of decision-making (Baarsma and Lambooy, 2005: 460). This neglect, Ciriacy-Wantrup (1971: 40-41) argues, can be traced back to times past when economics has "pushed into the background" social institutions that had once been of "great concern" in favor of "quantitative optimizing models". Ciriacy-Wantrup (1971: 40-41) blames "partly" institutional economics for this omission because it adopted a more "descriptive-historical" than "analytical" orientation in its analysis and became "burdened by traditions and value judgments" without developing "a body of viable theory" of institutions. Such

neglect, nevertheless, is glaring when manmade intervention in the form technology that is delivered and applied to the environment is delivered *through* institutions while the material resources and functions that the environment provides are delivered *to* institutions as Hayden (1993: 411) observes. Hence, Hayden (1993: 411) takes into account the context, i.e. an object's "relations with other things" such as institutions in valuing the object, to argue that context has been neglected by ecologists and economists in their modeling. Hayden (1993: 411) goes so far as to argue that "a purely environmental problem does not exist" but is instead embedded in larger "real world systems" that include the following which any "serious" modeling of "an environmental problem" "should" account for: 1) cultural values; 2) societal beliefs; 3) social institutions; 4) personal attitudes; 5) technology[8]; and 6) the natural environment.

Rational choice, however, need not obviate the need for institutions as Vatn posits. Vatn (2005b: 60, 83) views the concept of institutions as including the "conventions, norms and legal rules of a society [that] provide expectations, stability and meaning essential to human existence and coordination, [and which] regularize life, support values and protect and produce interests". Vatn (2005a: 207) argues that there are three different aspects of institutions: 1) as constraints on individual behavior as "rules of the game in a society" (Vatn, 2005a: 205); 2) as cognitive models that enable—not constrain—individuals to act through shared mental frames of reference and provides a worldview or context that is the source of an individual's identity; and 3) as normative structures that create common values in individuals and pressures to conform to these values such that rationality is about social appropriateness of an action (doing the morally "right" thing) that can help to prioritise certain actions in complex choice situations (such as morally 'grey areas')

[8] Sagoff (2007: 34-35) points out that even market prices do not take into account future technological innovation in assuming supply of a resource to be fixed which makes it thus a problem of "allocation" or "distribution".

rather than maximizing one's returns from alternative choices of action (Vatn, 2005a: 207). Institutions, in this sense, help to foster a common mental frame of reference—such as everybody paying their 'fair share' ("fair distribution" of costs) as Vatn (2004: 9) argues. Such a mental frame views and interprets environmental phenomena through the lens of rational choice/consumer choice which is shared by like-minded individuals such that there is no cognitive structure that can be learned independently of other individuals (i.e. "as unsocialized individuals"), and that concepts cannot be understood independent of the context (Vatn, 2005a: 208). Institutions that influence such mental constructs include the choice of policy instrument such as the voluntary donation or taxation payment vehicle mentioned previously (see Chapter 2) which influence the underlying logics that in turn influence the "institutional frames" people apply to comprehend and act on their preferences in a situation and influence these frames (Vatn, 2005a: 215). Such mental constructs manifest in the form of "value articulating institutions" (VAIs) which are "constructed set[s] of rules or typifications [i.e. common understandings]" that can lead people to behave differently despite their underlying preferences according to the character of the VAI, such as citizens in a deliberative setting or as consumers in an economic setting—the latter such as people possessing lexicographic preferences eliciting "protest responses" in CV surveys but who are still willing to pay (Vatn, 2005a: 211) (elaborated below). Classical economists like Adam Smith, John Stuart Mill and Karl Marx acknowledge the effect of institutions on individuals' desires or preferences; among 'classical' institutionalists, Veblen champions this view (Vatn, 2005a: 210).

The normative structure in Vatn's concept of institutions involves ethics, norms and culture that have been discussed at length above (see Chapter 3). The emphasis on culture is seen in Vatn's (2004: 4) elaboration on the importance of institutions for three reasons: 1) in situations of

uncertainty when individuals rely on "socially tested forms of behavior" embodied in institutions to "simplify" the situation when information is costly; 2) on influencing what are considered as "needs" (e.g. food, shelter and care) which the ways these needs are met are "socially contingent" as they can take a variety of forms; and 3) in fostering likes and dislikes in individuals. This leads Vatn (2004: 4-5) to conclude that preferences are "cultural traits" and to argue that one's behavior depends not on the potential returns expected from alternative choices, but the "normatively appropriate behavior" that depends on the situation or the role one adopts. This behavior is, however, by no means "automatic" or "unreasoned" as each situation "must be interpreted" and the appropriate response selected such that individuals are "reasonable people adapting to the rules of institutions" rather than "slaves of social norms" (Vatn, 2004: 4-5). In other words, individuals have to "acquire" this "understanding" about their own needs, the behaviors of others and the working of the natural world, unlike neoclassical economic theory which assumes that individuals already have a "predefined" ability to understand these things (Vatn, 2004: 4). Furthermore, Vatn (2005a: 209) points out that norms as the normative aspect of institutions play a role in regulating exchange among individuals not just on an instrumental basis to discourage opportunism and fraud, but also on the normative basis of "good conduct" in terms of reputational costs as institutions serve to reduce transaction costs in interpersonal exchange, facilitate transactions, increase the volume of transactions in the market and monitor infringements and punish violators. This regulation of interpersonal exchange by facilitating transactions and punishing violators brings to fore the importance of institutions as constraints on individuals' behaviors. Milton Friedman (2002: 15) seems to exemplify this view in advocating for laws as "rules of the game" as North did (see Chapter 2). In the context of the environment, Sunstein (1994: 817) best represents this view in his stressing on the role of law as he notes that descriptions of the kinds of

valuation can create and alter social norms, and laws are made to reflect this "process of description and valuation" and law can "have effects on kinds of valuation as well".

The relation between institutions and the environment is not straightforward. Hayden recognizes that there is "never a direct relationship between any one institution and an environment" as institutions do not operate in isolation from one another but "overlap" with other institutions in "any social endeavor"; thus, Hayden (1993: 411-412) concludes that institutions "work through" other institutions in "transaction with" the environment. Hayden (1993: 412-413) further argues that no institution exists apart from the natural environment in which it operates, and thus to speak of an "outside force" that impacts on an ecosystem as an isolated system is "not possible" as: firstly, there are many forces and varied; secondly, resources from ecosystems can only be extracted through institutions rather than exist naturally in the wild ready to be used, which leads Hayden to argue for "appropriate" institutions in crafting environmental policy; and thirdly, numerous institutions are "likely" to be related to different kinds of "environmental entities". If the relation between institutions and the environment is so complex and tight, the "regular exchange between the environment and social institutions" makes ecological sustainability and biodiversity "much more difficult to define separate from a particular context and much more difficult to apply in a context" (Hayden, 1993: 414). Hayden (1993: 414) argues that ecological sustainability has "a social meaning" because ecologies and biodiversity have "a social context", such as the wetlands which can change due to "different technological and social habits", but also with "different technological and social regime" (such as dumping of chemicals into wetlands) as socioecological processes can produce the latter changes which involve "human groups, their technologies, and their institutions".

Such interconnectedness between institutions and the natural environment is supported by Sutton and Anderson (2016: 89) who note that "ecosystem services do not flow directly from natural capital to improve human well-being but result from complex interactions of human, social, natural and built capital that improve well-being". Environmental valuation fails to take into account interactions among social, natural, human and built capital such as the *ceteris paribus* (i.e. all things being equal) assumption drawing from Sutton and Anderson's (2016: 90) assessment of the value of Central Park in New York. Hayden (1993: 419) concludes with the proposed solution that institutional economics is more suitable to study ecosystems as the parts and the whole of ecosystems cannot be studied in and of themselves but are "more and more given by technology and institutions" and humans "must decide upon the kind of technology, institutions, and environment". This leads back to "instrumental philosophy" that requires taking into account the context of valuation which is the "whole socioecological process", that is, how environmental goods and services are valued in relation with the process (Hayden, 1993: 419). Such a solution seems to find support in Fourcade (2011: 1769-1770) who argues that the value of nature is constructed as the differences in the valuation of nature brought about by pollution from oil companies, Exxon Valdez in the US and AmocoCadiz in France, show that nature is "never "nature"""; rather, it is "an assemblage of relations involving humans and nonhumans, defined and performed jointly in state policies, legal rules, political commitments, economic technologies, and ecological theories, in the strolls taken along the coastline, the shellfish collected for dinner, the ways of life of fishermen and the sand walked on by visitors, in the claims of scientists and the policies of public officials, and in the ideas and emotions that landscapes we may never have seen evoke in the presumed "public"—us". This emphasis on monetary valuation of the environment,

Fourcade (2011: 1732) argues, demonstrates the "trust in numbers" which is "characteristic" of modern societies occurring as "a historical consequence of political centralization, the progress of a commercialized economy, mass education, and democratic legitimation processes".

The symptoms of this "trust in numbers" is reflected in the "systematic use of quantification in public policy decision making" as mentioned in Chapter 2 which presupposes "a particular form of political rule, one rooted in the authority of rational expertise rather than custom or personal leadership" (Fourcade, 2011: 1732). Sen (2000: 935), echoing Max Weber, argues that this reliance on numbers is a sign of modern societies' demand for "a rationalistic approach, which demands full explication of the reasons for taking a decision, rather than relying on an unreasoned conviction [e.g. tradition] or an implicitly derived conclusion". Such differences in valuation of the environment between Exxon Valdez in the US and AmocoCadiz in France, Fourcade (2011: 1732-1733) contends, is attributed to differences in the legal structure and emphasis in the US and France. For example, the US civil service is less insulated from the public than the French one because public distrust in the state in the US is more so than in France which enjoys more independence and higher status (Fourcade, 2011: 1734). Moreover, the structure of legal contestation is more punitive in the US in contrast with that in France as the US favors juries who act as what Sunstein et al (2002) call "intuitive retributionists" driven by moral considerations and who award large, arbitrary punitive damages as well as common law favoring expert evidence; this contrasts with French legal systems where punitive damages are absent and compensation is symbolic as a token monetary sum for "compensation of moral prejudice" or a public apology (Fourcade, 2011: 1734). Sunstein (1994: 819-820) recognizes that the impact on valuation is attributed to differences in legal systems. He argues as a "limitation" of law that there is no

guarantee that law will adopt a particular kind of valuation even if this valuation method is persuasively defended. This is because valuation requires additional considerations of the efficacy of the law and the principle that supports the use of the coercive power of the state to enforce a law, and considering separation of public and private spheres of life as each sphere requires a different kind of valuation that renders the law acceptable even if the valuation may be inappropriate in other contexts.

If preferences expressed as valuation bids are mediated by institutions whether via rules, norms or one's mental models, adopting a value neutral view of one's preferences may not be the appropriate treatment. Gowdy (2004: 246) criticises the "nonjudgmental" treatment of people's preferences by arguing that "by forcing individual preferences through the narrow funnel of rational choice theory, economists are denying individuals a whole range of choices falling under the rubric of endogenous preferences, that is, preferences that depend on the individual's personal history, interaction with others, and social context". According to Gowdy (2004: 249-251), endogenous preferences manifest in the following: preferences that give rise to endowment effect; socially conditioned preferences; inconsistent time preference leading to time inconsistency and hyperbolic discounting pending future outcomes individuals expect[9]; preferences based on biased cultural transmission depending on opinion leaders rather than rational choice axioms; and other regarding (i.e. social) preferences. Similarly, Baarsma and Lambooy (2005: 469) argue that WTP has to be interpreted in its "institutional context", their suggested "institutions" including income distribution, technology, market structure, property rights, consumer preferences and cultural values which are constraints on individuals' behaviors following Vatn's definition of institutions

[9] Concerning non-linear discounting, Ludwig (2000: 33) notes that "there is some evidence that people do not apply the usual sort of discounting to benefits that are received in the far future".

above. That these "institutions" are "dynamic that evolve interactively" suggest that the final configuration of these institutions in each society is different, which leads Baarsma and Lambooy (2005: 469) to suggest that different people in different societies interpret a WTP question differently. This has even led O'Neill (2001: 1868) to declare that the involvement of property rights as an institutional factor/context may render valuation as "an issue of politics and not one that cost-benefit analysis is even in theory capable of resolving" because property rights to an environmental ecosystem or resource decides "who has rights to expect compensation for producing an environmental good and who has the duty to pay". It also prompts Spash (2011: 360) to argue that pleasure for the individual should not be mere wanton hedonism experienced in isolation from other individuals but should be "the pattern of life and its experiences". Thus, institutions should not be seen solely as constraints on man as "economic man", i.e. *homo economicus*, but also as enablers as they define or "constitute" man as "social man" and create an interpretive context or "meaning" (Vatn, 2005a: 203-204).

If so, new institutional economics as Vatn advocates above may be helpful. New institutional economics is a theory based on Hayek (1937), Coase (1960; 1937), and Williamson (1985; 2000). New institutional economics argues that institutions are not given but impact on economic development by determining the degree of freedom and the kind of information market participants have to base their decisions on, which differentiates it from old and neo-institutional approaches (Baarsma and Lambooy, 2005: 461). Old and neo-institutionalists tend to see an institution as "a social organization that, through the operation of tradition, custom, or legal constraint, tends to create durable and routinised patterns of behaviour that retain their force even in other contexts" (Baarsma and Lambooy, 2005: 461). However, lately, new institutionalists or adherents of new

institutional economics—not to be confused with neo-institutionalists and neo-institutional economics—have come to see an institution as "a set of rules" which are "based on values and experience" (Baarsma and Lambooy, 2005: 461), such as for Ostrom (1986). The goal of new institutional economics is to create rules for markets to work properly by 'optimizing'—maximizing benefits and/or minimizing costs—"organisational and negotiation structures, markets, enterprises, and other actors" (Baarsma and Lambooy, 2005: 462) and not primarily on decision-making itself as with neoclassical economics theory (Baarsma and Lambooy, 2005: 461). New institutionalists view that rational choice theory should not be discarded but "extended or perhaps be modified" taking into account the limited cognitive capacity of human beings to process information, i.e. bounded rationality, and external constraints exerting on one's decision-making capabilities, such as transaction costs, property rights and governance structure (Baarsma and Lambooy, 2005: 462, 463). Vatn (2005a: 205) uses new or "neoclassical" institutionalism to describe institutional economists who base their analysis on neoclassical economics but who reject the assumptions of full information of economic agents and zero transaction costs. Vatn (2005a: 205-206) argues that the uncertainty about the value of knowing more information in a case of imperfect information in markets makes it impossible to determine the level of optimization of actions of agents given their constraints when optimization requires information to be complete, i.e. information costs have to be zero; if so, this undermines the assumption of individual rationality.

The adoption of new institutional economics may be apt also because of a contradiction that Vatn (2005a: 206) identifies which neoclassical economics does not address: that is, the role of the "social planner" (i.e. policymaker) is expected to behave in the public interest (having other

regarding preference) to "represent the will of the consumers" where policymaking creates solutions using markets even for public goods even when economics assumes all agents, including the social planner, to be self-interested maximizers. Sunstein (1993: 221) identifies five ways in which law as constraints on individuals' behavior might deal, or fail to deal, with environmental issues: 1) through failure to resolve CXN problems as understood under common law; 2) through solving CXN problems according to the "optimistic, "public interest" account of environmental legislation"; 3) through well-organized interest groups holding law hostage at the expense of wealth redistribution and even social welfare as viewed from public choice theory; 4) through ad hoc (i.e. "chaotic and arbitrary") action that neglects aggregation of social preferences or lacks coherent social judgment about the public good following Arrow's impossibility theorem; and 5) through a process of deliberation among citizens and representatives such that private preferences are transformed and "shaped" in response to new information and perspectives of other participants. That new institutionalists see humans as social actors with lexicographic preferences rather than the rational economic man (*homo economicus*) may lead new institutionalists to rely not solely on economic valuation and accompanying CBA which measures value in only one dimension (i.e. money) but will include other dimensions of value such as property rights in Coasean bargaining, multi-criteria analysis, allocation games and citizens' juries (Baarsma and Lambooy, 2005: 469).

The importance of institutions shows that the state cannot be a neutral, impartial actor presiding over the adjudication of environmental disputes among actors. Sunstein (1994: 819) argues that the state cannot be neutral over the kinds of valuation because the state "has to make decisions about how to allocate rights and entitlements; it has to decide what can be traded on markets and

what will be subject to politics, and these decisions inevitably will take some sort of stand on appropriate valuations". In this sense, Sunstein (1993: 220) argues that "fully acontextual" preferences "sometimes" do not exist as they are affected by or "endogenous" to existing legal policy including "the setting of the legal entitlement", which complicates the adjudication of preferences and subsequently, the determination of lawful entitlement (see also Bowles, 1998: 75; Boyle, 2007: 18). Sunstein (1993: 225, 227-229) maintains that "acontextual" preferences are a myth that governments are unable to locate to work with. This is because individuals' prior preferences are formed due to various reasons such as individuals' habituation to a good, inertia preferring the status quo, loss aversion or moral responsibility to the commodity. This makes it untenable for governments to be neutral or impartial towards all preferences, but refusal to act on any preference can result in anarchy. Lewinsohn-Zamir (1998: 379) supports the importance of one's initial entitlement noting that preferences can also depend on the "initial allocation of legal entitlements (the endowment effect)". Allocation based on one's prior legal entitlements may lead to Jon Elster's (1983) "sour grapes phenomenon" which occurs when individuals envious of others' better conditions refuse to support a project as allocation is based on such entitlements—such as with respect to income distribution. Notwithstanding the above, Sunstein (1993: 235) does not discount the possibility of working with existing preferences if endowment effect is small but endowment effects tend to be large for environmental resources which can impair hypothetical valuation of resources not traded in markets through stated preference approaches (e.g. via CV). This supports Laurans and Mermet's (2014: 99) argument that ecosystem service valuation does not operate in a "social and political vacuum" resulting in an "automatic" optimization function but "has to be taken up and used by real policy-makers" instead—in fact, as only one agent assumed to act as one "pure rational actor" with one budget constraint. Sunstein (1993: 220) argues

that private preferences for environmental goods may be "adaptive to existing environmental options" stipulated by law and thus this can "sometimes" explain the social demand for environmental regulation and "impeach" the preferences that act as inputs into environmental decisions.

Thus, law can act as the "reference point" from which one evaluates the monetary worth of environmental resources. If so, this violates Coase theorem which states that in cases of economic transactions with negligible transaction costs, the allocation of resources to individuals should be unaffected by initial endowment, i.e. initial property rights (Kahneman et al, 1990; Sagoff, 2007: 53; Vatn and Bromley, 1994: 140; Sunstein, 1993: 223-224, 227). As well, this has led other scholars (e.g. Plott and Zeiler, 2005) to challenge the endowment effect manifested in WTA exceeding WTP (see Louie and De Martino, 2014: 461). Yet, Sunstein (1993: 229) argues that it is "not helpful" to consider counterfactually the case of no initial entitlement such as anarchy or a state of nature even if actors are seemingly allowed to do what they want without apparent legal intervention as such action—such as pollution—is actually backed by state-enforced legislation that gives these actors the right to pollute; in other words, so long as the state exists, the state "inevitably allocates entitlements". If laws affect individuals' expression of their underlying preferences through assigning the initial allocation of one's entitlement through existing entitlement rights (e.g. private property rights), Sunstein (1993: 235) argues that government should avoid satisfying or abide by some aggregation of private preferences when such preferences are not "value neutral" at all but endogenous to the laws that affect them and hence such preferences cannot be taken as "given" in any "global sense" (as opposed to "local sense" in which preferences can be 'locally neutral' when valuation does not (drastically) alter allocation of

endowments to local actors through laws). Or put differently, "sometimes" no "prelegal or prepolitical" preference exists which can be used as a basis for law or policymaking while in other times, social norms rather than law affect valuation (Sunstein, 1993: 234-235); the roles of social norms have been addressed in Chapter 3.

Different institutions can elicit different behaviors and affect how individuals interpret such behaviors. Paavola and Adger (2005: 360) argue that behavioral cues and the institutional context are important as signalling of one's intentions becomes a source of information on one's behavioral cues when agents have multiple motivations and limited ability to detect the motivations of other actors, and different institutions specify the circumstances their rules apply in creating the institutional context. Yet, rules do not determine behavior as agents can exhibit context-inconsistent behavior, such as other-regarding behavior in market institutions (e.g. via buying fair trade products which are more expensive or boycotting goods at their own expense), or corruption in government institutions which demonstrate self-centered on top of welfare-centered behavior (Paavola and Adger, 2005: 360). Consistent with the new institutionalists' definition of institutions which sees rules as values based, Paavola and Adger (2005: 359-360) argue for the contextualism of conflicts among actors which involves situation of specific values, embedding of values in institutions and influence of particular institutions on agents' "preferences, choices, and actions as well as aggregate economic and environmental outcomes". In this sense, Paavola and Adger (2005: 359; see also O'Neill et al, 2002: 141) caution that there is no "algorithmic solution for social choices" as neoclassical economics is wont to espouse, particularly when values are incommensurable (e.g. utilitarian, non-utilitarian consequentialist, and deontological), and instead should highlight the importance of "procedural solutions" as rules (such as aggregation and

decision rules) to overcome incommensurability and "translate values that gain support into institutional rules". This concurs with Sen's (1985: 123) view that the market context can spur one to make 'rational' decisions confuses procedural rationality defined as the procedures to arrive at a maximally preferred outcome, and rationality or rational choice as "a matter of correspondence of choice to the person's reasoning and of the quality of that reasoning", i.e. reasonableness (see Vriend, 1996: 277).

The "algorithmic" solution is associated with the market-based approach based on decision-making (rational choice) axioms, commensurability using money as the metric and aggregative (i.e. additive) procedures to measure society's WTP via the summation of individuals' WTP. However, the pioneer of the general equilibrium theory in mainstream economics, Walras, notes that the market cannot be used as a basis for rational decision-making and that human beings are not totally independent of one another but rather, are dependent on one another to some extent and that "social morality" is distinct from "individual morality" (see Munda, 1996: 165). Such interdependence is emphasized in Kumar and Kumar's (2008: 817) proposal to frame the environment in terms of positional versus relational goods rather than public versus private goods to make valuation "more comprehensive" by accounting for "good social relations" as well as the "productive actions and pleasurable gestures". Interdependence is also emphasized in Boyle's (2007: 18) argument that it is not just "initiatives and institutions" but one must convince others that "one's arguments are good, one's institutional innovations necessary, and one's horror stories disturbing" which Boyle credits environmentalism for doing so by re-presenting "arcane" facts to capture media attention and articulate ideas that "any educated citizen" would be concerned with. Paavola has identified terrestrial (i.e. material) and community (i.e. social) attributes that grant

environmental resources its interdependent feature as a good. Besides excludability and rivalry features, terrestrial attributes include "amenability for multiple uses, mobility, stability or fluctuation of yields, and amenability for storage" (Paavola, 2007: 95). Drawing from Ostrom (2005b), community attributes include "the number of involved agents, heterogeneities of their values, interests and power, as well as the levels and types of social capital they possess" (Paavola, 2007: 95). Risks of free-riding and CXN problems increase with more actors while differences in interests, income levels, goals and values result in greater chances of conflicts among actors' preferences in the utilization of environmental resources; Paavola and colleagues (Paavola, 2007: 95; Paavola and Adger, 2005: 356) argue that these problems can be overcome with greater social capital to foster trust and reduce transaction costs.

A particular problem with institutions is that institutions entrench the very ideas of mainstream economics that can be antithetical to the environment, namely, commodification of the environment. Commodification of nature and the political space (i.e. political institutions and processes) is influenced by framing nature and its worth in terms of "commodity-calculus" that seeks to maximize individual utility through CBA (Pritchard et al, 2000: 39), which could be seen as a consequence of modern societies' "trust in numbers" as Fourcade observes (see above). Pritchard et al, however, view that this framing can be overcome at least on a local scale by reframing natural resource management around common property and communal management regimes as evidenced by Ostrom's (1990) works. However, Munda (1996: 166) contends that commodification is only one of several legitimate points of view and reflects "real power structures" but only partly as other values (e.g. ethics) can render it impossible to reduce "value" to a single numeraire as part of what Functowicz and Ravetz (1994: 198) term "post-normal

science". Post-normal science advocates public institutions to engage the public more frequently as there is rising uncertainty in resolving an increasing number of policy issues that are morally grey areas, such as nuclear power, genetic modification and climate change (Spash, 2011: 363-364). In confronting these issues, Spash (2011: 365) advocates for treating the world not as a "deterministic mechanical system" but a "chaotic evolving biological system", and recognizing the importance of "others", both human and non-human (Spash, 2011: 367). It consequently means, as Stagl (2012: 228) surmises, that "the role of experts, the meaning of knowledge and how decision processes need to be designed to make more effective policy" need to shift the emphasis from the sole focus on outcome towards quality decision processes which ought to be "more transparent, deliberative, and inclusive processes" to inform policy and decision-making.

Alternative models to the policymaker as the monolithic "rational agent" then, according to Laurans and Mermet, are based on Graham Allison's models (see Allison and Zelikow, 1999; Allison, 1971). Besides the unitary rational actor model, alternative models are the "organizational" models that decide based on how a decision problem is fitted into an organization's routine and know-how in order to 'satisfice' rather than to optimize which outlines an organization's mission and 'social appropriateness'; and "policy" models (i.e. bureaucratic politics model) based on competition among different actors and organizations for decision-making authority affecting many interest groups by delineating how policies can impact on various interest groups, triggering the creation of new interest groups through identifying "winners" and "losers" of a policy decision, and acting as justification for policymakers to defend their decisions and influence values (see Laurans and Mermet, 2014: 101-102). Such contestation can give rise to multiple loci of decision-making authority in public institutions or coexistence of "poly centers"

of decision-making which institutional ecological economists emphasize. This empowers subnational actors (e.g. local customary governance systems of natural resources; see Ostrom, 1999: 278-282; Ostrom, 1990) away from national governments which these economists view ambivalently as necessary to create rules (or laws) and set property rights to (re)distribute natural resources but are themselves prone to government failures (Slavíková et al, 2010: 1369). Conflicting interests in managing the environment can be mitigated by institutions striking "a particular balance between conflicting interests by either establishing, reaffirming or redefining entitlements in environmental resources" (Paavola, 2007: 95; Paavola and Adger, 2005: 356).

If so, it is no wonder that Kallis et al (2013: 98) note that there is no "unique" value of environmental goods and services "independent of the distributional and institutional settings within which such values are expressed" as initial entitlements matter, such as one's right to pollute or be compensated for environmental damages which can lead to very different valuations and outcomes (Vatn and Bromley, 1994; Kallis et al, 2013: 98). Kallis et al (2013: 100) argue that monetary valuations are not "isolated phenomena of methodological interest" but are "part of broader commodification processes, which involve symbolic, institutional, intellectual, discursive, and technological changes that reshape the ways humans conceive and relate to nature" which they attribute to "processes of capitalist development through accumulation by dispossession, accentuated under neo-liberalism". However, Kallis et al (2013: 100) caution that there exists "bio-physical, political, and ethical limitations" to monetization which in turn hinders the commodification process and allows for contestation and re-formulation of polices to regulate natural resources. The fear is that ecosystems will be commodified resulting in economics and markets treated as ends in themselves rather than as means to solve environmental degradation

(Bauler and Pipart, 2014: 131; Neuteleers and Engelen, 2015: 255; Schaeffer, 2008: 151). This is not to mention the problem of aggregation in commodifying the object as Kumar and Kumar (2008: 811) underscore the difficulty in measuring the value of "non-commercial and subsistence direct uses" such as environmental goods and services compared to the "value of marketed products"; the absence of markets for such environmental commodities; and the public good characteristics of environmental goods and services such that their access and scarcity cannot be controlled which "imply that the social value of biological resources can't be derived from simple aggregation of their values to individuals in society, the sum of their private values". Besides creating a semblance of 'objectivity' in measurement, Pritchard et al (2000: 37-38; see also Gatto and De Leo, 2000: 347) accuse monetary commensurability of reducing ecosystems or natural resources to prices (as with neoclassical/environmental economists) or energy flows (as with biophysical economists/ecologists) in restrictive (or "normatively rigid") ways in order to achieve equilibrium (such as in markets or alternatively as energy flows), either through individuals' preferences in their role as consumers, or through expert analysis of energy throughput.

Economists such as Costanza et al (1997; see also Gatto and De Leo, 2000: 352), however, rebut such accusations levelled at valuing 'intangibles' like environmental quality by arguing that to make a decision is to put a price on intangibles in terms of risk such as value of statistical life or aesthetics and therefore reduce these intangible aspects to a common monetary scale. They argue that people in fact make valuations everyday through employing trade-offs to mitigate risks of loss of limb and life, such as relying on standards of construction of buildings, bridges and other structures (Costanza, 2000: 7). This line of reasoning has been met with several rejoinders. Sunstein (1994: 804), for one, resorted to the intrinsic value argument for life that life is an end

goal “worthy in itself”, and the valuation of risks is highly contextual dependent on the “setting” such as in relation to other job opportunities available and qualitatively different type of risks (Sunstein, 1994: 837-838; 1993: 251). Aldred (2006: 150), in another, argues that even if agents are made to behave according to rational choice axioms, it does *not* follow that choosing money over some probability of death implies commensurability of money and one’s life, but rather demonstrates the continuity axiom such that an agent will choose money over life given some (very) small probability of death. This explains why Sagoff (2007: 85) argues that economists should just confine themselves to delineating property rights in CPRs and design institutions to coordinate individual action rather than dictating society on the use of WTP as the metric. He charges that the use of the metric ironically empowers economists to “second-guess market outcomes – to treat any as a “failure” – in favor of their own metaphysics, morals, and personal convictions” when instead, as Sagoff argues, “Choice is an activity; individuals are agents; they are not sites where preference or WTP may be found”.

4.2.1 The ‘expressive’ quality of institutions

Given the above controversies, frustration with the ineffectiveness of monetary valuation tools can be partly explained by the neglect to account for the policy context in which these tools are used, that is, “a tendency to overlook the mechanics of how valuation is embedded into the institutions that mediate environmental management” (Phelps et al, 2017: 16; see also Edwards and Abivardi, 1998: 243-244). This is supported by Gómez-Baggethun and Ruiz-Pérez (2011: 623-624) who argue that institutions mediate the transition from economic framing to valuation to application on commodified objects as “cash flows” by stipulating CBA in policies for proceeding from economic framing to valuation, and institutions creating markets for these objects to be traded, e.g. carbon

sequestration, watershed management. Gómez-Baggethun and Ruiz-Pérez (2011: 623-624) recognize that the transition from economic framing to valuation to commodification is not so distinct in reality when policy decisions concerning the environment are made within the framework of markets and institutions favoring markets (i.e. via CBA) when such decisions should be made independent of the market context. In this sense, Gómez-Baggethun and Ruiz-Pérez (2011: 624) argue that money is not a "neutral" measure in the process of commodification of nature as it is tied to the "ideological and institutional structures" that make and implement environmental policy.

Thus, conventional valuation approaches do not take place in a vacuum but in a policy context (Ascher and Steelman, 2006: 81). If government agencies actually diverge from CBA, Adler and Posner (2000: 1124-1125) argue that this divergence reflects not just agencies' data or financial limitations, but also the tug-and-pull of opposing interest groups or public outrage—the latter which is in turn symptomatic of public ignorance, herding, strategic behavior or transgression of morality. Stagl (2012: 229) explains that the sustainability appraisal is "not merely a methodological issue" as the "type of evaluation and the institutional structures in which the [sustainability] appraisal is embedded influences the outcome". This is because valuation and appraisal methods "determine who participates in the decision-making process, how they participate and in what capacity (consumer, stakeholder, citizen), what counts as data, and which data processing and aggregation procedures are used" (Stagl, 2012: 229). To Stagl (2012: 229, 240), this is a process of "institutionalizing social choice" and makes valuation methods "value-articulating institutions" (VAIs). This has far-reaching impacts both on the quality of life of current generations and that of future generations (Stagl, 2012: 229).

Such a view of valuation and appraisal methods as VAI finds support in other scholars. For example, Spash (2011: 363) argues for the "need" for VAI as "[w]ell-being in society, and social decision processes, require institutions that allow for the *expression* of different types of values" (emphasis added) especially as the policy process involves power such as dealing with vested interest groups (e.g. multinational corporations) that are "not part of the [neoclassical economic] analysis" and markets are "socially constructed institutions". Spash (2011: 363) thus cautions against letting markets perform freely on their own without "taking responsibility for market design and functioning" or worse, attempting to fit the world into the market model. The expressiveness element is repeated in Sagoff (2007: 28) who views public institutions as expressive, that is, environmental policy as "the *expression* of public values rather than as the satisfaction of subjective preferences" (emphasis added) with values defined as conceptions of what is "good" or "right" as opposed to values as "consumer preferences"; that is, institutions, political arrangements and processes of public conversation (i.e. deliberation) become "central" as they reflect the collective identity of a community of individuals as well as their sub-community identities (Sagoff, 2007: 29). Expressiveness is also found in another of Vatn's (2005a: 211) definition of VAI where "frames [are] invoked in the process of expressing values that regulate and influence which values come forward, which are excluded, and what sort of conclusions can be reached". Kallis et al (2013: 98) invoke this definition to advance that the "social processes of valuation, including monetary valuation, are value articulating institutions (VAIs)" which lead people to exhibit different preferences depending on the "socio-institutional environment" in which they express their preferences, e.g. in a church versus in a market. Kallis et al (2013: 100) castigate Costanza et al's valuation of the world's ecosystems estimated to be at three times the

world's gross domestic product (GDP) to argue that the monetary value exceeded "reveals the impossibility of internalizing nature with market instruments, [thus] strengthening the case for collective regulation" and that the "absurdly high" dollar amounts of the valuation estimate may on the other hand ironically "question the whole idea of monetary valuation and opens up the space for other value-articulating institutions" even as resorting to environmental valuation may grant environmental valuation primacy over other forms of valuation. Supporting Kallis et al's argument for the "socio-institutional environment" above, Soma (2006: 39) borrows Vatn's (2005b) definition of VAI to argue that differences in contexts such as different "institutional arrangements" (e.g. the market, firm, family, political arena) determines the roles that people adopt which tempers expression of their preferences through behaviors in order to suit the demands of the institution.

The role of the VAI and its importance via its impact on valuation can be seen in the incommensurability argument that O'Neill (2001: 1867, 1873) makes against rational choice by viewing the environment as "a site of conflict between competing values and interests, and institutions and communities that articulate those values and interests" which cannot be reduced to a single measure, whether monetary or otherwise. O'Neill (2001: 1867, 1873, 1870; see also Ludwig, 2000: 34) argues that there is no need to rely exclusively on the money metric to measure costs and benefits when alternative metrics are available, such as the number of people who suffered and gained as a result of a policy intervention, use of judgment, procedural rationality, and expressive rationality. Hence, VAIs are "constructed set[s] of rules or typifications [i.e. common understandings]" in this respect as defined earlier, which can elicit different behaviors according to the character of the VAI: as citizens in a deliberative setting, or as consumers in an

economic setting (Vatn, 2005a: 211). Such a typification includes the notion that everybody pays their 'fair share' of the price (i.e. "fair distribution" of costs) as mentioned earlier (see Vatn, 2004: 9) and market exchange as "a special type of social construct" formed by individuals' common understandings of exchange (Vatn, 2005a: 208).

Legal institutions are one particular type of institution that illustrates this "expressive function". Sunstein (1994: 818), in particular, argues for "the expressive function of law", i.e. "the law's role in reflecting and communicating particular ways of valuing human goods"—and thus the large impact the state has on kinds of valuation "because of law's expressive function" that debates over the plurality of values and incommensurability of human goods. Sunstein (1994: 780, 789) reasons that, "Many legal debates actually involve the appropriateness of different kinds of valuation in different areas of law" rather than just mere "level" of valuation; this is especially so considering that law and social norms can be "related and sometimes mutually enforcing behavioral influences" (Sunstein, 1994: 789). Thus, choosing the socially appropriate "kind" of valuation is a matter of "judgment" that, Sunstein (1994: 790) argues, is "a frequent, though often overlooked, part of social and legal discussion". Sunstein (1994: 820-821) emphasizes the importance of the law's "expressive function", i.e. "whether the rule expresses an appropriate valuation of an event, person, group, or practice", for two reasons. Firstly, law can influence social norms through positive reinforcement (reward) or negative reinforcement (punishment) and social norms are crucial as any assessment of law based on its consequences will not just rely on "brute" facts alone but will be "mediated" by a set of "(often tacit) norms determining how to describe or conceive of consequences". This implies that any legal consequence is "interpretive and thus evaluative in character" and thus "simple consequentialism is not a feasible project for law" to the effect that

the expressive function of law affects both social attitudes and the use of law to decide what sorts of consequences are relevant for legal purposes. This makes any effect of some legal rule "a product of expressive norms that give consequences identifiable social meanings - including norms that deny legal significance to certain consequences" (Sunstein, 1994: 822).

Secondly, law allows for expression of individuals' pre-existing intrinsic motivations such as "personal integrity, commitment and the narrative continuity of a life" which consequentialism cannot fully account for as it is about one's beliefs in a type of life (Sunstein, 1994: 822-823). This is demonstrated by US Supreme Court rulings on segregation, capital punishment, hate speech and practice of religion in schools that have an "expressive or symbolic character" as the Supreme Court "is often taken to be speaking on behalf of the nation's basic principles and commitments". In this sense, the Court has an "educative effect" which is quite different from consequences of rulings "conventionally understood" and which may not affect the content of the law but is a means to understand public views on the various social issues, that is, "the expressive function is a part of political and legal debate" (Sunstein, 1994: 824). Thus, Sunstein's (1994: 858) advocacy of analogies and understanding of legal consequences "mediated as these are through expressive norms" suggest support for the "rule consequentialist" position as understanding such consequences relies on practical reason which in the process avoids monism, i.e. monistic theories of value. Thus, Sunstein (1994: 856-857) proposes to rely on self identity ("self-understanding") as well as communal identity ("a form of narrative continuity within a life or within a society") in order to make choices over incommensurable goods. Nevertheless, Sunstein (1994: 851) acknowledges that the role of the market is one kind among the diverse kinds of valuation as incommensurable goods appears to be tradable, e.g. pets, music, childcare, ecotourism.

From the above, it is difficult to ignore the social inappropriateness of conventional valuation methods. On the one hand, it can be argued that governments attempt to account for social propriety but free-market economists, as opposed to institutional ecological economists, are "very strong" opponents of government intervention and always emphasize the problem of government failure (Slavíková et al, 2010: 1369; see also Paavola and Adger, 2005: 361-362). Despite their differences, institutional ecological economists can even agree with free-market economists that governments are not the principal solutions when private markets are absent or fail to price accurately as governments are vulnerable to rent-seeking behavior and capture by interest groups (Slavíková et al, 2010: 1370). Hence, mainstream economists reject the results of consensus sought through government processes ("measures placed on the ballot by a legislative body") such as referenda and consensus obtained through bottom up initiatives ("ballot measures proposed by citizens") because they are seen as political and not maximizing the aggregate utility of voters, let alone all stakeholders (Ascher and Steelman, 2006: 85-86). Thus, conventional valuation approaches assume that intensity of preferences operates on totalling stated or revealed WTP in the absence of private markets for environmental goods and services rather than via the willingness to participate in the ground-up initiative or referendum vote, or by a policy process that may increase or reduce the intensity through the strategies of political activists (Ascher and Steelman, 2006: 86). On the other hand, Vatn (2005b: 108; see also Slavíková et al, 2010: 1370) argues that institutions can encourage individuals and policymakers to act on their underlying pre-existing preferences based on their interests and ideas about what is considered "a sensible or good society", as supported by Sunstein's argument for the Supreme Court's "educative effect" above. Vatn (2004: 12) illustrates this point by raising CV as an example of a VAI as CV "defines a specific

role for the respondents and it structures what is considered relevant data and the specific rules concerning how data should be handled". This explains the behaviors of some individuals who still offered a monetary bid even though they engaged in protest bids due to the "broader social context" that influences such responses, such as pressure to conform to the rules of the institutional setting or are ambivalent towards treating the environment as a commodity or as a rights based entity (Vatn, 2004: 12).

However, Vatn (2004: 12) warns that conforming to CV does not mean respondents feel that CV is a "proper" VAI. Rather, as Meinard and Grill (2011: 1713) contend, valuation—as in CV—acts as "a medium for consumers to express the economic importance they bestow on abstract goods". Meinard and Grill (2011: 1707-1708, 1709) argue that it is not that economic valuation methods are reductionist as critics claim but that these methods fail to consider the characteristic of the good, whether "abstract" good such as biodiversity or "concrete" good that economic analysis usually concerns itself with, that determines whether individuals can visualize such goods in the abstract for which revealed preference methods demand in order to presuppose the existence of markets for such abstract "goods" as biodiversity. As for stated preference methods (i.e. "contingent valuation methods" and its variants such as discrete choice modeling), the widespread criticism is that stated preference methods are vulnerable to respondents engaging in strategic responses when compared to the veracity of responses elicited by revealed preference methods as elaborated earlier (see Chapter 2). However, Meinard and Grill (2011: 1709) propose that stated preference methods can alternatively be conceived as "a procedure used to let consumers express the economic importance they bestow on the good or the attribute studied" which if so does not disqualify responses that are "expressive or ethical manifestations". Moreover, Meinard and Grill

(2011: 1709) point out that current literature does not compellingly argue that people must not attach any importance to the good or service that they are willing to pay for via their WTP elicited short of arguments that these individuals are indeed unable to attach any importance; this supports Sen's (1979) argument that economists dismiss the importance of "introspection and communication" and also honesty through eliciting one's WTP honestly. Stated preference methods such as CV can shape ("form and refine") individuals' preferences through "expressive media" such as dialogue with one another, written submissions, and actions in private sphere (the market) and public sphere (such as "engage in political action") as preferences are "not entirely predetermined independently of their expression" as Meinard and Grill (2011: 1709) show.

However, the focus of this discussion is the ability of stated preference methods to allow individuals to express their pre-existing preferences for environmental goods and services in the form of WTP in the initial stage of valuation. Individuals then "form and refine" their preferences further along the CV process though interacting with other actors if they are ambivalent towards the environmental good or service in question caused by, for example, the absence of the market (prices) for the environmental good or service to accurately inform their preferences. It is such ambivalence that gives rise to "early problems" in the use of CV surveys which Meinard and Grill (2011: 1709) identify including scoping or embedding effect which are inconsistencies in monetary bids disproportionate to the scale of the environmental good (quantum of monetary bids are the same whether preserving one lake or ten lakes, for example), and sequencing effect arising from the order of the environmental goods presented in the survey form (an environmental good that appears at the top of the survey tends to get a more than disproportionate share of one's total WTP compared to other items further down the survey list). Hence, Meinard and Grill (2011:

1709) contend that such CV bids should be viewed as individuals' "expressions" rather than "fixed preexisting consistent sets of preferences for the goods" that CV strictly requires, which can be refined and mitigated by repeating rounds of valuations while informing respondents of results of previous rounds of valuations which result in "truer" valuation "only to be limited by the specific pragmatic objectives of the enquiry". This supports Venkatachalam's (2004: 94; see also Hanley et al, 2009: 42-43) argument for the convergence between WTP and WTA bids over repeated valuations due to respondents' lack of information about the environmental good or service and who simply lack time to "optimise" their decision.

Indeed, results from valuation studies is not always consistent with rationality as respondents do not consider their budget constraints in bidding their WTP because of the hypothetical nature of the valuation exercise particularly with using stated preference methods relying on hypothetical scenarios, the lack of iteration and learning from repeated valuation exercises elsewhere, and individuals' confusion between their private and public preferences as two different preference structures (Baarsma and Lambooy, 2005: 468; see also Shogren, 2005: 1005-1006); these can lead respondents to value goods in a basket based on their "good causes" which they "dump" onto the survey when one of these goods is surveyed such that it creates "an overall preference" for environmental preservation (Baarsma and Lambooy, 2005: 468). However, Meinard and Grill (2011: 1710) defend stated preference methods as "expressive devices" by citing surveys which study potential consumer demand for novel tangible (i.e. "concrete") products as part of product testing phase of new commercial products to demonstrate that there is "no reason to doubt its [stated preference methods'] relevance" which thus can be applied to "concrete" environmental goods like a specific "emblematic" species (e.g. bears like pandas, polar bears). This parallels

Simonson's (2008b: 193) defense of inherent preferences that can be studied via product testing in refuting Bettman et al's (2008: 172) disagreement with Simonson's (2008a: 162) suggestion of adaptation of one's preferences by arguing that observations of variance in adaptation among individuals to certain objects can be "an indicator of a pre-existing readiness or disposition to prefer". If valuations incorporate "expressive" elements as with stated preference methods, Meinard and Grill (2011: 1710) argue that it is dangerous to compare and aggregate several valuations as different valuations capture different snapshots of valuation which is an ever-changing, shifting ("dynamic") process which thus should not render the criterion for judging among the best valuations as a "clear-cut, mathematical one" but a "tentative, interpretative one".

4.3 Conclusion

Institutions present another perspective showing that individuals do not make decisions independently of others' decisions. The importance of institutions is demonstrated by the extraction of natural resources, their conversion into manmade products, and their sale and ownership, all of which take place through governing institutions. The value neutrality of one's preferences is thus called into question if individuals express their underlying preferences through such institutions which in turn mediate their choice behaviors. This is besides the fact that institutions can embody ideals such as commodification which are antithetical to environmental management, though it seems that institutions merely act as a container which readily take on the goals and ideals of the humans that control them. This gives rise to the interesting observation that institutions can be 'expressive' of a community's normative ideals that goes beyond the instrumental view of the environment to include notions such as a community's vision of the 'good life', or in the converse entrench perspectives antithetical to the environment such as

commodification. This raises the question of how socially appropriate environmental valuation methods are if they are implemented through such institutions which reflect the desired norms of a community, including cultural norms. This is albeit mainstream economists' criticisms of governing institutions which are vulnerable to capture and manipulation by 'partial' actors, whether they be legislatures or voters. In answering these questions and those from Chapter 3, theories are drawn from new institutional economists such as Ostrom, cross-cultural psychologists such as Hofstede, Triandis and Schwartz, and evolutionary psychologists such as Yamagishi. It will be shown through Ostrom that norms, culture and governing institutions constitute the macro context which interact with one's micro context focusing on one's immediate social circle which occupies most of one's daily interpersonal interactions. Amidst these interactions is the contention between cross-cultural psychologists such as Hofstede, Triandis and Schwartz on the one hand, and on the other hand evolutionary psychologists such as Yamagishi in offering rival explanations of such interactions occurring within one's in-group. Together, these theories go towards validating the criticisms levelled at environmental valuation identified in Chapters 2, 3 and 4.

CHAPTER 5 THEORY

5.1 Introduction

This chapter aims to advance the theories of Elinor Ostrom and Toshio Yamagishi in supporting this thesis' argument that context does impact on an individual's valuation of the environment. Recalling Chapters 3 and 4, a discussion of the environmental valuation literature suggests that individuals' expression of their pre-existing preferences towards environmental goods and services are not exogenous to the institutions and culture that people inhabit. Their views interact with those of their fellows. Peering through the depths of the literature reveals that individuals exhibit more agency in the form of resistance towards the valuation exercise than their preferences are supposed to dictate. Such hesitancy in readily placing a monetary value on environmental goods and services whether through surveys outright or indirectly through market purchases seem to be grounded in interdependency among actors' (anticipated) actions of others' as well as the constraints macro factors place on them such as norms and rules; such interdependency and constraints form the context. Ostrom and Yamagishi provide possible avenues to explain and test the effects of context on individuals' expressions of their underlying preferences through valuation. Ostrom (2000a: 141) argues, in particular, that "various contextual factors" affect the "rate of contribution to a public good", including "the framing of the situation and the rules used for assigning participants, increasing competition among them, allowing communication, authorizing sanctioning mechanisms, or allocating benefits". Ostrom (2010a: 70) defines *context* at two levels as "micro" context and "macro" context: the former refers to the "experimental design created by the experimenter to test theory", while the latter refers to "the broader context outside the experiment that may affect the individual". Ostrom's arguments provide the motivation to factor in the role of

context, while Yamagishi's points serve as a rival thesis to those of scholars who argue that environmental evaluation has "cultural" explanations.

The next section discusses how Ostrom's (1986) study of CPR management through the discipline of new institutional economics provides a rationale and foundation for the extensive investigation into interpersonal relations among individuals and macro factors as influences on valuation. Ostrom's arguments for a two-level context and interpersonal trust are put forth to justify considering contextual factors in an individual's valuation. The following section raises the possibility of "cultural" explanations of environmental valuation drawing from the literature on individuals' pro-environmental behavior (PEB) such as recycling focusing on the individualism-collectivism (I-C) dimension of culture that cross-cultural psychologists such as Hofstede, Triandis, and Schwartz extensively and systematically examine. Ostrom's silence on the genesis of reciprocity suggests that cross-cultural psychologists can explain this gap by claiming that one's interests reflects the strength of one's identity in relation to his/her in-group: collectivists conceive their interests in terms of the group. Subsequent section advances Yamagishi's arguments as a rival explanation to those of cross-cultural psychologists through the lens of evolutionary psychology. He argues that it is not one's putative cultural identity of one's in-group that explains why valuations are "cultural". Rather, it is an individual's expectations of future benefits from members in his/her in-group that leads them to conceive a system of formal and informal rules to monitor and punish in-group members who do not reciprocate.

5.2 Ostrom's arguments for the role of interpersonal relations as context

Ostrom's concept of context will be tested in this dissertation for its effects on individuals' environmental WTP. Recall that one of the problems with environmental valuation is the problem of strategic behavior (see Chapter 2) which suggests that individuals' preferences are not as exogenous as mainstream economists assume. When one's WTP is affected not just by individuals' perceptions of the probability that others will pay—and pay their "fair share" at that—but also mediated by the type of policy instrument such as voluntary donations or compulsory taxation which renders individuals' bids legally binding (with taxation) or not (with donation), the interpersonal and policy contexts become integral to one's decision to pay. Such contexts resemble Ostrom's two-level context as mentioned earlier: the interpersonal context which is the "micro" context" and the policy context which is the "macro" context. A chief proponent of the role of context is Vernon Smith (2010: 11) who defines context as "instructions and procedures" in a laboratory setting. He argues that there are "so many dimensions of context significant treatments in determining action" because each context brings to fore aspects (or "defines elements") in a set of myriad circumstances that are besides the explicit payoff motivation, and that the context as "instructions and procedures" triggers an individual to search his or her knowledge based on past experiences in life to make a choice, especially for unfamiliar situations (Smith, 2010: 11). Ostrom and colleagues (see Poteete et al, 2009: 357) support Vernon Smith's definition of context as they note that the experiment, the culture and the environment in which these experiments were conducted affected the behavior of participants and experimental outcomes. Cross-cultural psychologists such as Triandis et al (1988: 324) also observe that reasons for (non-)conformity to norms cannot be attributed to the paucity of norms or sanctions in the laboratory. Simply put, Ostrom (2010b: 6; see also Poteete et al, 2009: 351, 379-380) defines the "macrocontext" as "the social-ecological system in which groups of individuals make decisions" which can include:

biophysical or physical "(such as those characterizing a resource system)"; cultural or communal "(such as those related to shared norms and sense of common history and future)"; and institutional "(related to the rules used to structure relationships)" variables as well as allowing for "feedback relationships" among these variables which can strengthen or weaken levels of cooperation over time (Ostrom, 2009a: 215, 223; Ostrom, 2014a: 9-10). The "microcontext", to Ostrom (2010b: 6; 2009a: 220-221; see also Poteete et al, 2009: 351, 379-380), is "related to the specific attributes of an action situation in which individuals are directly interacting" which generally concern how much information individuals possess about the other party, duration of interaction (number of rounds of interaction), annonymity and signalling to others via communication and punishment.

Cárdenas and Ostrom (2004: 309-310) argue that studying the context of a game is important because institutions affect individuals' decisions to cooperate by performing three key tasks: 1) reinforce social norms that are consistent with the rules; 2) gather information about the behavior of others; and 3) allow rewarding followers and punishing violators through material and non-material incentives. In arguing for the role of context, Ostrom and colleagues (see Poteete et al, 2009: 343; Varughese and Ostrom, 2001: 748; Ostrom, 2009c: 58; Ostrom, 2010c: 160) criticize the abuse of rational choice theory to explain *all* types of situations when rational choice theory "explains how individuals achieve close-to-optimal outcomes in competitive market settings, but fails to explain how individuals will or will not cope with social dilemmas". This is all the more so when many laboratory participants cooperate in one-shot social dilemma situations with no hope of future gain from the other party which suggests that norms and social preferences beyond monetary payoffs can explain individuals' motivation for action, but are only necessary and insufficient to explain cooperation (Poteete et al, 2009: 344). Borrowing from Jon Elster's (1989a:

3) argument, Ostrom (1991: 238) argues that rational choice theory "does not, in the standard version, tell us what our aims ought to be" as individuals but only "tells us what we ought to do in order to achieve our aims as well as possible". In contrast, context gives individuals more clues about what their aims should be as indicated in March and Olsen's (1989: 160) "logic of appropriateness" which argues that behavior is rule-governed rather than consequence-governed (see Ostrom, 1991: 238-239; VanWey et al, 2014: 43; Varughese and Ostrom, 2001: 748). However, Ostrom (1991: 239) cautions that March and Olsen's argument for rule-governed behavior should not dismiss the possibility of rational calculation that the individual can take as individuals have the leeway to decide which actions to take permitted under the rules as institutions do not specify what actions individuals can take but merely indicate what sets of actions are permitted and/or forbidden. Ostrom (2010b: 4, 5) exhorts social scientists to recognize that "individual behavior is strongly affected by the context in which interactions take place rather than being simply a result of individual differences" just as biologists "recognize that an organism's appearance and behavior are affected by the environment in which it develops"; individual differences "do make a difference, but the context of interactions also affects behavior over time". However, Ostrom and colleagues (see VanWey et al, 2014: 32) reject structural determinism (e.g. dependency theory/world systems theory) as an explanation of phenomena, whether structures are social or biophysical, but find these structures useful as "they provide a rich understanding of the constraints and opportunities inherent in changing social and economic structures and varying biophysical contexts". Ostrom (2000a: 153-154) also recognizes that arguing for the importance of context is not sufficient as a theory is needed to show how context matters especially to actors who cooperate on the condition that others also cooperate ("conditional cooperators") and actors who are willing to punish violators even at the expense of their own self-interested gains ("willing

punishers") and the upholding of norms of a population, such as using an evolutionary approach as the "first step"—an approach that this dissertation proposes to do so via Yamagishi.

I explore the effect of an individual's trust in other individuals and his/her confidence in governing institutions in his/her country on his/her environmental WTP. Ostrom's key arguments with relation to the context center on the role of interpersonal trust as the micro context, and on the functions of norms and rules as the macro context. This section focuses on the role of trust as norms and rules will be discussed in subsequent sections when the arguments of cross-cultural and evolutionary psychologists will be evaluated, respectively. Ostrom typically begins her arguments with Mancur Olson's (1965) *The Logic of Collective Action* to argue that his "zero contribution thesis" is a conventional starting point for public goods argument (see, for example, Ostrom, 2000a: 137; 2002: 29; 2007: 244; 2009a: 212; 2014b: 101; VanWey et al, 2014: 42); or with Garrett Hardin's (1968) "The Tragedy of the Commons" which shows that individuals cannot escape by their own effort the prisoner's dilemma (PD) of natural resource usage and thus require external help to avoid such a scenario (see, for example, Ostrom, 2012a: 112-113; Ostrom, 2014b: 101; VanWey et al, 2014: 42; see also Yamagishi and Cook, 1993: 236). External intervention comes in the form of either government intervention on the questionable assumption that public officials understand how ecosystems work and act in the public interest so as to induce socially optimal behavior (Ostrom, 2000b: 31; 2007: 242, 253; 2009a: 211; 2009b: 25; 2009c: 52; 2010d: 321; 2010b: 2-3; 2005c: 254; 2010a: 68; 2012b: 131; 2016: 92; Ostrom and Ahn, 2001: 15), or private property rights to achieve allocative efficiency of resources through competitive market mechanisms (Ostrom, 2000b: 31; 2010b: 2-3: 2012b: 131; Ostrom, 2016: 92) in the form of perfect

competition among firms where all individuals possess perfect information on all goods among other conditions, as mentioned previously (see Chapter 2).

While the PD model dominates scholars' discussion of CPR management such as open access natural resources, Ostrom (2009b: 27) argues that PD as non-cooperative game theory is a "special case useful when individuals attach no utility to the payoffs of others" as there can be many "types" of players interacting within a setting such as the aforementioned willing punishers, conditional cooperators, and rational egoists. Ostrom (2007: 257) thus criticises the sweeping assumption that "all individuals have altruistic utility functions" in explaining experimental findings as it does not explain why individuals are willing to give in some situations and not willing to do so in other situations when the situation as "institutional arrangements" is itself an important explanatory variable. For example, Ostrom and Ahn (2003: 4) criticize first generation theories of collective action by arguing that the treatment of the individual as "atomized, selfish, and fully rational" does not comport with "reality" where individuals "do not live in an atomized world" and that not all individuals are selfish. Ostrom (2010d: 320) criticizes thin models of rational choice operating in the form of the competitive market for managing goods which are not private goods such as CPR and public goods, and points out that Olson's zero contribution thesis is not demonstrated in a "large number" of small- to medium-scale groups confronting CXN problems (Ostrom, 2010e: 551; Ostrom, 2014b: 103). CXN problems such as climate change, Ostrom (2010e: 550-551; 2014b: 99-100) submits, is caused by an aggregation of many local actions, contrary to scholars who promote simply global legal enforcement as a solution (Ostrom, 2010e: 555; 2012d: 354, 365). Ostrom observes that individuals behave differently in different CPR situations contrary to Hardin's prediction that all will overharvest for their own self-interests.

Building on these observations through her fieldwork, Ostrom (2009a: 211) counsels that "building trust among participants that the other participants are trustworthy and reciprocators is an essential core of future theories". This is because individuals are more willing to act on their pre-existing preferences to cooperate with one another to provide public goods and CPRs as Ostrom (see aforementioned) and Yamagishi (elaborated below) find that not all individuals are necessarily rational egoists (i.e. *homo economicus*) but most are in fact willing to cooperate with others *conditionally*. Ostrom notes further that "[w]ithout the development of trust and reciprocity, those who cooperate in dilemma settings may be "suckers" who contribute to the unearned benefits of others". However, she recognises that it is difficult to use "conventional" game theoretic models of individual behavior to explain trust and reciprocity. Ostrom's observation finds support in Yamagishi (2011: 255) who points out that it is "a well-established finding that cooperation in social dilemmas requires trust in other people". Ostrom (2010b: 8) observes that various types of monitoring is important to the health of CPR which is related to the "core problem" of building trust among individuals. Ostrom (2010e: 551-552; 2014b: 105) highlights that trust as an explanatory variable figures powerfully when one considers that even governments rely on citizens' trust in public agencies to implement their policies as they trust the government to be "objective, effective, and fair" instead of running roughshod over citizens using coercion as those scholars imply who advocate government as the solution to CXN problems. Moreover, Ostrom (2012a: 106) points out that the market "itself is not a viable independent institution without being embedded in effective public property arrangements, courts of law, and police", which in turn, depend on the citizens' confidence in these public bodies to operate as they should.

Confidence is, however, distinguished from *trust* as Yamagishi and Yamagishi (1994: 131) define confidence as "expectation of technically competent role performance from those involved with us in social relationships and systems", or as "expectation of competence", while trust is "expectation that partners in interaction will carry out their fiduciary obligations and responsibilities, that is, their duties in certain situations to place others' interests before their own" or "expectation of goodwill or benign intent". This is similar to Schwartz and colleagues' (see Devos et al, 2002: 484) conceptualisation of trust in institutions. Ostrom and colleagues (see Poteete et al, 2009: 350, 353) argue that the "core" of "an evolving theoretical explanation of successful or unsuccessful collective action" is "the internal link between the trust among participants in a common-pool setting—or a more general collective-action situation—and the increased probability of all participants using reciprocity norms" as "[l]evels of trust can act as a heuristic guiding the choice among alternative norms" whether or not individuals choose to reveal their preferences to other actors when the situation is complex and the information on the situation overwhelming. However, the importance of trust and reciprocity have been overshadowed by focus on payoffs even though they claim that Kenneth Arrow (1974; see also Poteete et al, 2009: 350) had "long ago pointed to the essential role of trust between partners as the most efficient mechanism for governing transactions".

I explore how an individual's family can impact on one's learning of norms, particularly cultural norms, which will go towards measuring his/her cultural orientation (see Chapter 6). Ostrom invokes the concepts of learning and norms to describe how individuals can build trust with one another in order to overcome CXN problems—and escape the PD scenario. Ostrom (2010b: 5) argues that "learning and norm-adopting individuals can be used as the foundation for

understanding how individuals may gain increased levels of trust in others leading to more cooperation and higher benefits with feedback mechanisms that reinforce positive or negative learning". Reciprocity among individuals arises when "not only that individuals adopt norms but also that the structure of the situation generates sufficient information about the likely behavior of others to be trustworthy reciprocators who will bear their share of the costs of overcoming a dilemma" (Ostrom, 2010b: 5). Thus, "in some contexts", "rational individuals" need not be helpless in overcoming "social dilemma situations" (Ostrom, 2010b: 5; 2009c: 52),[10] such as the PD as among the most well-known social dilemmas (Ostrom, 1998a: 1-2).

Ostrom and colleagues (see Gardner et al, 1990: 338) define evolutionary process as "learning" process. Dietz (2005: 208-209) elaborates on Ostrom's works arguing that the "core idea" of evolutionary theory is "something like this: information shapes individuals in ways that have consequences for them. Those consequences influence what information persists and what disappears, thus changing the information in the population over time. Also… the population of individuals is a key element of the environment of each individual". Simply put, the evolutionary argument is that individuals are seen as *not* as perfectly informed but boundedly rational who can learn from their mistakes (see, for example, Simon, [1947]1965; Williamson, 1985); individuals can make mistakes in choosing strategies designed to realize a set of goals but learn from their

[10] Ostrom (1998a: 3) defines social dilemma as referring to "a large number of situations in which individuals make independent choices in an interdependent situation". An alternative definition of social dilemma is which "occur whenever individuals in interdependent situations face choices in which the maximization of short-term self-interest yields outcomes leaving all participants worse off than feasible alternatives" (Ostrom, 1998a: 1).

Such conceptualisations of social dilemmas have been echoed by cross-cultural psychologists such as Triandis and colleagues who define social dilemma as "a situation where people are interdependent and face a choice between cooperative (i.e., collective) interests and noncooperative (i.e., individualistic) interests", or as "a situation in which two or more persons receive a higher payoff for a non-cooperative choice (defection) than for a cooperative choice—no matter what the other members choose—but all members are better off if all cooperate than if all defect" (see Chen et al, 2007: 260).

mistakes and improve their strategies (Ostrom, 2007: 256; 2009c: 58; 2010c: 160; 2010b: 3-4; 2010e: 551; 2014b: 104; VanWey et al, 2014: 40-41). This is consistent with Dietz and Stern's (1995: 273) criticism of the assumption of independence of one's preferences as "quite unrealistic" as social influence can help frame choices for individuals as seen in Chapter 3. Ostrom (1998a: 2) observes that norms and rules for how an activity should be executed can evolve over time and monitoring and punishment occur in case of non-performance, for which evolutionary psychologists have produced evidence to show that individuals have evolved the capability to learn norms and "general social rules" that increase returns from engaging in CXN. Ostrom (1998a: 12) argues having a reputation for being trustworthy or for punishing others who do not keep to their end of the agreement or fair share "increases fitness in an environment in which others use reciprocity norms" in an evolutionary context. Ostrom details the process of trust through learning and norms using the "indirect" evolutionary approach where a population consists of conditional cooperators, rational egoists and willing punishers who can learn and adapt their strategies based on their feedback from the other party. The importance of conditional cooperators is supported by Shinada and Yamagishi (2007: 331) who note that the literature shows that "an overwhelming majority of players in the public goods game behave as conditional cooperators (individuals who cooperate if, and only if, other members cooperate) rather than as unconditional cooperators or unconditional defectors". Conditional cooperators and willing punishers are more likely to start by cooperating and subsequently calibrate their cooperation directly proportional to the amount of cooperation from the other party, while rational egoists more likely to start by not cooperating and would adjust cooperation when they lose benefits and learn the strategies of others who are receiving higher material rewards.

However, knowing whether an individual is a conditional cooperator, rational egoist or willing punisher depends on the information available with the trustworthy type requiring complete information while incomplete information can generate the following outcomes: knowing that the population but *not* the individual is trustworthy can still generate cooperation but will decline over time, while knowing what type the individual is through noisy signalling which is "at least more accurate than random" will increase the survivability of the trustworthy type—noisy signals can come from seeing one another (e.g. by inferring from the body language of other party) and face-to-face communication (inferring from verbal cues of other party, e.g. tone) (Ostrom, 2000a: 144-145). The role of the trustor's *perception* plays a part at this juncture as Yamagishi and Sato (1986: 68) note that perception is one solution to overcome problem of free-riding when most people are conditional cooperators ("rational contractors") but difficult to do so in practice, or by assuring that others will cooperate. The "indirect" evolutionary model is in contrast with the "strict" evolutionary model where individuals in the latter are seemingly unable to learn and change their strategies as they are presumed to inherit their strategies which they do not change; over time, those individuals with more successful strategies will survive and reproduce at a higher rate, thus spreading their strategies to their offspring (Ostrom, 2000a: 143). Such evolutionary models operate differently from the selection pressures exerted by the perfectly competitive market which requires specific conditions such as perfect information of buyers and sellers, low transaction costs, self-interest maximization in the form of profits and private property rights. However, Ostrom (2007: 255-256) argues that these conditions are not available in public economies when "[m]any of the situations of interest in understanding how public economies govern and manage collective goods, however, are uncertain, complex, and lack the selective pressure and information-generating capabilities of a competitive market"—leading scholars to assume bounded rationality

on the part of the individual. However, Ostrom's position that learning and norm abiding generate trust among individuals dovetails somewhat with Yamagishi and colleagues' (see Kiyonari et al, 2006: 278, 280) experimental findings that it is cooperation that leads to trust and that trust exhibited by the *trustor* does *not* beget trustworthiness from the *trustee* in their comparison of how American and Japanese trustees behave in a trust game in contrast with the "faith game"—the crux lies in analyzing how norms result in cooperation, for which Yamagishi and the cross-cultural psychologists give opposing views.

Trust is a major topic in the burgeoning literature on social capital. Inglehart and colleagues note that social capital has become a popular concept because it "offers a universal answer to the basic question of all social sciences", which is "what keeps societies together and leads individuals to act for collective goals?" (Welzel et al, 2005: 122). However, how social capital is conceptualized is disputable. Ahn and Ostrom (2008: 73) define *social capital* as "a set of prescriptions, values, and relationships created by individuals in the past that can be drawn on in the present and future to facilitate overcoming social dilemmas". Ostrom and Ahn (2001: 13) consider social capital to "encompass the concepts of trust, norms of reciprocity, networks of civic engagement, rules and law", all of which "affect the expectations that individuals have about patterns of interactions that groups of individuals bring to a recurrent activity". They describe the social capital used in Ostrom's work as "primarily in the form of shared norms, common knowledge, and rules-in-use [i.e. *de facto* rules] and is emphasized as a means of solving the collective-action problems that the appropriators of relatively small-scale, common-pool resources (CPRs) face". Ostrom and Ahn (2001: 9) elaborate that the "shared norms and patterns of behavior the [natural resource] appropriators develop over time" are "forms of social capital" with which they can "build

institutional arrangements for resolving common-pool resource dilemmas", while other factors that help solve CXN problems such as CPR management include communication and repeated interaction and expectations of mutual trust developed from such continued face-to-face communication, and capacity to create their own rules, monitor and punish violators. Paavola and Adger (2005: 363) aforementioned share this view by urging for social capital to be "integrated" into new institutional economics and ecological economics as it facilitates creation and implementation of rules, knowledge and obligations and the building of horizontal networks and vertical social organisations for CXN.

Social capital is an individual level variable because Ostrom and Ahn (2003: 4) view "social capital as an attribute of individuals and of their relationships that enhances their ability to solve collective action problems"; this view pegs social capital to the interpersonal level. Ostrom (1992: 345) argues that "generalized norms of reciprocity and trust" that most resource appropriators share can be used as "initial social capital". Ostrom (1994: 558-559) maintains that social capital can be invested in through bargaining over which rules shall be adopted in allocating benefits and costs of a CXN, and that social capital is "created when individuals learn to trust each other so that they are able to make credible commitments and rely on generalized forms of reciprocity rather than on narrow sequences of specific quid pro quo relationships" (Ostrom, 1996: 31). Ahn and Ostrom (2008: 73; see also Ostrom and Ahn, 2003: 15; Ostrom, 2009b: 27) then identify trustworthiness, networks, and institutions as "three basic forms of social capital"; they are "capital in the broad sense that they serve as independent inputs to economic and political processes and outcomes" even as they do not fulfill Arrow's three conditions of capital though Ostrom and colleagues

dispute this.[11] To illustrate, Ostrom (2000c: 178) identifies the following as forms of social capital: 1) "family structure" as "different types of lineage groups create different types of property rights and access to flows of future incomes"; 2) "shared norms" such as reciprocity but also include more destructive norms such as the norm of deference to elders or those in authority and norm of retribution; 3) conventions which are "particular manner[s]" of handling "particular opportunity or problem in a specific location and time" which have "economic value because transaction costs are much lower when most participants already have agreed that a particular convention is appropriate and positive gains can be achieved with a low risk of breakdown"; and 4) "rule systems" which can be evolved or "self-consciously designed" as rules are needed to create social capital in a "self-conscious manner".

I measure one's trust in unfamiliar individuals than in familiar ones. Putnam shares Ostrom's recognition of the importance of CXN problems by arguing, in Ostrom and Ahn's (2001: 10) words, that CXN problem "lies at the core of economic development and democratic order". As "[e]xplicit contracting and monitoring is often too costly or impossible, and third-party enforcement impractical", voluntary cooperation is "necessary" which is "greatly enhanced when participants draw on existing social capital", the sources being "norms of reciprocity and networks of civic engagement" (Ostrom and Ahn, 2001: 10). Putnam (2000: 134) avers that generalized reciprocity as a "principle" is the "touchstone" of social capital. Ostrom and Ahn (2001: 10)

[11] Arrow's three conditions of capital are: 1) extension in time; 2) deliberate sacrifice for future benefit, i.e. investment in social capital by sacrificing current resources to reap (hopefully) future benefits; and 3) alienability (i.e. transferability of ownership of capital from one individual to another; see Ostrom, 2002: 39). However, Ostrom and Ahn (2003: 15-18) argue that social capital: 1) can be invested in by expending time and effort to make sure rules are promulgated and followed and norms are obeyed; 2) is sellable, i.e. alienable, such as the reputation of a firm from which it is able to be profitable because of its trustworthy and reliable suppliers and loyal and large customer base; and 3) is measurable using surveys (e.g. World Values Survey, International Social Survey Programme).

elaborate that generalized reciprocity "efficiently restrains opportunistic behavior that will lead to an increase in the level of trust by those who have witnessed repeated reciprocity", while "networks of social exchange, which in game-theoretic terms, increase repetition and connectedness of relationships also increase trust" as individuals repeatedly see and hear about one another. Networks of social exchange or civic engagement include "neighborhood associations, choral societies, cooperatives, sports clubs, mass-based parties" which are "a particularly important form of social capital" because they represent heightened engagement or "intense horizontal interaction" among in-group members of these networks (Ostrom and Ahn, 2001: 10).

But how Putnam, a prominent champion of the role of social capital, defines it is problematic for this dissertation. Inglehart and colleagues (see Welzel et al, 2005: 122-123) challenge Putnam's conception of social capital by arguing that "elite-challenging actions" (e.g. boycotts, strikes, demonstrations and petitions, *à la* 2011 "Occupy Wall Street" movement) count as manifestations of social capital. The "institutionalized" nature of voluntary associations (i.e. as "commitments to formal organizations") is viewed by some scholars (e.g. Almond and Verba, 1963: 322; Etzioni, 1993) as "schools of deliberation in which people learn to cooperate, acquire civic skills and adopt such civic orientations as trust and tolerance", where "widespread membership in voluntary associations makes institutions more 'civic', that is, more responsive and accountable to the citizens" in Putnam's (2000) view. However, Inglehart and colleagues show that civil disobedience as "elite-challenging actions" are "non-institutionalized" *but* "their elite-challenging thrust does not disqualify non-institutionalized actions as a form of community involvement". Putnam questions whether anti-elite mass movements (i.e. civil protests) can undermine social capital by destroying 'orderliness' in the form of 'orderly' civic associations though Inglehart and colleagues

attribute this pejorative view of anti-establishment mass actions to confusing "collective violence" (e.g. mob violence, riots, routs, unlawful assembly) with "civil protest activities".[12] If Inglehart and colleagues are correct, adopting Putnam's definition of social capital is problematic for this analysis as individuals *need* to know one another presumably through voluntary associations in order to make CXN possible. This condition is unnecessarily restrictive when one considers that citizens in a state do not know one another but are compelled to cooperate in face of threats such as climate change by contributing donations and/or taxes *believing* that other citizens who are strangers to them will also do so likewise—this theme of expectations of others shall be explored by Yamagishi and colleagues below.

Inglehart and colleagues' contention has ramifications for this dissertation when it explores how one's trust in strangers nested within a country affects one's WTP for environmental conservation, when familiarity with non-strangers self-evidently answers this question. Such a criticism challenges the so-called "network school" of social capital which focuses on whom one knows in making CXN possible when Inglehart and colleagues (see Welzel et al, 2005: 124) find that "participation in elite-challenging action is more closely linked with aspects of civic-mindedness than is association membership". To Inglehart and associates (see Welzel et al, 2005: 140-141), "[d]ifferences between the two forms of community involvement are most evident at the societal level" as "[a]ggregate measures of elite-challenging action show much stronger linkages with any measure of 'good governance' than do aggregate measures of association membership" leading them to conclude that it is one's personal values represented by "self-expression values...to which an activity is tied, not the activity as such, that makes a society civic" and "decide whether people

[12] See Welzel et al (2005: 125) on riots, rebellions and plunder as "uncivic" actions even as "terrorist, criminal and extremist associations" are "uncivic" even though they are manifestations of social capital but in its 'dark' forms.

make civic or uncivic uses of their social capital" rather than social capital *per se*. In fact, as Keefer and Knack (2005: 719-720) note, joining voluntary associations can ironically exacerbate tensions between members of voluntary associations and non-members; more associational activity may actually have weakly positive or even negative impact on probability of CXN; and effects of associational activity may break down at "higher levels of aggregation" (Keefer and Knack, 2005: 710-711). Associational activity may create exclusivity within the population leading to in-groups and out-groups that need not always help overcome CXN problems—as Yamagishi and colleagues will show. Keefer and Knack (2005: 703) argue that trust and trustworthiness are more the "product of individual behavior and decisions" rather than innate which Fukuyama (1995) suggests in differentiating "high trust" societies from "low trust" societies. To Ostrom's credit, she and her colleagues (e.g. Ahn and Ostrom, 2008: 89) qualify that trustworthiness *alone* is *insufficient* to explain how it can contribute to "the formation of one's expectation of others' behaviour" as it is "usually a configuration of the intrinsic motivation, the surrounding social structure, and the possibility of rule enforcement that influences an individual's decision whether or not to reciprocate when trusted". Yamagishi et al (2015: 437) further distinguishes trust into two types whose implications will be elaborated later: *general(ized) trust* towards unspecified individuals at large defined as "default trust in other people when sufficient information is missing to judge whether they are trustworthy or not", versus what is termed here as *interpersonal trust* which is trust in specific actors as general trust as "a fragile form of trust" is "quickly replaced by more specific trust, or expectations of trustworthiness of a particular individual based on information obtained in on-going interactions". General trust is "usually understood from a consequentialist perspective", that is, the trustor's belief whether the trustee will reciprocate the trustor's trust in the trustee (Yamagishi et al, 2015: 438-439).

5.3 Cross-cultural psychologists' suggestion that valuation is "cultural"

Culture's effects on individuals' environmental WTP will be tested in my dissertation. This is because environmental valuation has been suggested to possess "cultural" roots. Indeed, Inglehart and colleagues' argument for self-expression values above suggests that culture can influence environmental management if social capital is necessary to overcome CXN problems. Presumably, scholars favoring the cultural argument (e.g. in studying pro-environmental behavior or PEB; see below) argue that individuals in cultures which stress more the importance of the group over that of the individual are more likely than those in cultures which favor the individual over the group to act on their pre-existing preferences for cooperation mostly (see section 5.2 above on conditional cooperators) with other in-group individuals to achieve group outcomes such as providing public goods and CPRs. From Chapter 3 (see above), scholars have advanced arguments that both culture and norms can influence individuals' valuations of the environment. Norms are values-based standards of behavior as Schwartz (1977: 231) defines for "internalized norms" such as duty, justice, equality and reciprocity. Norms have been argued to influence valuations and even provide a "link" between individual motivators and societal motivators for one's action as well as include the role of institutions as classical or critical institutional economists explore but which "new" institutional economists neglect (see Spash, 2011: 361).

Considering that price is a "social phenomenon" because consumers act in their own self-interests in isolation from the community but can be "influenced by the group's common heritage and culture" if acting within the constituency (Brown, 1984: 239), one way culture impacts on valuations is through the influence of cultural norms such as providing socially desirable bids

(Börger, 2013: 156, 163)—which presumably seeks not to offend others as Yamagishi and colleagues argue (explained below). In making complex decisions with diverse ramifications as opposed to "the simplest kind of choices" that some scholars argue applies for rational choice theory, individuals are argued to adopt a "culturally conditioned sense of fairness" and are willing to enforce cultural norms even at their own economic expense (Gowdy, 2008: 633, 634). However, the intrinsicality of cultural norms has been questioned on the suspicion that they are the product of the economic behavior of many agents (see, for example, Vriend, 1996: 270-271). Culture's influence on valuation seems to reflect the non-material benefits that individuals obtain from the environment as reflected in "cultural ecosystem services" that the Millennium Ecosystem Assessment (2005) and some scholars (e.g. Chan et al, 2012: 744) adopt, as well as "socio-cultural values" that emphasizes both material and immaterial wellbeing (see Scholte et al, 2015: 68). Together, they come under the ES framework that ecological economics claims to "complement or counterbalance" the utilitarian aspects of value (Pröpper and Haupts, 2014: 29-30) distinct from the neoclassical paradigm that environmental economics still uses.

Focus will be on the norm of reciprocity among other norms in my dissertation. Ostrom (1990: 36) argues for the importance of norms, the most important impact of shared norms being on "the strategies available to individuals [that] has to do with the level of opportunistic behavior that [natural resource] appropriators can expect from other appropriators". Earlier, Ostrom (2009c: 51) argues for "boundedly rational, norm-based human behavior" as "a better foundation for explaining collective action than a model of maximizing material payoffs to self". Ostrom and Ahn (2001: 21) cite norms, especially the norm of reciprocity, as an "important form of social capital". Ostrom (1990: 36)) contends that shared norms that "reduce the cost of monitoring and sanctioning

activities can be viewed as social capital to be utilized in solving CPR problems", and that reciprocity is a "basic norm taught in all societies" (Ostrom, 1998a: 10). Such a claim is not far-fetched considering Schwartz and Bardi's (2001: 281) findings that values pertaining to individuals outside of one's social circle, i.e. "benevolence values (helpfulness, honesty, forgiveness, loyalty, responsibility)" and "universalism values (e.g., social justice, equality, broad-mindedness)", rank higher than types of values pertaining to one self (e.g. power, achievement) which suggests that benevolence and universalism values are taught to others from young and that norms towards treatment of others are important. Ostrom and colleagues (see Ostrom, 1998a: 10; Ostrom and Ahn, 2001: 21) define reciprocity as "involving a family of strategies" in CXN situations including: "(1) an effort to identify who else in involved, (2) an assessment of the likelihood that others are conditional cooperators, (3) a decision to cooperate initially with others if others are trusted to be conditional cooperators, (4) a refusal to cooperate with those who do not reciprocate, and (5) punishment of those who betray trust""; thus, trust is "an integral part of reciprocity" to the effect that an individual who adopts the norm of reciprocity is "trustworthy" (Ostrom and Ahn, 2001: 22). Given that information about others' trustworthiness is "an essential input" to an individual's decision whether or not to cooperate, it can be said that reciprocity as a norm "prevails in a society [which] implies that a significant proportion of individuals in the society are trustworthy" (Ostrom and Ahn, 2001: 22).

In Ostrom's (1998a: 4) view, that players can "rationally" choose reciprocity even as standard rational choice theorists assume reciprocation of cooperation with cooperation is "irrational" shows that reciprocity is a "core norm used by many individuals in social dilemma situations". Ostrom (2000a: 142) identifies two types of "norm-using players": "conditional cooperators" and

"willing punishers" which are already mentioned. In fact, reciprocity may not be that "irrational" as Ostrom (1989: 22) views that norms as a whole "fits within the rational choice framework" as norms "are like all constraints on decision making in that they may affect the utility that individuals derive from various actions but do not determine actions". A telling example demonstrating the importance of reciprocity as a social norm is Ostrom and colleagues' (see Ghate et al, 2013: 511) research on indigenous communities in India where many participants cooperated in managing natural resources even in the absence of interpersonal communication, leading them to attribute this to "shared norms" which are "deeply embedded" in these communities that obviate the need for communication (Ghate et al, 2013: 518). Other examples include their observations of behaviors of Japanese workers in the fishery industry of a Japanese coastal community towards contributing to public goods in an experiment which they attribute to norms that reflect the level of competition that workers face in their daily jobs with those who work in a more cooperative environment contributing more to the public good (Walker and Ostrom, 2003: 114). In these instances, Ostrom (2010c: 161) explains that "underlying norms and direct experience in a particular setting combine to affect orientations toward reciprocity". It seems that, Ostrom (2000a: 146; 2009c: 59) observes, some experimental participants enter an experiment bringing with them their "norms and values that can support cooperation".

I investigate whether in-group culture explains how individuals in the in-group adopt norms within the group. It seems how norms operate is that individuals who interact within "a particular rule-structured situation linked to a specific environment" can adopt norms of interaction with other individuals in this situation as there are others who are involved and actions will probably last for some time (Ostrom, 2008b: 24; 2009a: 213). Norms internal to the individual mediate one's choice

which is based on the expected costs and benefits of adopting a particular behavior (Ostrom, 1989: 18). Ostrom (2008b: 24) argues that individuals adopt strategies that affect themselves and others in light of relevant rules and shared norms. Individuals can change norms leading to better or worse outcomes for themselves and the environment when they obtain outcomes of their own actions and others' actions within a particular setting (Ostrom, 2008b: 24; 2009a: 213; 2012b: 130). Ostrom (1989: 22) explains that "new norms" are "more likely to arise in situations where substantial positive or negative externalities exist" as externalities or spillover effects may impel individuals to be "willing to forego some degree of his or her liberty to take action in exchange for an element of control over similar actions of others". For a norm to be "shared" by a group, individuals will first have to identify themselves as "part of a group", i.e. in-group as opposed to an out-group (Ostrom, 1989: 22); Yamagishi analyzes reciprocity within one's in-group but finds that reciprocity serves purposes *different from* upholding of shared norms (elaborated below). It is inferred from Ostrom's (2009a: 216) observation that human beings possess a "high level" of "social intelligence" that interpersonal communication more so than group identity allows an individual to "use the opportunity to elicit norms, assess each other's trustworthiness, and increase cooperation rates" and that human beings are able to "gain a relatively accurate judgment" of who is more likely to be trustworthy in an experiment; Yamagishi further scrutinizes the role of group identity complementing the individualism-collectivism dimension of culture (see below). The likelihood of norm adoption increases where individuals are more likely to share a common future, are aware that their actions are monitored and that cooperative actions can generate higher payoffs contrary to some scholars' views that all humans are self-interested in *all* contexts (Ostrom, 2009a: 224). However, likelihood of norm adoption decreases when individuals do not interact with others or learn about how others behave in similar situations in the past (Ostrom, 2009a: 221, 222).

Cross-cultural psychologists such as Triandis (2001: 911) seem to echo this view of norm adoption such as based on in-group members' shared future, but explain norm adoption in terms of how collectivistic or individualistic a culture is. In "tight" cultures which are highly collectivistic, people agree on punishment for deviation from social norms, surveillance on one another is high as individuals tend to live close to one another, and people are highly interdependent on one another for survival. This contrasts with "loose" cultures which are highly individualistic, individuals are more heterogeneous following different social norms from one another, where surveillance and interdependency on one another is low. A condition for the longevity of moral norms and rules, Ostrom (2009a: 219) explains, is dependent on them requiring to be reciprocated by the other party as observed from experimental findings, or else individuals following a norm or rule will stop following them. The contribution of norms to public goods finds support in cross-cultural psychologists such as Hofstede and colleagues (see Minkov et al, 2013: 1095) who agree that social norms regardless of one's theoretical view of them definitely contributes directly to social order as they discover from one's attitudes towards "societal norms" including homosexuality, abortion, divorce, euthanasia, suicide and prostitution associated with "procreation and preservation of life", in contrast with the effect of "illegal-dishonest factor" encompassing bribery, fare avoidance, tax evasion and public benefits claims associated with obedience to an external, higher authority which "has a cultural element in it" but is "diluted and contaminated with noncultural ingredients".

Nevertheless, Ostrom (2009a: 217) admits that the assumption that humans can adopt norms is controversial because scholars analyzing actions of self-interested ("self-regarding") players in

traditional game theory do not make this assumption, and need not make this assumption when the setting is highly competitive (e.g. market setting). However, Ostrom defends this assumption by arguing that it would be difficult otherwise to explain how human beings cooperate in social dilemma situations using backward induction of repeated games as Yamagishi et al (2005a: 280; Cook et al, 2005: 126) also note. This is so "unless humans have the basic capabilities to adopt norms of behavior that may lead them at times to adopt costly strategies that are not in their short-term material advantage (even though such norms are frequently in their long-term net benefit)", which is backed by evidence from neuroeconomics and dictator games involving double-blind experiments where some individuals gain "pleasure" from following norms such as trusting and trustworthy behaviors and even from punishing violators of social norms (see also Ostrom, 2009a: 213-214; 2010a: 71). Nevertheless, Ostrom (2009c: 57-58) is aware that simply assuming that individuals can be "socialized into seeking better group outcomes" ignores the fact that some groups fail to obtain better group outcomes, i.e. "jointly beneficial outcomes". Furthermore, Ostrom (2010b: 4) admits that "[s]imply assuming that humans adopt norms, however, is not sufficient to predict behavior in a social dilemma, especially in very large groups with no arrangements for communication"; even with strong preferences to follow norms, "observed behavior may vary by context because the perception of the 'right thing' would change" and that the other party may have an unknown or bad reputation such as being a free-rider (Poteete et al, 2009: 348). Cross-cultural psychologists such as Oyserman and Uskul (2008: 150) also raise the importance of perception recognizing that both societal and individual level cultural variables can affect how individuals perceive a situation or is "understood" as "subjective construals", that is, "[s]ocial structures, social situations, and internalized values are likely to influence the sense made of any particular situation (subjective construal of social situations...)".

I treat the norm of reciprocity as a cultural norm in my investigation of culture's effects on WTP. Ostrom (2009d: 748) treats shared norms or "norms of behavior generally accepted in the community" as part of culture (see Chapter 3); she views culture as acting via "cultural norms" individuals share as a community as part of the "social side" of socio-ecological systems. Ostrom and Ostrom (1997: 83, 85, 86-88) eschew conceptualizing culture in terms of worldviews or cosmologies (e.g. fatalism, hierarchy, autonomy, individualism and egalitarianism) as Aaron Wildavsky and associates propose. This is because these disparate types of worldviews suggest that individuals of different worldviews cannot be members of the same organization when these categories stratify society based on age, sex, seniority and other "ego-centered social categories" suggesting people's social positions relative to other people's positions are fixed when in fact, heterogeneous individuals do interact with one another to create rules ("laws as institutional arrangements") and shared norms ("manners and customs") that such cultural differences need not determine how individuals behave. While Vernon Smith (2010: 9) is not so sure that cultural factors can be ignored judging by single play games as opposed to repeated games, Ostrom views that culture need not be deterministic as culture can impede development of trust among individuals and hinder achieving a common understanding or perspective of the problem situation, or be used to exclude others from benefitting from the resource despite shared economic interests. Nevertheless, cultural heterogeneity among group members need not necessarily impede interpersonal cooperation as long as these differences are restrained so as not to impede cooperation through "internal policing" (self-censoring or self-restraint) or that each of the diverse members bring unique resources (such as time, money, specialized skills) that are needed to access a natural resource making it a coordination game (Poteete and Ostrom, 2004: 445); individuals can

set up institutions to enable CXN despite religious, ideological and socio-economic heterogeneity such that institutions can mitigate the impact of heterogeneity just as heterogeneity can influence institutions likewise (Poteete and Ostrom, 2004: 448-449).

In particular, I adopt one measure of one's culture at the individual level, i.e. cultural orientation (see Chapter 6), operationalized using cultural values learned from one's parents which is strongly supported by observations from cross-cultural psychologists. Ostrom's view of culture above as operating through cultural norms does not necessarily conflict with cross-cultural psychologists', such as Triandis (2001: 910) who attributes customs to "aspects" of cultures and habits to "aspects" of personality—but he reasons that customs and institutions arise from habits of people who use "elements" of individualism and collectivism "frequently" (Triandis, 1993: 163). Ostrom's view of cultural norms that *individuals* share is also consistent with Oyserman and Uskul (2008: 148) who, as cross-cultural psychologists, define individual-level culture as "internalized features of culture" in terms of "values and norms". Such internalization occurs as a result of cultural transmission of values. Ostrom and Ahn (2003: 5) argue that 'cultural' concepts such as trust, trustworthiness, and norms cannot be reduced to incentives "embedded in social structures of interaction" as first generation theories of collective action do because norms such as duty are learned from people of diverse communities (e.g. cultures), from experience (e.g. morals; see Ostrom, 2009c: 60), and/or from inter-generational transmission (e.g. elders and peers) (see also Ostrom, 1998a: 9; 2009a: 213; 2009c: 59; 2010c: 161; Ostrom and Ostrom, 1997: 87). In Ostrom's (1998a: 10-11) view, norms do not occur naturally but must be learned via language (Ostrom, 2005b: 126), such as from a young age from parents, siblings, teachers and friends—which makes the evolutionary approach indirect as opposed to strict based on genetic changes. This renders

norms variable from society to society depending on the norms instilled into the individual. Cultures evolve when new entrants to a population would learn the "preference orderings" of those who gain higher material payoffs in the "immediate past" while individuals who are less successful in gaining material rewards would learn the strategies and the values of those who achieve higher material rewards described as "a cultural evolutionary process" (Ostrom, 2000a: 145); the strategies of those who are more successful are dependent on the adoption of shared norms within a community that reinforces the norm-conforming action with repeated, frequent interaction among individuals within the community, i.e. in-group (Ostrom, 2014a: 11).

Triandis (1989: 513) argues that norm reinforcement takes place via child-rearing practices which "are usually associated with rewards for conformity to ingroup goals, which leads to internalization of the ingroup goals", which concur with Schwartz and colleagues (see Dobewall et al, 2014: 8) who find that one's values can be inferred from measuring children's perceptions of their parents' values. Triandis' argument also finds support in Oyserman et al (2002: 115) who argue that parenting can influence the child's adoption of personal qualities from the parent(s) despite difficulties to tease out how institutions influence culture. Yamagishi and colleagues (see Chiu et al, 2010: 486-487) also concur through their observations that ideas which one perceives to be shared in the group ("intersubjective knowledge") is more easily conveyed and communicated to the other and given more priority in groups than ideas that merely achieve widespread consensus, the former such as parents transmitting their personal values and values that parents perceive others in the group share (i.e. "intersubjectively important values"). The inter-generational transmission of culture is reflected in Triandis' (1996: 408) definition of culture which views culture to consist of "shared elements that provide the standards for perceiving, believing, evaluating,

communicating, and acting among those who share a language, a historic period, and a geographic location"; these "shared elements are transmitted from generation to generation with modifications", which include "unexamined assumptions and standard operating procedures that reflect "what has worked" at one point in the history of a cultural group".

Of course, culture may be transmitted by external channels such as education and mass media as Inglehart and Baker (2000: 37, 49) explain in arguing for the use of the nation as the level of culture that impacts on the individual because "once established, the cross-cultural differences linked with religion have become part of a national culture that is transmitted by the educational institutions and mass media of given societies to the people of that nation as a whole". Minkov and Hofstede (2014: 805-806) dispute the dominance of religion in national culture, however. Instead, Minkov and Hofstede draw on three complementary theories to explain the emergence of societal culture in order to argue that national boundaries more than global religions explain the emergence of societal, i.e. national, level culture: 1) functional theory which focuses on "a specific combination of values and norms, resulting in specific behaviors that may be useless, or even dysfunctional, in a different society" to deal with problems particular to a society; 2) complexity theory which explains that "cultures are created through the complex and frequent interactions of individuals who share an environment" which Minkov and Hofstede argue cannot be replicated at the global level such as through global religion; and 3) neo-institutional theory which argues that societal level culture emerges from ways to obtain food, safety and shelter by "trial-and-error" that "achieve acceptable levels of efficiency [which] turn into the structures of rules, norms, values and roles that become accepted as legitimate". Neo-institutional theory coheres with Kluckhohn's (1954) definition of culture as "culture is to society what memory is to individuals" which, in

Triandis' (2001: 908; Triandis and Suh, 2002: 135) view, "includes what has worked in the experience of a society, so that it was worth transmitting to future generations"—though Yamagishi and colleagues (see Chiu et al, 2010: 485) would argue otherwise. Nevertheless, formal socialization is not the only avenue as Schwartz and Ros (1995: 101) point out that "adaptation to social reality and informal socialization are just as central to the transmission of cultural values to individuals as is formal socialization". This suggests that inculcation of norms may be at the personal level as Schwartz (1977: 232) recognizes via informal socialization, but also at the macro level which is the "social- or group-level in terms of the norms, priorities and guidelines set up by societies, cultures, and other social groupings" as Oyserman et al (2002: 114) note in studying personal values. Thus, in terms of Ostrom's two-level context, culture exists in both the micro context at the personal or individual level, and in the macro context at the country level. This affects the operationalization of culture used in this dissertation (see Chapter 6).

I conceptualize culture as individualism-collectivism (I-C) in testing culture's effects on individuals' expression of their pre-existing preferences for cooperation to provide CPRs through their environmental WTP. Ostrom (1989: 22; see also 2010b: 5) explains how norms *in general* occur which are motivated by the presence of externalities, but does not address how the norm of reciprocity *in particular* comes about. She recognizes that not all individuals share the same reciprocity norm as some go by the norm of unconditional cooperation because they trust in others and are trustworthy (e.g. altruists), others conditional cooperation progressing from reciprocity-based to trust-based behavior with positive reinforcement (e.g. conditional cooperators), and yet others either leave the group or change their behaviors by adopting the strategies of those who are more successful in securing higher payoffs (e.g. rational egoists). Ostrom (2003: 44) proposes that

human beings do not "inherit" reciprocity norms through biological processes though they can be learned such as from family, peers and schools; reciprocity as cultural norms can be learned via sociological processes. Still, she does not explain the genesis of the reciprocity norm, i.e. how reciprocity originates. The gap in her explanation seems to be filled by arguments of scholars who incorporate culture into explanations of individuals' pro-environmental behavior (PEB). These scholars argue that I-C as a particular dimension of culture can explain why individuals choose to adopt certain pro-environment actions, such as recycling and participating in environmental social movements. Such scholars include Cho et al (2013), Kopelman (2009), Roy and Goll (2014), Peng and Lin (2009), McCarty and Shrum (2001), and Turkyilmaz et al (2015). For example, in their study on how individualism and collectivism influence perceived consumer effectiveness (PCE) and individuals' environmental attitudes which in turn impact on their environmental commitment, Cho et al (2013: 1056) find that only individualism influenced PCE and environmental attitudes. Furthermore, Cho et al (2013: 1057-1058) identified "Confucian collectivism" as a group cultural orientation "of most interest" even as country cases that are selected are based on "their historical reputation as individualistic and collectivist communities" and sampling is restricted to a convenient sample of college students. As another example, in contending that national culture besides economic factors ought to be examined to explain environmental sustainability, Husted (2005: 353) argues that "[e]nvironmental interest-group activity appears to be much more widespread and diverse in individualistic cultures than in collectivistic cultures". He notes that the pro-environmental movement springs forth from "widely dispersed interest groups, rather than centralized associations", and thus expects that "a country with high individualistic tendency should have more environmental groups and thus a greater social and institutional capacity to respond to environmental problems".

Major proponents of the instrumentality of the I-C dimension of culture are largely cross-cultural psychologists who include Hofstede, Triandis, and Schwartz, but also include researchers of other disciplines such as Inglehart who finds that the various measures of I-C that he, Hofstede, Triandis, and Schwartz propose are correlated with one another which Schwartz (2006: 151-153) agrees. Their measures center on a common theme: "autonomous human choice" (Inglehart and Welzel, 2005: 136), or an individual's "freedom of choice" from others (Inglehart and Oyserman, 2004: 79-80, 89), i.e. "the centrality of the individual vs. the group, group traditions vs. individual wants" (Inglehart and Oyserman, 2004: 74). Oyserman et al (2002: 111) note that the I-C dimension is so prominent in cross-cultural research because "these constructs have received the most research attention as models of cultural difference and because they have appeal as basic processes", and the "bulk of current research either focuses on assessments of individualism and collectivism as value or attitude statements or on assessments of differences in self-concept, well-being, relationships, or cognition as a way to infer effects of individualism and collectivism". I adopt Hofstede's (1998: 26; see also Hofstede and McCrae, 2004: 63) definition of *individualism* as "the extent to which the ties between individuals in a society are loose, so that everyone is expected to look after himself or herself and his or her immediate family only". This is in contrast with *collectivism* which Hofstede (1998: 26; Hofstede and McCrae, 2004: 63) define as "the extent to which people in a society from birth onwards are integrated into strong, cohesive ingroups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty", noting that collectivism has no political connotation as it merely "refers to the group, not to the state".

Among these cross-cultural psychologists, Triandis explicitly studies the influence of I-C dimension on CXN and norms. The norm of reciprocity is suggested to relate to the I-C dimension through different types of exchanges practised in collectivistic cultures which are "communal *exchanges* and much intimacy" as opposed to the "contractual *exchanges* and less intimacy" observed in individualistic cultures (emphasis added) (Triandis and Gelfand, 2012: 508-509). This observation comes on the heel of another observation made by Triandis (2004: 90; Triandis and Gelfand, 1998: 118) that individuals' attitudes are more important than interpersonal norms in individualistic cultures but the obverse is true for collectivistic cultures, and that the difference in one's behavior towards his/her in-group and out-group is greater in collectivist than individualist cultures (Triandis and Gelfand, 2012: 508-509). This is evident in judging the appropriateness of behaviors in particular situations and communications (tone of voice, gesture) (Triandis and Gelfand, 1998: 122; Triandis, 2004: 90). To Triandis and associates (see Suh et al, 1998: 483), collectivists are more likely to achieve social consensus on what is socially appropriate and are conversely less likely than individualists to tolerate deviance from shared norms. Furthermore, in contrast with individualists who see the self as stable but the environment as mutable, Triandis (2004: 90) argues that the mutability of the self that collectivists perceive in contrast with the stability of the environment means that the meaning of individualism and collectivism can change as collectivists change in-groups in defining themselves as interdependent with in-groups while individualists see themselves as independent. The in-group is dependent on how an individual defines his/her in-group (e.g. family together with or as opposed to friends, merchants, government employees), and on the situation which can broaden or narrow the boundaries of one's in-group (e.g. today's rivals may be tomorrow's allies in the face of a larger rival) (Triandis et al, 1988: 326, 333). Thus, Triandis and Gelfand (2012: 507) recognise that groups can experience change

in culture due to change in "situational conditions" such as emphasizing "common fate and the need for interdependence" and presence of "crises and threats to the in-group" can "increase the probability of collectivism", as well as by conditioning individuals' behaviors that reward individuals for group action leading to collectivism or individual action leading to individualist cultures.

The I-C dimension of culture has also been analyzed in its impact on individuals' trust. Schwartz and colleagues applies his model of cultural values differentiated into ten types of universal values (elaborated below) to study their relation to one's trust in institutions which increases as an *individual* becomes more collectivistic (see Devos et al, 2002: 488, 492). One's trust in strangers increases the more individualistic one is but is the converse with collectivistic individuals (Schwartz, 2007: 183-184). Schwartz (1977: 268) adopts an individual level view of culture in terms of one's image of the self—whether independent or interdependent in relation to other individuals—which is the self-construal model associated with Markus and Kitayama (1991: 225; see also Triandis, 1993: 158). The self-construal model explains that people comply with social norms to fulfill the demands of externally learned norms (i.e. "maximize socially mediated external reinforcements") or to avoid letting themselves down if they internalize their norms in order to "maintain or enhance self-evaluation". This is especially so when individuals can be punished by others for not following social norms and social norms are consonant with personal norms but can counterbalance personal norms when they conflict with each other and can become personal norms when internalized (Schwartz, 1977: 268); however, Yamagishi challenges the self-construal argument (elaborated below). Other examples of studies on I-C's impact on trust include Adaman et al (2011: 696) with respect to households' WTP for carbon dioxide emissions reductions in 26

cities in Turkey, and Chen and Hua (2015: 46) in the context of urban tree conservation in Guangzhou, China. Nevertheless, these studies do not explain how or why distrust in government institutions occur as (dis)trust is not necessarily endemic to particular cultural orientations.

Culture conceptualized as individualism-collectivism dimension will be measured at two levels in my analysis: individual level, and group level which is country level. Triandis differentiates culture at the individual level from that at the group level. Triandis and colleagues (see Probst et al, 1999: 174) suggest that the I-C dimension can be analyzed at the cultural and individual levels by proposing idiocentrism and allocentrism as definitions of culture at the individual or "psychological" level that correspond, respectively, to individualism and collectivism at the "cultural" or societal level. Triandis and colleagues (see Probst et al, 1999: 174) define *idiocentrism* which views the individual as "the basic unit of social perception, the self is an independent entity, personal goals have primacy over in-group goals, in-group confrontation is acceptable, and social behavior is not so different when the other person belongs to an in-group versus an out-group". With relation to CXN, idiocentrics "give priority to personal goals over the goals of collectives" (Chen et al, 2007: 261; Triandis et al, 1988: 324), and treat relationships and group memberships as "impermanent and non-intensive, strangers may become friends or allies, and current in-group memberships may be given up for others" (Oyserman and Uskul, 2008: 147-148). This is in contrast with *allocentrism* which views the group as "the basic unit of social perception, the self is defined in terms of in-group relationships, in-group goals have primacy or overlap with personal goals, in-group harmony is a value, and social behavior tends to be very different when the other person belongs to an in-group versus an out-group" (Triandis et al, 1988: 324; Probst et al, 1999: 174). Concerning CXN, allocentrics "are concerned with interpersonal

harmony" by "subordinat[ing] their personal goals to the collective goals" (Chen et al, 2007: 261), and treat relationships and group memberships as "ascribed and fixed, "facts of life" to which people must accommodate", "[s]trangers are not to be trusted; in- and out-group memberships are fixed" (Oyserman and Uskul, 2008: 147-148). In short, the "core meaning" of collectivism and allocentrism, to Schwartz (1990: 140), is "giving priority to ingroup goals over personal goals" and that collectivist cultures and allocentric persons emphasize "values that serve the ingroup by subordinating personal goals for the sake of preserving ingroup integrity, interdependence of members, and harmonious relationships". In contrast, the "core meaning" of individualism and idiocentrism is "giving priority to personal goals over the goals of the ingroup" and that individualist cultures and idiocentric persons emphasize "values that serve the self by making the self feel good, be distinguished, and be independent" (Schwartz, 1990: 140).

However, not all cross-cultural psychologists study culture at both micro and macro levels. Oyserman and Uskul (2008: 145, 168) support the view of culture as multi-level recognising that culture at the societal level can influence culture at the individual level and vice-versa. Uskul and Oyserman (2006: 173-174) echo Ostrom's view of the micro and macro context by noting that answers to self-reported surveys may not necessarily reflect the influence of culture and cultural context on aspects of life that these survey questions pose (e.g. on marriage, on school), but may instead reflect "the research context and potentially systematic differences across cultures in how the research context is perceived". However, Hofstede (see Minkov and Hofstede, 2011: 12; see also Fischer et al, 2010: 137; Triandis, 2004: 89; Oyserman and Uskul, 2008: 147; Oyserman et al, 2002: 6; Triandis and Suh, 2002: 137) and Inglehart (see Inglehart and Carballo, 1997: 35, 41) tend to treat culture at the ecological level. Schwartz (see Schwartz and Ros, 1995: 99; Fischer et

al, 2010: 136) agrees with Triandis that culture can be split into individual and cultural levels but does so from the perspective of cultural values.[13] Still, Schwartz is associated with advocating that both individualism and collectivism at the *individual level* are multidimensional in values which Hofstede (2001b: 215-216) supports. However, Schwartz (1990: 140-142; 151; 2008: 43; 2009b: 131; 1992: 13, 50-51; Schwartz and Bilsky, 1987: 550, 560, 561; Schwartz and Bilsky, 1990: 879, 889; Devos et al, 2002: 482-483; Schwartz and Boehnke, 2004: 230) differs from Hofstede by treating individualism and collectivism as not always orthogonal and in opposition to each other. This is because Schwartz (see Schwartz and Boehnke, 2004: 253, 231; Bilsky and Schwartz, 1994: 166; Roccas et al, 2002: 791) treats each of ten types of "universal values" as correlated with one another in characterising individualism and collectivism which is his "crucial" assumption. This is in contrast with Triandis (2001: 910; Triandis and Gelfand, 2012: 514) and Oyserman et al (2002: 5) who dispute the non-orthogonality assumption. Schwartz (2014a: 550) also advocates seven correlated dimensions to his study of culture at the *societal level*. This is in contrast with Hofstede (1998: 26; Hofstede and McCrae, 2004: 63) who views individualism and collectivism in opposition to each other at that level and with Oyserman et al (2002: 8) who suggest that individualism and collectivism at the societal level may be "better understood as domain-specific, orthogonal constructs differentially elicited by contextual and social cues".

Nevertheless, this dissertation will adopt Yoon's (2010: 46-48) operationalization of I-C as *multidimensional* at the *individual level* consistent with Schwartz's ten types of universal values and Triandis' (2004: 89) argument that individuals can be both idiocentric and allocentric at the same time with both allocentrism and idiocentrism possessing different types (i.e. vertical and

[13] For Schwartz's individual level analyses of culture, see Schwartz (2006: 141), for example. For Schwartz's societal level analyses of culture, see Bilsky and Schwartz (1994: 164-165), for instance.

horizontal). However, I-C at the cultural level is treated as "bi-polar" and "unidimensional" constructs at the *societal level* as they are measured by "short-term, situational cues" as found in surveys of I-C at the societal or country level. However, orthogonality is eschewed at both individual and societal levels of culture to reduce complication and chance of spurious correlation in large scale survey datasets such as the World Values Survey (WVS) that both Yoon and this dissertation draw from (Yoon, 2010: 46-48). Or as Triandis et al (1988: 336) put, "whether individualism-collectivism is one dimension or a multidimensional construct depends on the context of the study": I-C is "one dimension" or unidimensional if "one studies a broad range of values" such as Hofstede, but I-C becomes "multidimensional" if "one focuses only on self-ingroup relationships" as Triandis and colleagues did.

5.4 Yamagishi's "institutional view" of culture" as a "system of formal and informal mutual monitoring and sanctioning"

Another variable of interest included in my analysis is the quality of governing institutions tested for its effects on individuals' expressions of their pre-existing preferences for cooperation to provide public goods and CPRs via their WTP, including the interaction effect between governing institutions and a society's, i.e. country's, culture. The most intriguing feature of institutions from the critique on individuals' valuation of the environment (see Chapter 4) is the claim that institutions are expressive of individuals' values. Scholars such as Sunstein (1993: 225, 227-229) argue that the notion of acontextual preferences for the environment is sometimes non-existent as law as an institution needs to work with existing preferences as baggage. Vatn (2005a: 205, 207) argues for the instrumentality of institutions which he defines as having three aspects: rules, norms, and shared cognitive models. However, Hickerson and Sunstein argue for the "expressive" quality

of institutions. Institutions not just proscribe and prescribe certain behaviors, but also communicate the "expressive norms that give consequences of identifiable social meanings" (Sunstein, 1994: 822). The "existing pattern[s] of [human] response to these environmental exigencies [of satisfying basic needs like food and shelter]" (Hickerson, 1987: 1131-1132) are reflected in the institutions created by individuals who then abide by these institutions in what is known as value articulating institutions (VAIs). Hickerson (1987: 1131-1132) questions the assumption that individuals are the ultimate point of reference in valuation studies as the "atomistic view" subscribes to. This is more so when new institutionalists see humans as social actors with lexicographic preferences rather than the rational economic man (*homo economicus*) which thus calls for other dimensions of value to be included such as property rights in Coasean bargaining, multi-criteria analysis, allocation games and citizens' juries (Baarsma and Lambooy, 2005: 469).

Ultimately, Hickerson (1987: 1130, 1136) views instrumental valuations of the environment as more than just "value neutral" as neoclassical economics claims which treats cultural explanations of valuations as rational in itself or coincidental; they are "expressive" (see Brennan and Lomansky, 1993: 33). Institutions can mediate individuals' expression of their pre-existing preferences for interpersonal cooperation to produce public goods and CPRs such as by expressing individuals' lexicographic preferences through their refusal to endorse monetary valuation tools such as the stated and revealed preference methods by lodging protest responses (bids). Such responses can frustrate proponents of valuation if they fail to understand how valuation is "embedded into the institutions that mediate environmental management" (Phelps et al, 2017: 16; Edwards and Abivardi, 1998: 243-244). As Spash (2011: 363) notes, it is dangerous to let markets operate freely, or worse treat them as role-models of social organization as they are "socially

constructed institutions" populated not by *homo economicus* but dominated by vested interest groups such as multinational corporations. In short, as Hayden (1993: 419) argues, the context in which "instrumental" valuation occurs is actually "the whole socioecological process", that is, how environmental goods and services are valued in relation with the process itself .

I explore through the impact of rule of law at the country level the mediating impact of governing institutions on individuals' expressions of their underlying preferences for cooperation through their WTP. The interaction between institutions and norms gives rise to a peculiar conception of institutions as systems of rules but which are more than the formal laws of an organization or a country since institutions reflect the norms of the individuals who uphold these institutions as the claim above goes. If so, a distinction must be made between what Ostrom (2014a: 11-12; 2010f: 264; Ostrom and Ahn, 2001: 25) calls rules-in-form or *de jure* rules which sometimes describes formal laws, and working rules or rules-in-use, i.e. *de facto* rules. Both types of rules are "commonly understood and enforced prescriptions about what may, must, or must not be done" (Ahn and Ostrom, 2008: 74), which is in line with Ostrom and colleagues' definition of rules *per se*. However, the difference between the two is that the resource management rules that a community adopts need not necessarily reflect the formal laws of the land—though the former may complement the latter where formal laws are silent on certain issue areas or become *de facto* rules when formal laws are not effective. Such distinction is reflected in Ostrom's warning that "[n]o general set of formal rules exist that guarantee successful development of working rules (rules-in-use) in all contexts" (Ostrom and Ahn, 2001: 26; see also Ostrom, 1990: 51). Ostrom (2005a: 824) defines *de facto* rules or "rules-in-use" as "the "do's and don'ts" that one learns on the ground that may not exist in any written document", or even be contrarian to those legislative,

administrative, or court regulations in formal documents (Ostrom, 2005b: 832; 2014c: 89; 1990: 51). This view is consistent with her observations that communities self-govern by adopting working rules that are sometimes independent of the formal laws of the country as the 'third way' of managing CPRs different from private market allocations and public regulation as the two typical solutions taught in a standard economics textbook (Ostrom, 2016: 94).

Ostrom's view of rules above suggests that rule formation is endogenous, i.e. that individuals can exercise agency by changing the rules that they create. For example, allowing communication among research subjects constitute an "information rule change" which differs drastically from forbidding all forms of communication among subjects in laboratory experiments on CXN (Ostrom, 1999a: 503). Working rules have been recognised by scholars such as Gary Becker (1976) who models illegal behavior suggesting that "some probability is presumed to exist that illegal actions will be observed, and if observed by an enforcer, that penalties will be extracted" for which Ostrom terms such rules as "rules in use" or working rules; this contrasts with the implicit if taken-for-granted assumption of individuals as rule followers in standard game theory (Ostrom, 1986: 7). Ostrom (1989: 38; 1992: 347-348; 2008b: 25; 2012b: 132) cites the South California water basin management as an illustrative example in which parties to all except one (Orange County) of South California water basins use lawsuits to "renegotiate their property rights". Doing so transformed the court into a "legal forum for engaging a constitutional process" which led to the court appointing a watermaster to collect and share information among the parties to the water basins. That said, Ostrom (2008b: 24) observes that individuals can use rules created by governments, or make and enforce their own rules. Working rules are, however, not impermeable to external influences such as global changes ("states of the world and their

transformations") as well as the nature of a community. This leads Ostrom (2014c: 91) to caution that working rules "alone never provide both a necessary and sufficient explanation of the structure of an action situation and results".

Nevertheless, if working rules matter more than formal rules to environmental valuation as Ostrom claims, this dovetails with Yamagishi's argument for the importance of rules as formal and informal monitoring and sanctioning rules that a community adopts in his criticism of the "cultural" thesis that argues that intrinsic "cultural" motivations such as individualism and collectivism explain why individuals band together. Both Ostrom (1998a: 16; 2005a: 833-834; 2007: 249; 2008c: 18; 2009d: 752; 2010d: 328; Poteete and Ostrom, 2004: 454) and Yamagishi (see Shinada and Yamagishi, 2007: 338) agree that rules need to be legitimate in order to be binding on any individual in the community, and that rules need to be accepted at least tacitly (Ostrom, 1986: 7; Yamagishi, 1988a: 533; Yamagishi et al, 1998a: 167-168: Yamagishi et al, 2008: 201; Yamagishi and Suzuki, 2010: 198; Hashimoto and Yamagishi, 2015: 116; Shinada et al, 2004: 382; Yamagishi et al, 2005b: 186; Hashimoto and Yamagishi, 2013: 144; Hashimoto and Yamagishi, 2016: 286-287; Hayashi et al, 1999: 41). They even use similar terms to describe the strategies individuals take within a community. However, they differ in the discipline adopted in their analysis. Ostrom discusses individuals' actions using classical game theoretic terms while Yamagishi applies *evolutionary* game theoretic terms in treating individuals as "cultural game players" who pursue their goals "by adjusting our actions in accordance with our anticipated responses from others" in addition to "cultural agents" whose goals are culturally determined or programmed into people's minds (or "culturally installed") (see Hashimoto et al, 2011: 146).[14]

[14] See also Gintis (2007: 300) who distinguishes between classical and evolutionary game theories. However, note that Moller (2002: 556-557) describes evolutionary game theory using different terminology as "new game theory"

This challenges not just cross-cultural psychologists such as Hofstede, Triandis, Schwartz and other well-known scholars such as Markus and Kitayama (1991: 225), but also "a larger community of game-theoretically oriented social scientists" such as Gintis (2007) who focus on incentives or the *direct effect* of punishment at the expense of the *indirect effect* of punishment affecting people's behaviors in terms of their *expectations* of how others would react to their own behaviors (Hashimoto et al, 2011: 146). The role of assurance as mentioned in Chapter 2 reflects this important consideration of one's expectation of others' behaviors before undertaking a particular choice behavior to cooperate or not with the other party notwithstanding one's pre-existing preferences for such cooperation.

The importance of rules is evident from how Ostrom views their functions, especially in overcoming the pitfalls in explanations using rational choice theory. Ostrom (2014c: 88-89; see also Ostrom, 1990: 53; 2005a: 831; Ostrom and Ahn, 2001: 24) finds that rules are created as "the results of human beings' efforts to establish order and increase predictability of social outcomes". Rules, Ostrom (1986: 6) argues, affect the "structure of a situation in which actions are selected" rather than effect singular outcomes or actions; the effects which can be direct or indirect such as by forbidding certain outcomes, or help or hinder certain strategies (Gardner and Ostrom, 1991: 125-126). In other words, rules are not the solution to a game but act to structure the situation (Ostrom, 2005a: 844). Ostrom (1986: 7-8) elaborates that rules "specify sets of actions or sets of outcomes" in three ways: 1) forbidding some specific actions or outcomes which by doing so, specifies indirectly the permissible actions or outcomes by setting upper and lower bounds of an action or outcome, such as traffic speed limits; 2) stating explicitly the upper and lower bounds of

in contrast with "classical game theory" that he sees as defined by von Neumann and Morgenstern who focus on individuals as rational players who possess self-interests that conflict with those of others.

an action and thus rendering those actions or situations unstated as forbidden (e.g. ambits of government agencies such as arrest warrants or public seizures); and 3) must be implemented once the court reaches a judgment (e.g. a legal sentence must be imposed upon receiving a verdict from the jury). Ostrom and Ahn (2001: 24) highlight the double-edged nature of rules as they can be used to "increase the welfare of many individuals or, if collective choice processes are controlled by a well-organized subgroup, to benefit that group more than others". Rules can be wielded as "the means by which we intervene to change the structure of incentives in situations", and manmade rules can be changed but "physical and behavioral laws cannot" (Ostrom, 1986: 6). This distinguishes physical and manmade laws apart from each other even as they both belong to the "game-theoretical rules" as Ostrom argues but game theorists largely neglect to elaborate this distinction as they are more concerned with the outcomes resulting from individuals' choices unless outcomes differ among games and affect the choice situation as Anatol Rapoport (1966: 18; see also Ostrom, 2005a: 831; 2005b: 17-18; 2014a: 11) avers. The malleability of rules renders rules "interesting variables" as humans can change rules which is one of rules' "key characteristics" (Ostrom, 1986: 6). More specifically, Ostrom (1986: 5) elaborates the specific functions of rules which are "the result of implicit or explicit efforts by a set of individuals to achieve order and predictability within defined situations by: (1) creating positions (e.g., member, convener, agent, etc.); (2) stating how participants enter or leave positions; (3) stating which actions participants in these positions are required, permitted, or forbidden to take; and (4) stating which outcome participants are required, permitted, or forbidden to affect".

Rules play an important function in managing CPRs that Ostrom argues has been overlooked by rational choice theory. Ostrom (2008a: 251) argues that two conditions must be met in order for

rules to be successfully adopted: 1) expected or perceived benefits must exceed expected or perceived costs of creating or changing rules relating to access to and harvesting of the resource; and 2) a critical mass or "minimal winning coalition" of members in a group is needed to agree that the perceived benefits of adopting or changing the rules is positive overall. That individuals can actually adopt rules to overcome CXN problems, Ostrom (1998a: 4) argues, is at odds with rational choice theory's "indeterminacy" problem which is the lack of a unique equilibrium due to multiple equilibria arising from two kinds of uncertainty: the number of repetitions (finite versus infinite) and type of players (rational egoists versus "irrational" conditional co-operators). Another problem with rational choice theory that Ostrom (1991: 240; 2010c: 156; 2009c: 53) identifies is the "inadequacy" problem whereby the theory is insufficient to predict individuals' actions as shown by the lack of empirical evidence for the theory. Ostrom (1986: 21) points out that the absence of stable equilibria when individuals use "majority rule aggregation procedures" (e.g. as demonstrated by Arrow's impossibility theorem and the Condorcet paradox) is "not consistent" with empirical observation that individuals are able to formulate and implement rules among themselves to reach stable equilibrium or near-stable equilibrium—and even manage to achieve optimal or near optimal outcomes if individuals possess low discount rates and interact in indefinitely repeated rounds of social dilemma situations (Ostrom 2003: 23-24). In particular, Ostrom (1989: 17) criticizes the "extreme assumptions" in "standard" game theory such as complete information, infinitely repeated situations, absence of erroneous moves made by players and very small groups as they are "rarely approximated" in the field for which Ostrom proposes to treat these assumptions as "*variables affected by the situation* rather than as assumptions or constants unaffected by the situation" (author's italics).

Rules are important by permitting violators to be punished which is essential to creating assurance to contributors to a CPR. Besides legitimacy and universal acceptance of rules mentioned earlier, Ostrom repeatedly emphasizes the need for enforcement for rules to be effective. This is important considering that each community will have "some" rational egoists which means that individuals cannot be relied on their own intrinsic motivation to cooperate but instead will have to craft institutions to encourage the intrinsically motivated to cooperate while deter free-riders and untrustworthy partners, as Ostrom (2005c: 259-260) notes. Thus, Ostrom and Nagendra (2007: 195) argue that it is wrong to assume that either *all* individuals will cooperate to solve resource dilemmas or that *no* individual will voluntarily make and/or enforce rules to govern CPR. Such deterrence can occur in the form of costly monitoring and sanctioning activities undertaken such as by willing punishers which are needed besides the rules themselves, as Ostrom and Nagendra (2007: 186) find. Rules need human beings to enforce them in order to be effective as "rules are not self-formulating, self-determining, or self-enforcing" but are formulated, implemented and upheld by human beings (Ostrom, 2005a: 833; 2014c: 90). Even if rules have "shared meaning" for all individuals, the context in which rules apply can change due to changes in technology, in shared norms and in circumstances (Ostrom, 2014c: 90). This, however, is "not consistent with the theory of norm-free, complete rationality" as Elster (1989b: 40-41) argues which Ostrom (1999a: 505) concurs. Rules need to be enforced in order to be effective, but can be breached by parties in contrast with players in a formal game (Ostrom, 2005a: 833).

However, rules meting out punishment need to be paired with interpersonal communication in order to be most effective (Ostrom, 2012c: 34; 2012e: 79; 1998a: 8; 2014d: 8), as individuals need to "communicate, sanction one another, or make new rules" (Ostrom et al, 1999: 279). Rules must

be generally known and understood, seen as morally rightful (i.e. legitimate) and followed and enforced to be considered effective (Ostrom, 2007: 249). The necessity of enforcement and communication thus goes back to the issue of trust as the presence of rational egoists in a group—exacerbated by heterogeneity of interests, capabilities and background situations among actors (Ostrom, 1992: 344)—suggests a trust deficit among individuals which calls for "further investments" in "monitoring activities" and "appropriate sanctions" for "non-conformance" if those who are "learning how to use a set of rules do not trust one another", as Ostrom and Ahn (2001: 27) argue. Ostrom and Ahn (2001: 25; see also Ostrom, 2008c: 17) note that formal institutions in the form of rule of law can foster generalized social trust in a diverse society through "legal pragmatism" which implies that: 1) "both the content of the laws and the procedures of application and interpretation should, whenever possible, reflect the common features found in the cultures of different social groups"; 2) "the rule of law should be flexible enough to accommodate the diversity of problems characteristic of a modern, socially heterogeneous society"; and 3) "the process of applying legal rules must take account of the full range of relevant interests in a socially diverse society".

A phenomenon of interest in this dissertation is assurance when one's trust in others is conditional on the availability of punishment for violators. Like Ostrom, Yamagishi also emphasizes punishment but with a twist: that it is not intrinsic "cultural" motivation that explains the behavior of in-group members such as reciprocity observed as an in-group norm, but self-interested motivations that drive members of one's in-group to create and administer a system of monitoring and punishment on all other members. Recall that both Yamagishi and Ostrom agree on the legitimacy of rules in order for rules to be effective. The 'twist' refers to the indirect effect of

punishment in terms of altering one's *expectations* of the probability that others will cooperate that Shinada and Yamagishi (2007: 338) argue contribute to the legitimacy of rules; this is in addition to the direct effect of punishment which alters the incentives to cooperate or defect that game theorists usually emphasize. Shinada and Yamagishi (2007: 330-331) note that "[m]ost experimental studies of punishment" including Ostrom et al (1992), Fehr and Gächter (2002), and Olson (1965), neglect to separate the indirect effect from direct effect of punishment as they analyze them for their "combined effect" on promoting interpersonal cooperation. Rather, Shinada and Yamagishi (2007: 331) argue that the indirect effect can "supplement" the direct effect: the direct effect of punishment "transforms outcomes of cooperation and defection" in terms of profitability of cooperation as opposed to free-riding, and the indirect effect of punishment affects one's expectation that others will cooperate which is "a necessary (although not sufficient) antecedent to a cooperative venture". Shinada and Yamagishi (2007: 331) explain that the indirect effect of punishment operates as "threat of punishment" that "provides reassurance to conditional cooperators that other group members will also cooperate" which "satisfies their condition for cooperation"; in other words, punishment promotes cooperation "among conditional cooperators through the reassurance it provides, rather than by the fear of being a target of penalization (the direct effect of punishment)".

If Yamagishi and colleagues' view of the indirect effect of punishment is correct, it holds major implications if one considers that "an overwhelming majority of players in the public goods game" are "conditional cooperators (individuals who cooperate if, and only if, other members cooperate) rather than as unconditional cooperators or unconditional defectors", as Shinada and Yamagishi (2007: 331) note of the literature. In effect, it is not only that the rules operating as *incentives* that

affects whether individuals cooperate with one another, but the *fear* that one will be punished by other individuals that also encourages cooperation. Thus, a possible criticism against revealed preference methods of environmental valuation, as Yamagishi et al (2005a: 279) note, is that "the experimenter cannot tell from the players' actions whether the mutual defection results from the players' own untrustworthiness (preference for defection) or their inability to trust each other despite their own trustworthiness (preference for cooperation)" as one player in a PD can be driven by fear of the other's untrustworthiness rather than greed in defecting, while the other player can perceive the first player as motivated by greed in defecting. Yamagishi et al (2005a: 300) argue that this requires separating trust from cooperation in order to allow the researcher to identify one player's defection based on fear of the untrustworthiness of the other rather than greed in the trust game.[15] Yamagishi and colleagues (see Cook et al, 2005: 128-129) note that greed and fear are tied to the decision whether to cooperate or defect in PD and social dilemma: in PD, one party's greed and the other party's fear of the former's greed, or one's fear of the other's fear that one does not cooperate leads one to defect.

My objective is to investigate Yamagishi's claim that how culture operates may *not* be through intrinsic motivations that one possesses by virtue of membership to a cultural, i.e. individualistic or collectivistic, group. Rather, culture utilizes a mechanism that involves one's pragmatic expectations of future benefits obtained from other individuals in one's in-group through their reciprocation to one's contributions to the in-group that is coupled with a system of punishment that penalises those in the in-group for not reciprocating. It is thus one's expectation of whether the other party will cooperate that Yamagishi argues for two components of trust in criticising the

[15] Yamagishi and Sato (1986: 67-68) define *greed* as "the active pursuit of self-interest" and *fear* as "the motivation for uncooperative behavior that is based on the lack of trust and the sense of helplessness".

arguments of cross-cultural psychologists using his "institutional" view of culture. Yamagishi et al (2015: 436) argue that general trust has two aspects: "the responder's belief that his/her trust will be honored and his/her preference to be a trusting person". Correspondingly, general or attitudinal trust has both a "belief component" in the sense of one's belief in whether others reciprocate trustworthily (i.e. "expectation of other people's trustworthiness"), and a "preference component" in the sense of one's preference to want to trust others (i.e. "preference for trust...is for self-identity—what kind of person I want to be") (Yamagishi et al, 2015: 440-441, 455). It is this "belief component" in terms of one's expectations of others' trustworthiness that leads Yamagishi (1988a: 533, 534) in his earlier work to propose a "cultural-institutional" approach that stresses the presence of mutual monitoring and sanctioning that prevents individuals from free-riding in a group rather than the "cultural-individualistic" approach that argues that it is individual members' collectivistic orientations that prevents them from free-riding; Yamagishi's (2003: 356-357) "institutional view of culture" operates as a "system of formal and informal mutual monitoring and sanctioning".

Yamagishi's evidence for his "institutional view of culture" comes from his experiments which find that American participants cooperated more than Japanese participants in the absence of a punishment system, but the Japanese cooperated more than the Americans when the Japanese themselves paid for a punishment system (see Cook et al, 2005: 124). Similarly, an earlier experiment comparing exits between two groups with free riders that Yamagishi (1988a: 539-540; 2003: 356-357; Yamagishi et al, 1998a: 167;) conducted reveals that Japanese participants exited from their group made up of Japanese participants *more often* than American participants in a group with other American participants in the *absence* of punishment even when the costs of

exiting the group was high, but Japanese participants exited as likely as their American counterparts when costs of exiting from both groups was equally low. This should *not* be the case, Yamagishi (1988a: 532, 533) reasons, if Japanese are more collectivistic than Americans are and thus Japanese would not free ride or less so than the Americans. This is because the Japanese being more collectivistic "are more concerned with the interests of the group than their own individual interests" such that their "collectivistic orientation deters them from free riding". In fact, while defending that large-scale cross-national surveys are not merely "lip service", Yamagishi (2011: 255) shows that Americans are more trusting, i.e. higher in general trust, than the Japanese which is contrary to the putative view that the Japanese are more trusting of one another since the Japanese are more collectivistic and hence should be more cooperative with one another.

Yamagishi (1988a: 541) explains the counterintuitive behavior of Japanese participants above through his "structural goal/expectation theory" that it is "the different opportunity structures available" in the "cultural" system rather than an individual's cultural orientation that leads individuals to behave individualistically or collectivistically: low exit cost (i.e. low barrier to exit) from the group obviates the need for collectivistic solutions such as instituting a system of mutual monitoring and sanctioning but high exit costs necessitates such a collectivistic solution as the "only viable solution". This explains why Ostrom (1998a: 8) is able to show using experiments run by Yamagishi (1986; 1988a; 1988b) that low-trusting individuals outperform high-trusting individuals in contributions to the collective goods when given the opportunity to contribute to a "punishment fund"; thus, it is not merely trust *per se* but coupled with punishment that enables low-trust individuals to achieve near optimal outcomes. An individual's cost of exiting his/her in-

group depends on the availability of resources to that individual outside his/her in-group that is at least comparable to those the in-group provides in order to ensure his/her survival.

The cost an individual incurs from exiting his/her in-group is essential to Yamagishi's (2013: 24) explanation that norms come from individuals themselves who form a group and possess "self-sustaining system of shared beliefs" about how others in one's in-group will behave by reciprocating or not his/her contribution to the in-group given the group incentives available to him/her such as pooled resources for survival or social support from the group (Hashimoto and Yamagishi, 2013: 144; 2016: 286-287); this explanation contrasts with Ostrom who does not explain how reciprocity occurs. This explains why individuals reciprocate in-group members due to the former's own beliefs about how others reciprocate and the incentives that reward appropriate individual behavior. Hence, Yamagishi (2011: 255-256) questions the need for trust if punishment can bring the group together in order to act collectively since he observes that the Japanese function in an "*assurance*-based society" rather than "*trust*-based society" (emphasis added). In an assurance-based society, interpersonal trust within one's in-group is unnecessary when mutual monitoring and punishment ensure that all members in the in-group abide by group norms, cooperate with one another but forego opportunities to interact with out-group members which may be more lucrative but riskier when there is no monitoring and punishment mechanism. However, in-group members face high costs of punishment such as being expelled from their in-group if they fail to cooperate with in-group members. Thus, it is "the nature of social incentives" that "coerce" people in a collectivistic group to behave in a "trustworthy" manner as measured by one's reputation for cooperation within the in-group which is more likely to occur in the absence of a "fair and effective legal system". In fact, Shinada and Yamagishi (2007: 338) further question

government intervention as an alternative solution to the market in solving CXN problems by arguing that Hobbes was in fact championing the use of indirect effect of punishment by affecting people's expectations of others' cooperative behavior rather than using the direct effect of punishment by using a central authority to force others to comply.

Thus, Yamagishi and colleagues explain the differences in general trust between Americans and Japanese by arguing that Americans exhibit more trust and Japanese want more assurance as commitment to a long-term relationship is more important to Japanese than to Americans. Trust is defined here as "an expectation of others' benign behavior under circumstances where people do not have control over others" and assurance as "an expectation of others' benign behavior within stable and mutually committed relationships where people have control over each other", which Ostrom adopts (see Hayashi et al, 1999: 34; see also Yamagishi and Yamagishi, 1994: 131-132). Japanese want assurance and the 'sense of control' in order to achieve "closed and stable social relations" which thus renders "mutual control" of the other party in the form of mutual monitoring and sanctioning important in Japanese society (Hayashi et al, 1999: 41). Thus, Yamagishi and colleagues (see Hayashi et al, 1999: 42) argue that cooperation among Japanese cannot be attributed to collectivism which is a "premature conclusion" when it is assurance or a "sense of control" over the other party's choices that explains cooperation among Japanese, whereas Americans base their trust on their "general belief" that human nature is benign. If so, this generalizes to the conclusion that it is one's belief in the "nature of social relations and of human nature" rather than differences in "motivation to be altruistic or cooperative" that have a "profound influence" on how people behave in interdependent situations. Yamagishi et al (1998a: 169-170, 189; see also Yamagishi and Yamagishi, 1994: 133) argue that "general trust (trust in others in

general) and commitment formation are considered alternative solutions to the problems caused by social uncertainty"; social uncertainty is defined as "the risk of being exploited in social interactions", i.e. "when (1) his or her interaction partner has an incentive to act in a way that imposes costs (or harm) on the actor and (2) the actor does not have enough information to predict if the partner will in fact act in such a way".

The instrumental role of one's expectations of others' likelihood of cooperation in games points to the larger role an individual's perception of others in his/her in-group plays in further questioning the cross-cultural psychologists' stance. The role of perception is obtained from Yamagishi's (2013: 24) explanation of the norm of reciprocity above that mentions that individuals in an in-group share certain beliefs about how others in the group behave towards them given the incentive structure of the group, their actions which ultimately reinforces such beliefs leading to a "self-sustaining system of shared beliefs" of their own making. Yamagishi and Suzuki (2010: 194) hint that reciprocity among individuals arises within institutions as "a self-sustaining system of incentives" when "each party's response to an incentive provides an incentive for the other party to respond in a certain way" which in turn creates a "mutually reinforcing relationship" which is "self-sustaining". This explanation is supported by Yamagishi and Kiyonari's (2000: 127) experiment which finds that expectations of in-group reciprocity overpower group identity as the source of cooperation among individuals in one-shot PD, as their "most important finding is that players gave more money to an in-group member than to an out-group member in the simultaneous game, but not in the sequential game". Moreover, they find that "players expected a higher level of cooperation from the partner and cooperated at a higher level in the sequential game than in the simultaneous game", which suggests the "power of direct reciprocity" but not in-group reciprocity.

They also show that "statistically controlling for the effect of expectation greatly reduces the effect of group identity on cooperation" which demonstrates that in-group favoritism arises not by virtue of membership to an in-group as social identity theory espouses. This is because the group is actually a boundary or "container of the expectations of in-group reciprocity" demarcated by homogeneity, closeness, and common fate among in-group members, i.e. "the fact that all members of a group are treated the same way by outsiders" (see Yamagishi and Mifune, 2008: 24). Overall, Yamagishi and colleagues' experiments comparing cross-societal differences in trust and trustworthiness between American and Japanese participants support Yamagishi's "institutional" approach to culture emphasizing one's expectations of how others react to one's behavior and the role of incentives and punishment in conforming to in-group norms that become self-sustaining and thus circular or self-fulfilling prophecy which obviates the need for trust to bind the in-group together as interpersonal relationships are forged through commitment. Thus, Yamagishi's second criticism of revealed preference methods stems from his observation that individuals behave the way they do so in their in-groups not necessarily as an end in itself but to use such behaviors as a means to achieve some other end.

Yamagishi and colleagues' experimental findings thus lays the ground for their opposition to the cross-cultural psychologists. Hashimoto and Yamagishi (2016: 286) *agree* with Oyserman, Triandis and Schwartz that the human mind is able to adapt to both individualistic and collectivistic situations or contexts. However, Yamagishi and colleagues disagree with these cross-cultural psychologists in two ways. Firstly, Yamagishi and Suzuki (2010: 185) argue that "a particular strategy" that members in a culture adopt does not direct an individual to automatically or "unidirectionally" adopt a task to adapt to their natural environments as the tasks themselves

uphold the culture as "a self-sustaining institution of beliefs, behavior, and incentives among interdependent individuals". Secondly, Yamagishi et al (2008: 580) point out that one's "behavior is not always an exact reflection of preferences, but can instead be a means to another goal". Behaviors that are means to an end rather than an end in itself can go bi-directionally, as it can include socially desirable behaviors undertaken by oneself such as "presenting oneself to others in such a way as to elicit high valuations from them" (Yamagishi and Suzuki, 2010: 185-186). Such behaviors include an individual's use of a "default strategy" of behaving as used in everyday life without conscious deliberation in the absence of social cues until otherwise told such as the "not-offend-others" strategy (Yamagishi and Suzuki, 2010: 187; Yamagishi et al, 2008: 580). However, it can also be the other way round when many individuals "collectively" adopt a particular strategy to which individuals are *then* "advised" by the context or situation to adapt which creates a range of behavior dependent on this collective strategy (Yamagishi and Suzuki, 2010: 185-186). According to Yamagishi and colleagues (see Chiu et al, 2010: 486), such social desirability explains the stability of interpersonal exchanges among members of an in-group because "socially wise behaviors as prescribed in the intersubjective norms collectively constitute a Nash equilibrium in which one receives less desirable outcome if one behaves differently", such as being banned from or restricted in accessing an in-group's (e.g. village) pooled resources for survival (e.g. water for irrigation). Over time, "consensual beliefs become self-sustained" as individuals "act in concert with the behavioral implications of the consensual beliefs" even though they may personally "dislike" such actions. In other words, the majority's preferences do *not* automatically become norms automatically internalized by individuals (Yamagishi and Suzuki, 2010: 186) as it is dependent on whether violations of the norm (e.g. via cheating) has occurred in a society structured by informal mutual monitoring and sanctioning as Japanese society is (Hayashi et al,

1999: 41). This creates an "action-outcome contingency" which, in turn, "depends upon the level of consensus among norm enforcers" and "[h]ow people perceive the contingency...including their perception of the consensus, will affect their expectations of others' responses and, thus, the actions they take to attain the goals of sociality and status" (Yamagishi, 2013: 23).

Thus, Yamagishi et al (2005b: 177) question whether in-group favoritism is merely due to shared social identities like nationality, university attended, or ethnicity which contradicts cross-cultural theories that argue collectivists are more likely than individualists to favor the in-group by virtue of membership to a 'shared culture'. As such, Yamagishi and associates (see Chiu et al, 2010: 490) "caution that cultural behaviors are not merely scripted responses to the individuals' cultural ecology" as social institutions mediate the process by which mind and culture affect each other (i.e. "the process of mutual constitution of mind and culture"), and individuals are "quasi-rational actors who are calculated to the different constraints and affordances in their local environments and behave in ways that match the situational requirements for personal fitness". In other words, individuals are "cultural game players" who behave *not* according to "internalized goals and preferences" (Hashimoto et al, 2011: 140) as cross-cultural psychologists such as Markus and Kitayama (1991) argue. Rather, they behave according to "the collectively produced incentives, that is, a set of anticipated responses from others" or "intersubjectively shared beliefs", or "the expected responses of others [that] are at least as important as their personal goals in deciding (either consciously or through heuristics) their behaviour" (Hashimoto et al, 2011: 141, 146). However, Yamagishi and colleagues concede that the "two views of humans—as cultural agents [i.e human beings behave according to internalized cultural values as Markus and Kitayama argue] and as cultural game players—are not mutually exclusive; each individual has both the aspects of a cultural agent and a cultural game player" (Hashimoto et al, 2011: 141), and "fully accepts the

possibility that some of the preferences are culturally shared and engender culturally specific behaviours through internalized values and preferences" (Hashimoto et al, 2011: 146).

The use of rules in in-groups explains how in-group culture perpetuates itself over time when in-group members implement rules at the formal and informal levels to monitor and punish violators to enforce social norms (Yamagishi, 1988a: 533; Yamagishi et al, 1998a: 167-168; Yamagishi et al, 2008: 201). This is evident in Maghribi traders and Japanese guild-like group of merchants known as "kabu-nakama" in Japan from 17th to 19th century (Yamagishi and Suzuki, 2010: 193; Hashimoto and Yamagishi, 2015: 116). Thus, "social order in collectivistic societies is maintained through mutual monitoring and threats of exclusion from social relations" in order to ensure one's survival by having access to a group's pooled resources (Hashimoto and Yamagishi, 2013: 144; 2016: 286-287). This argument thus circles back to the "core of the institutional approach" to culture that Yamagishi and colleagues argue above which is that institutions are formed by the strategies that individuals collectively undertake to solve adaptation tasks collectively that they create in the first place with the "solutions" of such adaptation tasks are "best achieved by applying the very strategies they use" (Yamagishi and Suzuki, 2010: 186)—which is therefore circular (Yamagishi et al, 1998b: 322) and thus 'relativist' (as in cultural relativism), or a "self-fulfilling prophecy" (Yamagishi and Suzuki, 2010: 195; see also Yamagishi et al, 2008: 584). This makes one's "strategy set" become "self-sustaining in the sense that a circular reinforcement relationship is established between strategies and adaptation tasks" (Yamagishi and Suzuki, 2010: 186). Thus, Yamagishi and Suzuki (2010: 194) view an institution in its basic or "primitive" form as "a self-sustaining system of incentives" which is "in fact an equilibrium in which a particular pattern of behavior is maintained because other parties' behavior provides the incentive to maintain a current

behavior, and this holds true for all members of the institution". In a sense then, the property of "sharedness" associated with a 'cultural' group as "having something in common" such as the "shared meaning" conception of culture (e.g. sharedness in value priorities) that many cross-cultural psychologists adopt (e.g. Hofstede, 2001b) as Schwartz (2014b: 6; Fischer and Schwartz, 2011: 1129) observes, is quite different from that which Yamagishi et al (2012: 66) conceptualize as the "commonality of knowledge" or shared beliefs as used in game theory by comparative institutional economists.

The role of one's beliefs about others' behavior is thus central to Yamagishi's arguments as Yamagishi and Suzuki (2010: 195) argue that how individuals in a group behave publicly, i.e. in the presence of others, is dependent on their beliefs about how others will behave towards their own behavior which is, in turn, regulated by their own perceptions of public opinion on their behavior. Yamagishi (2014: 35) argues that "the fact that individuals in a culture have a set of beliefs and values (or, preferences) in common is not as important as the fact that people share the belief that they have such a set of beliefs in common" in arguing for shared knowledge as in game theory rather than shared traits as in culture. Yamagishi (2014: 35) elaborates that "[t]his mutual understanding of the shared-ness of a set of beliefs and values plays a critical role because it allows individuals to predict others' responses to their own action. Simply having a set of beliefs and values in common without the understanding that others have the same set of beliefs and values does not allow predictions of others' responses" (Yamagishi, 2014: 35). This role of perception is illustrated by the Japanese behaving "in a collectivistic manner, without necessarily being collectivist themselves" as they believe other Japanese would endorse collectivism even as they do not (necessarily) endorse collectivism personally; thus, Japanese behave collectivistically as a

"default strategy" in order to 'avoid a bad reputation' among their compatriots in their in-group (Yamagishi and Suzuki, 2010: 189, 195).[16] This strategy can be particularly crucial for individuals in collectivist societies who face a higher cost than those in individualist societies as the former individuals have fewer or no alternative groups to go to if they are rejected by their current in-groups (Yamagishi and Suzuki, 2010: 186-188). This view comports with Ostrom's recognition of the importance of perception, such as participants' perception of external regulation which influence decisions to cooperate or defect in an experiment (Cárdenas and Ostrom, 2004: 307), as well as at the international level where perception of rules is also important (McGinnis and Ostrom, 1992: 38). It is one's expectation of reciprocity—whether anticipated or actual—from in-group members associated with one's 'sense of control' which Yamagishi and Kiyonari (2000: 121) observe which transforms the original PD incentive structure into an assurance game or stag hunt, the latter model which Ostrom repeatedly examines in her observations on CPR management. It is also this expectation of reciprocity that explains Ostrom's recognition of the concept of assurance that Yamagishi and colleagues (see Hayashi et al, 1999: 34) adopt, though she does not elaborate on trust in the way that he did. Ultimately, Yamagishi's view on perception is consistent with Ostrom's (2008a: 251) argument for one's *expected/perceived/judged* costs and benefits for adopting or changing rules in CPR management.

5.5 Conclusion

This section reiterates the main goals of this chapter, which is to advance Ostrom's and Yamagishi's arguments as a critique of the seemingly acontextual valuation of the environment

[16] Hashimoto and Yamagishi (2015: 117, 121) use the term "preference-expectation reversal" to describe the phenomenon when the Japanese behave collectivistically but not necessarily being collectivist themselves. Relatedly, Chiu et al (2010: 483-484, 488) describe this projection of the Japanese and Koreans expecting their compatriots to be *interdependent* but wanting the self to be *independent* as "pluralistic ignorance".

that individuals exercise as seen in Chapters 2, 3 and 4 above. Ostrom's arguments are submitted as a justification for the examination of contextual factors on individuals' valuation of the environment. Her arguments set in the context of CPR management are notable for the following: 1) the two-level context that she proposes such that the lower level context concerns interpersonal interactions occurring within the higher level context which include the norms and rules of one's community, such as country; and 2) the role of trust and the accompanying norm of reciprocity which she deems are important to solving CXN problems that she accuses rational choice theorists of neglecting. While Ostrom goes so far as to suggest how norms in general are formed and even hint that norms can be transmitted through cultural processes, she is particularly silent on the genesis of the norm of reciprocity occurring within one's in-group. The arguments of cross-cultural psychologists such as Hofstede, Triandis, and Schwartz along with Inglehart are then raised in this chapter to compensate for this lacuna in Ostrom's elaboration by proposing that the individualism-collectivism dimension of culture as a higher level contextual factor explains reciprocity among individuals in their in-group. This argument seems to be reflected in scholars who study PEB such as recycling. Though these cross-cultural psychologists disagree with one another over how the poles of individualism and collectivism should relate to each other (as orthogonal and/or multi-dimensional), they largely agree that culture can be divided into individual level and societal level cultures.

However, evolutionary psychologists such as Yamagishi find the explanation of cross-cultural psychologists wanting. While Yamagishi acknowledges some presuppositions of the cross-cultural psychologists that both seemingly collectivistic and individualistic individuals have their respective ways of working with members of their in-groups, Yamagishi and colleagues observe

from their experiments that it is not the innate or intrinsic 'cultural' motivations of individuals that lead them to behave in the way that cross-cultural psychologists observe. Rather, it is the expectation of future benefits from other members in the in-group that explains why individuals, particularly apparently collectivistic individuals, create a system of formal and informal monitoring and sanctions that creates assurance among in-group members who fear that others in the in-group will not contribute by reciprocating, i.e. free-riding. Yamagishi thus offers a structural perspective which is an alternative account of the genesis of the norm of reciprocity to that of the cultural explanation of the cross-cultural psychologists but is at odds with the latter. Yamagishi and Ostrom agree on the role of rules as punishment which act as negative incentives for non-cooperation. However, Yamagishi differs from Ostrom by not just offering why the reciprocity norm occurs, but also details a two-component model of trust that encompasses one's own trustworthiness and one's view of the trustworthiness of others. It is based on the latter which is one's expectation of the probability that others in the in-group will cooperate that the role of one's perception of others' behaviors in the in-group is a major recurring theme of Yamagishi's arguments: that how individuals in a group behave is dependent not just on their beliefs on how others in the in-group will react to their actions but also the former must believe that others in the in-group also share these beliefs given the incentive structure or institution—that is, working rules—under which the group operates in and which is of their own making. The above positions lay the bedrock on which the hypotheses of this dissertation are built on and on which the choice of research methodology is made. These will be elaborated in the next chapter on the methodology adopted in this dissertation.

CHAPTER 6 HYPOTHESES AND MEASUREMENT

6.1 Introduction

This chapter advances a set of hypotheses to test the arguments proposed by Ostrom, as well as those advanced by cross-cultural psychologists such as Hofstede and Schwartz against those which Yamagishi contends, as elaborated in Chapter 5. In testing these arguments, hierarchical logistic regression is proposed as the quantitative method of choice for this dissertation. In Chapter 5, Ostrom argues that the context consists of two levels: a lower level context which comprises of interpersonal relationships or 'micro' context, and an upper level context or 'macro' context consisting of rules and norms in which individuals are nested in. Trust is confined to the lower level among individuals where reciprocity occurs among them and where they develop trust towards institutions, while rules seem to belong to the realm of the upper level that operates 'above' the individuals who create them. Culture in terms of the individualism-collectivism dimension as examined in Chapter 5 consists apparently of two levels at the individual and societal levels which resembles that of Ostrom's. The hypotheses and method proposed reflect this two-level context that will be justified and elaborated on in subsequent sections. The next section enumerates the hypotheses to be tested. This is followed by another section which details the statistical model and technique and operationalizes the accompanying variables.

6.2 Hypotheses

I propose four hypotheses to test the relationship between environmental valuations on the one hand, and cultural and institutional factors on the other. In doing so, I provide a proxy for individuals' environmental valuations using their environmental attitudes. Kahneman et al (1999: 203, 229) argue that dollar values elicited from respondents through CV approaches are more

appropriate measures of individuals' attitudes than their preferences towards the environmental commodity in question. Although supporters of CV such as Ryan and Spash (2011: 684) challenge the views of Kahneman et al, the former admit that individuals' WTP elicited reflects not only preferences but incorporates other motivations such as notions of social responsibility and moral dividends from supporting environmental causes; the latter also termed warm glow bias (Spash, 2000: 12; see also Pearce and Moran, 1994: 54-55; Kriström, 1999: 790). While a deeper examination of this debate is elaborated below (see below Chapter 8, section 8.2.1), a cursory view supports using one's environmental attitudes towards WTP as proxy for actual WTP.

Hypothesis 1: Individuals of similar cultural orientation possess similar environmental attitudes, ceteris paribus.

I test the proposition that an individual's predisposition towards individualism or collectivism influences one's valuation of environmental goods and services via Hypothesis 1. This argument has been advanced by Cho et al (2013), Kopelman (2009), Roy and Goll (2014), Turkyilmaz et al (2015), Peng and Lin (2009), and McCarty and Shrum (2001) among others as earlier mentioned. The importance of individualism and collectivism to CXN is seen in Hofstede (2001b: 436) who argues that the individualism-collectivism dimension influences an individual's need to form "stable relationships between (opposing) negotiators" in order to be able to work together. Hofstede (2001b: 239) elaborates that collectivist culture views as important the establishing of personal relationships *prior to* any negotiation on interpersonal tasks or goals (e.g. business dealings). Individualist culture, in contrast, views that interpersonal tasks or goals precede generation of interpersonal trust by bringing together people who share similar or complementary

goals. Thus, individuals who are more collectivist presumably possess stronger environmental attitudes as natural resource management requires group coordination at societal level. Cooperation at societal level requires individuals to venture beyond the confines of self and immediate family in order to cooperate with unfamiliar individuals. Such levels of cooperation should stay relatively constant as an individual's cultural orientation changes little over time. Such time consistent cooperation follows Yoon (2010: 61, 93) who suggests this in his nested analysis of the impact of an individual's cultural orientation on one's political attitude and behavior within a state.

The debate over the role of culture in Chapter 3 attests to the need to examine the effects of culture. One point of contention concerns how cultural benefits from ecosystems can be accounted for as Chan et al (2012: 746) acknowledge. At best, the literature on cultural value of ecosystems has provided "core concepts and approaches" but nothing futher (Small et al, 2017: 57). Nevertheless, others such as Vriend (1996: 270) argue that cultural benefits that ecosystems provide can be incorporated into valuations as it is all about individuals' preferences and perceived opportunities though he still adopts the perspectives of atomism and monetary profitability in doing so. Vriend's views, however, have encountered opposition such as from Farley et al (2015: 250) who argue against such atomism. Brown (1984: 245) is more sympathetic towards Vriend's views about valuation though with the caveat that improvements to valuation should improve or create new "group decision-making procedures". A second contention centers on the need to focus on incommensurability and opportunity costs as proponents of culture tend to evoke. Hahnel and Albert (cited as O'Neill et al, 2002: 155) dismiss such debates in their argument for a consequentialist position. However, O'Neill (2002: 157) and Gowdy (2004: 247-248) argue that

consequentialism is not the only position to consider when there are other viewpoints such as the process itself, e.g. fairness. Others such as Winthrop (2014: 209) find fault with framing the cultural significance of ecosystems in terms of 'services' when individuals vest nature with 'meaning'. Even others such as Sunstein (1994: 811) argue that individuals can still make choices among several possible options in the context of culture which is still in line with Costanza's (2006: 169; 2000: 6-7; see also Costanza et al, 1997: 69) definition of valuation as the act of assigning relative weights among choices. These viewpoints suggest that the debate over the role of culture is inconclusive, thus meriting further investigation.

I adopt Triandis and colleagues' definition of "individual *cultural orientation*" (emphasis added) as "an individual's cultural values independent of the dominant cultural orientation of the society in which he/she resides" (see Chen et al, 2007: 261), or "internalized cognitive structures that could guide choices by evoking a sense of basic principles of right and wrong, as well as priorities, such as personal achievement vs. collective good" (see Chen et al, 2007: 262). Cultural orientation as a concept is in line with Triandis and colleagues' conceptions of idiocentrism and allocentrism which are the individual-level counterparts to individualism and collectivism at the societal level, respectively (Chen et al, 2007: 261). Cultural orientation is distinguished from *cultural frame* defined as the "dominant cultural orientation" which "represent the general attributes of a given culture", which is the country-level counterpart to cultural orientation (Chen et al, 2007: 261). The implicit assumption behind adopting cultural orientation in the way Triandis (2004: 89) conceptualizes idiocentrism and allocentrism is that the individual can possess both individualistic and collectivistic traits which is in contrast with Hofstede's definition of cultural frame which can only be individualistic *or* collectivistic but *not* both at the same time. Yoon (2010: 58) argues that both individualism and collectivism should be treated as an individual's "cultural orientations" as

they are values expressed at the individual level; "culture" as a concept is only applicable when comparing societies as Hofstede (2001b: 15) maintains. Cultural orientation as defined here thus explains Triandis' (1989: 512) observation that the self is "dynamic, ever changing" as it "changes in different environments" such as when one transitions from home to school environment, for instance, or when "group climates are different", or even when drug-induced. Oyserman et al (2002: 40-41) suggests that individualism and collectivism at the individual level, i.e. idiocentrism and allocentrism, respectively, can be applied universally to all individuals despite "a diverse tool kit of measures". The differentiation of culture into cultural orientation at the individual level and cultural frame at the societal level prompts a need for a two-level analysis that accounts for aggregate and individual cultural orientations, as well as separate values (questions) that operationalize both orientations as Triandis and colleagues (Triandis, 1994; 1995; Triandis et al, 1985; Triandis et al, 1988) maintain.

Hypothesis 2: A state's cultural frame interacts with an individual's cultural orientation to amplify an individual's environmental attitudes if both cultural frame of the state and cultural orientation of an individual in that state are aligned, ceteris paribus*.*

I hypothesize that an individual's pro- or anti-environmental attitudes would be greatly increased if his/her cultural orientation is similar to his/her state's cultural frame, i.e. an individual's idiocentric cultural orientation is aligned with his/her country's individualistic cultural frame, or one's allocentric cultural orientation is aligned with his/her country's collectivistic cultural frame. Yoon (2010: 69) predicts that a state's cultural frame would increase or decrease even more the impacts of an individual's cultural orientation on one's political attitudes and behavior. Yoon

(2010: 12) argues that current research on political culture neglects to account for the impact of culture in the aggregate on the individual in terms of one's psychology which can in turn influence the former. Present research is either focused on societal level explanations of culture's impact on phenomena at large or is erroneous by making inferences about group culture from individual observations in studies that purport to focus on the individual which amounts to committing individualistic fallacy. Concerning the former, Yoon (2010: 16-17) identifies several studies that tend to fixate on "macroexplanation" of how groups influence political culture such as Fuchs (2007: 163) which can be traced back to Almond and Verba's (1963) seminal work, *The Civic Culture*; Samuel Huntington's (1996) controversial piece on *The Clash of Civilizations and the Remaking of World Order;* Robert Putnam's (2000) celebrated work, *Bowling Alone*; and various publications by Ronald Inglehart (e.g. Inglehart, 1997; Inglehart and Baker, 2000; Inglehart and Welzel, 2005). Yoon (2010: 15) advances that such a focus neglects the relationship between the individual and the group which has "not been well specified". The criticism concerning individualistic fallacy is seen in Yoon's (2010: 15-16) criticism on the lack of a causal mechanism that explains how political culture comes about to the point of tautology or obfuscation that conflates both individual and group level explanations (see, for example, Elkins and Simeon, 1979: 128; Almond and Powell, 1978: 25). Yoon (2010: 18-19) criticizes such conflation as doing so runs the risk of committing individualistic fallacy. Yoon (2010: 83-87) demonstrates through statistical analysis using hierarchical linear modeling that cross-level interaction exists between cultural frames at the country level and cultural orientations at the individual level on dependent variables like an individual's trust in others, participation as members in voluntary associations and engagement in "non-electoral" political actions like protests.

Supporting Yoon's arguments are cross-cultural psychologists who note the existence of such cross-level interaction. For example, Triandis and Gelfand (2012: 514) note that the "situation" can prompt individuals to retrieve individualistic or collectivistic "cognitions" which all individuals have; the "situation" can be cultural frame, rule or law, or even climate (Triandis and Gelfand, 2012: 503-504). In another instance, Schwartz (2009a: 2) argues that "[c]ultural value orientations" or cultural frame—not to be confused with cultural orientation—arise from individuals' "preferred ways" of responding to issues in group survival which "evolve and express" themselves through the "institutions, beliefs, and practices of the society". Schwartz (1994: 90) is aware that "there are theoretical reasons to expect culture-level and individual-level value dimensions to be related conceptually": 1) institutions must account for how individuals typically think and behave in prioritising among objectives as individuals and institutions would otherwise experience conflict with each other; 2) public "cultural institutions" socialize individuals to learn and live out values that perpetuate these institutions by promoting their interests and adhering to their requirements; and 3) objectives that particular cultural groups deem are important reinforce consonant cultural values if individuals pursue goals in line with these objectives, and/or discourage individuals from pursuing goals that conflict with these objectives. In particular, Schwartz (2006: 170-173) views that whether the cultural frame or "cultural value emphases" is individualistic or collectivistic can influence the qualities that a child learns, that is, cultural orientation. If so, I expect a similar result in terms of heightened individual environmental attitudes as alignment between one's cultural orientation and his/her state's cultural frame increases.

Hypothesis 3: Individuals who are subject to the rule of law of a particular country's institutions would possess similar environmental attitudes, ceteris paribus.

I test Yamagishi's argument that universally agreed rules while holding other factors constant influence individuals' valuation of the environment via Hypothesis 3. Through his cross-societal experiments comparing the behaviors of Japanese and American participants mentioned earlier, Yamagishi (2003: 354-355) maintains that formal and informal rules governing interpersonal relationships more so than an individual's cultural orientation affects levels of interpersonal cooperation. This arose from individuals' prior pragmatic expectations of benefits that can be reaped from cooperating with other individuals, rather than any inherent concern for the others' welfare. This is in contrast with Ostrom (2005b: 252) who does not dismiss the role of culture entirely, recognizing that culture is multi-dimensional but essentially imposes rules on outsiders. Yamagishi's experimental setting arguably mimics a country's political and legal structure by permitting participants to monitor and punish other participants contingent on the rules dictated by an external arbiter who is the experimenter in this context, which is consistent with Ostrom's and Vernon Smith's arguments for the importance of the experimental context in influencing participants' behaviors as earlier mentioned. Ostrom (2005b: 249) terms this political and legal structure as the "macroinstitutional structure" which affects the performance of self-governing groups in managing and harvesting CPRs such as natural resources. Governments are important as government agents can foster the formation and maintenance of autonomous collective management of resources, such as "open and fair" courts mediating conflicts among group members over resource allocation—in particular, in cases of negative spillover effects arising from actions of some appropriators on others. Furthermore, Ostrom (2005b: 254) submits that the "macroinstitutional system" is integral to fostering interpersonal trust among actors, the

breakdown of which is likely to result in parochial self-interested resource appropriation to the detriment of the self-governing group.

The debate over the role of institutions in Chapter 4 prompts the need to examine the role of institutions. One worry that scholars such as Pritchard et al (2000: 39) and Fourcade (2011: 1732) have about institutions is how institutions work counterproductively to undermine the environment by entrenching ideas of mainstream economics such as commodification. Others such as Munda (1996: 166), however, downplay such a risk as commodification is one viewpoint among several other legitimate points of view and partly reflects "real power structures". It is even possible for institutions to accommodate these various viewpoints as Paavola (2007: 95) and Paavola and Adger (2005: 356) note, or rely on "bio-physical, political, and ethical limitations" to monetization that eventually compel actors to abandon the money metric and resort to negotiation over natural resource management as Kallis et al (2013: 100) note. Another point of contention centers on the semblance of 'objectivity' that governing institutions project by commodifying the environment through monetary evaluation of goods and services obtained from nature. Pritchard et al (2000: 37-38) warn that monetary valuation would devalue the ecosystem or natural resource by treating them merely as production inputs that can be priced, or to be converted into energy flows to calculate energy throughput. Yet, economists such as Costanza et al (1997) rebut by arguing that individuals nevertheless engage in valuation everyday directly or indirectly when decisions have to be made. Still, others such as Sunstein (1994: 804) doubt that making decisions necessarily entail monetary commensurability among decisions while Aldred (2006: 150) argues that Costanza et al's argument demonstrates more of the axiom of continuity (life versus some small probability of death) rather than commensurability of money and one's life.

The instrumentality of agreed upon rules in CPR management leads this dissertation to adopt Ostrom's (1990: 51) definition of the *rule of law* as, "the idea that formal laws and working rules are closely aligned and that enforcers are held accountable to the rules as well as others" when "one speaks about a system that is governed by a "rule of law"". Rule of law takes a more nuanced definition when distinguishing between *de jure rules* or rules-in-form, and *de facto* rules or rules-in-use, i.e. working rules, as identified previously. When people can flout the rules even though they have been formalised as *de jure* rules or rules-in-form, Ostrom (2007: 249) defines rule of law as "most of the rules used in practice are consistent with the rules-in-form detailed in legislation, court decisions, and administrative procedures". Rule of law exists, according to Ostrom (2005a: 832), when law that is practised is observed in "constitutional, legislative, and administrative settings augmented by decisions taken by individuals in many different particular settings" which make *de jure* rules consistent with *de facto* rules. The absence of rule of law is seen when "there may be central laws and considerable effort made to enforce them, but individuals attempt to evade rather than obey the law" (Ostrom, 2005a: 832). Communication among actors in a group is assumed regardless of the type of political regime (democracy, anocracy, autocracy) individuals are under. This allows for laws at the *societal level* or *macro-context* to be adopted, legitimated and enforced as rules-in-use which are also rules-in-form as examples show that individuals can self-organize to make their own laws as long as they do not contravene the formal laws of the land—at least, overtly (Ostrom, 1989: 11), such as Chen and Hua's (2015) research on authoritarian China shows. Alternatively, individuals can discuss and formulate their own agreed laws concerning resource management even as local authorities 'overlook' such infractions in a case of 'benign neglect' such as when but not limited to authorities

lacking resources to enforce their laws, as individuals have done "for centuries" as Ostrom (1989: 13-14) notes. This assumption is important for natural resource degradation at larger scale such as climate change impacting on countries. At the *individual level* or *micro-context*, however, this dissertation assumes that rules governing interpersonal interactions is tacitly accepted among individuals in the form of *informal laws* which may not and need not be explicitly codified as long there is shared understanding and acceptance of these informal laws.

To be clear, no evidence suggests that Yamagishi views culture as institutions. This contrasts with others including, for instance, Grenstad and Selle (1995: 12-13, 23) who argue for treating culture as institutions "only when social relations are viably matched by certain sets of belief systems" if culture is defined as "ways of life". Yamagishi (2003: 356) emphasizes only that individuals' long-term interests and not their "intrinsic tendency" explain the Japanese putting group interests above self-interest. Yamagishi does *not* take into account individuals' "belief systems" on nature as Grenstand and Selle (1995: 12-13) do, as to whether nature is benign, ephemeral, perverse/tolerant, or capricious. Thus, this eschewing of "belief systems" is also similar to the skepticism that Ostrom and Ostrom (1997: 83, 85, 86-88) evince in their critique of Aaron Wildavsky's view of culture as mentioned previously. This is reflected in Ostrom's (2005b: 17) definition of rules closer to the "regulation sense" which are "the set of instructions for creating an action situation in a particular environment"; she did not mean rules in the cultural, i.e. "precept", sense as "one would not speak of enforcing, rescinding, or reinstating" them but defined these as "norms" instead. Uncertainty reduction, self-interest mediation and facilitation of CXN seem to be the objectives of Yamagishi's systems of mutual monitoring and sanctioning which, however, do not account for Grenstad and Selle's individuals' belief systems on the state of nature. Thus, institutions can be treated in

contrast with Hofstede's treatment of culture as cultural frame as Oyserman et al (2002: 5, 6) note, which is very similar to Triandis' definition mentioned above.

Hypothesis 4: National institutions affecting a country's rule of law interact with a state's cultural frame defined as dominant cultural orientation of the state to produce similar environmental attitudes in individuals towards particular environmental goods and services, ceteris paribus.

I propose Hypothesis 4 above to examine the interaction effects between a state's institutions and its cultural frame. Contrary to Yamagishi, however, Bachmann (2010: 89-90) *assumes* that culture and institutions are "highly intertwined". Observing that different actors in different states exhibit different behaviors in the same economic situation, Bachmann argues that institutions create risks and opportunities for certain actions which explains the differences among individuals' behaviors. Culture, in contrast, cannot account for such behavioral differences as it drives individuals to exhibit similar behaviors. Rules can interact with culture, as Ostrom and Ahn (2001: 27) mention before, to counteract the perverse incentives that individuals confront "given the physical and cultural setting they are enmeshed". In another instance, Ostrom (1998a: 8; 2008c: 17) notes that a community's acceptance of rules is contingent on "local circumstances and the cultural repertoire of acceptable and known rules used generally in a region". That individuals take into account *both* rules and culture is suggested by Vernon Smith (2010: 13) who argues that "people's decisions, consistent with their cultural experience, are often as sensitive to the specific context as to variation in the structure of the game" which is "how brains work". This interaction between culture and rules also motivates Putnam (2000; Putnam et al, 1993) to propose social capital or "social networks and the associated norms of reciprocity" as explanation for what makes a good (i.e. well-

functioning) democracy in his search for (civic) cultural variations between Italy and the US, as Yoon (2010: 9) argues.

The need to examine for signs of interaction between a country's rule of law and its cultural frame is motivated by the debate seen in Chapter 4 between proponents who argue that institutions express societal values and those who are more wary of government intervention. Supporters who argue for institutions' expressiveness of societal values criticise environmental valuation for overlooking the tussle among interest groups in having their viewpoints heeded by policymakers (Adler and Posner, 2000: 1124-1125; Spash, 2011: 363; Sagoff, 2007: 28; Vatn, 2005a: 211). This is particularly so when valuation is embedded in a policy context (Ascher and Steelman, 2006: 81) as the valuation exercise is carried out by governing institutions (Phelps et al, 2017: 16; see also Edwards and Abivardi, 1998: 243-244), such as legal institutions (Sunstein, 1994: 818). Such reasoning has been advanced as opposition towards commodification and thus valuation of the environment (e.g. O'Neill, 2001: 1867, 1873). However, economists counter by noting that governments are prone to regulatory capture by interest groups leading to government failure (see Slavíková et al, 2010: 1370; Ascher and Steelman, 2006: 85-86). Still, proponents such as Vatn (2005b: 108) defend institutions for their ability to socialize individuals' and policymakers' interests that make for "a sensible or good society". In treating valuation approaches as institutions, scholars such as Meinard and Grill (2011: 1709) nevertheless warn that valuation approaches such as stated preference approaches (e.g. contingent valuation) are prone to biases even as they can be used as initial steps to elicit bids. If WTP bids are indeed expressive, Meinard and Grill (2011: 1710) warn that it is problematic to aggregate individuals' bids that environmental economists typically do.

Cross-cultural psychologists such as Triandis (1989: 511-512) allude to the close relation between culture and *de facto* rules of a community by noting that culture includes "rules of the game of life that have been shown to "work" in the past" in his argument that culture 'stores' memories of what has 'worked' successfully for the community in the past, such as working rules that impinge on the individual's and subsequently his/her group's survival. Hence, Triandis argues that culture is able to substitute for deliberate thought in an action situation by resorting to custom as behaviors idiosyncratic to the group which memorializes them in order to save time. Schwartz also observes such interaction. Schwartz (2014a: 554) argues that culture as "average societal values" or cultural frame as he conceives it "emerge out of ongoing negotiations among persons and institutions over desirable goals, negotiations that produce a cultural context of values embedded in societal institutions", and hence culture "does not depend upon the degree of consensus regarding values among group members". Schwartz (2014c: 45) clarifies that just as institutions can mediate the effects of culture on individuals, culture can also mediate the effects of institutions on individuals. In fact, Schwartz supports the "expressiveness" thesis of institutions that both Hickerson and Sunstein espouse by contending that the "ways the social institutions in a society are organized express the underlying cultural value emphases", such as "competitive economic systems, confrontational legal systems, and achievement-oriented child-rearing" which "all express a cultural value emphasis on success, ambition, and self-assertion (e.g. in the United States)". Schwartz (2014a: 549-550) elaborates on the process of enculturation by explaining that individuals "absorb the impact of culture" through "social institutions" which "continually expose" them to "primes, affordances, and expectations consistent with the underlying cultural values" such that "[m]ost individuals develop, adopt, and/or internalize modes of thinking, behaviors,

attitudes, and personal value priorities that enable them to function effectively and feel comfortable in the societal contexts to which they are exposed". Ostrom and colleagues (see VanWey et al, 2014: 44) note the increase in more contemporary research exploring the role of culture in shaping and changing behavior "in ways that are not rational" that "has blurred the line between culture and institutions" as culture "both enforces irrational behavior and limits the menu of behavioral options". Such research posit individuals to be "adopting orientations to others that affect their perception of appropriate ways of relating to each other (e.g., fatalistic, individualistic, hierarchical, or egalitarian) and to risk", and "[a]ctors draw on organizational forms with which they are familiar (rather than forms which are necessarily the most efficient) in structuring new organizations" (VanWey et al, 2014: 44). Such an observation does *not* mean that Ostrom necessarily endorses culture conceived in terms of worldviews such as fatalistic, individualistic, hierarchical, or egalitarian; she does not as mentioned above in her critique of Wildavsky (see Ostrom and Ostrom, 1997: 83, 85, 86-88). Nevertheless, these observations attest to the popularity of studying the interaction between rules and culture. I investigate Bachmann's argument from the vantage of a state's cultural frame rather than an individual's cultural orientation as Inglehart and Welzel (2003) and Welzel and Inglehart (2007) argue that institutions like democracy exist only in the aggregate level rather than at the individual level.

6.3 Methodology

6.3.1 Dependent variable

I compare the results obtained from an analysis of wave 5 data from the World Values Survey or WVS (World Values Survey Association, 2014) against the WVS longitudinal data which contains multiple waves (World Values Survey Association, 2015). The WVS is relevant for two reasons.

Firstly, WVS measures environmental attitudes by more than one indicator which allows for more robust and comprehensive measurement—three questions to be precise; these are listed in Table 11 (see Appendix A). Secondly, the data collection methodology that WVS employs is designed to capture national representativeness. Oyserman and Uskul (2008: 116) argue that statistical methods like hierarchical linear modeling are useful only when representative samples from each country are obtained and countries sampled should be in "relatively large numbers", like, six or more countries. The WVS meets both criteria. In the latest two waves, the WVS surveyed 99 countries in the 2005-2009 wave and 183 countries in the 2010-2014 wave. The WVS targets a sample of at least 1,000 respondents (World Values Survey Association, 1981). Stratified random sampling is utilized to achieve representative national samples. Schwartz (2014b: 10) supports the importance of representativeness of sample in arguing that the "key to measuring the prevailing latent culture in a society is to obtain responses from a large number of people. Ideally, these people should be a representative sample of societal (or group) members". However, Schwartz argues for this by averaging the cultural values of all people in a society in order to combat "noise" or random impacts on one's personal values—a method which Yamagishi will criticise (see below). Surveys are conducted by social scientists who are required to adhere to strict rules and procedures and report progress on data collection during fieldwork. The WVS longitudinal dataset comprises of six waves in total which has the advantage of greater generalizability of results compared to analyses that are based on discrete waves, such as analyses using wave 5. However, out of these six waves, only waves 2, 3, 4 and 5 will be included in the longitudinal dataset. This is due to the absence of the three questions on an individual's attitudes towards paying for mitigation of environmental pollution (see Table 11, Appendix A) in waves 1 and 6 of the WVS; wave 3, however, features two of these three questions but will nevertheless be retained for

analysis (see Appendix A, Table 11). However, the wave 5 analysis utilizes particular questions in the wave 5 dataset to operationalize variables of interest that are absent in other waves that make up the longitudinal dataset, *viz.* cultural orientation and trust in strangers (elaborated below).

These three questions on individuals' attitudes towards their WTP for environmental conservation are important because environmental valuation has been shown to be affected by the choice of policy instrument used to mitigate negative environmental externalities, particularly if individual contributions were to be treated as an assurance game rather than a prisoner's dilemma. Blamey (1998: 65), for example, earlier argues that trust in other citizens to pay is dependent on whether the payment vehicle is voluntary such as a donation, or compulsory such as taxation. Farley et al (2015: 249) support Blamey's argument by noting that policy solutions based on collective decisions such as caps on pollution emissions or on independent decisions of other individuals such as taxes or voluntary payments can hinder individuals from satisfying their preferences when their decisions are interdependent on one another's. Assurance requires the threat of punishment (coercion) or its exercise such as through formal laws and/or working rules in order to assure individuals that other individuals are 'holding their end of the policy bargain' by contributing as they agreed, and/or ensure that everyone contributes their 'fair share' as incentives to cooperate and assurances that others will cooperate may not be sufficient to ensure that the public good is provided (Blamey, 1998: 53). Hence, using three separate questions respective to each policy instrument—donation, taxation, or government spending—instead of one overarching WTP question not only reflects the implication from Blamey's argument above that individuals would pay different amounts depending on the policy instrument, but also enables comparison of regression results across these three policy instruments operationalized respectively as three

separate dependent variables for both wave 5 and longitudinal analyses. Each of these WTP questions represents a particular payment vehicle through which an individual can pay to mitigate pollution. Thus, direct income payment is one payment vehicle which appears in the following *four* survey waves as shown in Table 11: waves 2, 3, 4, and 5. Taxation is the second payment vehicle in Table 11 which appears in the following *four* surveys waves: waves 2, 3, 4, and 5. Government spending, which is not surveyed in wave 3, is the third payment vehicle in Table 11 which appears in the following *three* survey waves: waves 2, 4, and 5. Responses to these questions are recoded in the reverse as reverse Likert scales were used to elicit answers such that 1 now represents "strongly disagree" and 4 represents "strongly agree" instead. Subsequently, these responses have been regrouped to generate a binary response variable by coding 1 for "agree" and "strongly agree"; 0 for otherwise. This is to enable multilevel ordered logistic regression to be used in the analysis (explained below). The unit of analysis is the individual. Thus, correlations are made across individuals within a culture (Triandis and Gelfand, 2012: 514), but who are *nested* within the country (see below).

6.3.2 Independent variables: individual level

This section explains the operationalization of independent variables at the *individual* level; independent variables at the *country* level will be elaborated in subsequent sections below. Note that while identical independent variables are used in both analyses of wave 5 and the longitudinal datasets, operationalization of the same independent variables in both analyses will differ. This is because some survey questions that feature in wave 5 are absent in other waves, as mentioned above. Hence, alternative proxy measures of these independent variables are needed.

6.3.2.1 Cultural orientation

Different questions will be used to operationalize cultural orientation in the analyses of wave 5 and longitudinal datasets as some questions are present only in wave 5 but absent in other waves as aforementioned. Ten questions in wave 5 will be used to elucidate an individual's cultural orientation which are listed in Table 12 (see Appendix A). These have been introduced in the WVS only from wave 5 onwards. These questions are adapted from Schwartz (1990: 144) who argues for the "refinement" of the instrument that measures cultural orientation at the individual level. Schwartz (2009a: 2; 2009b: 127) defends the use of cultural values as measure of individuals' cultural orientations as he argues that "value emphases" are expressions of "cultural ideals" which are the "conceptions of what is good and desirable" in a society and the "prevailing value emphases in a society may be the most central feature of culture", as supported by Max Weber (1958). Schwartz (2009a: 2) argues that these "cultural value emphases" arise and evolve from societies' confrontation with survivability or "a set of basic and inevitable issues or problems that arise in regulating human activity" which leads to each society possessing a unique set of "cultural value emphases". Schwartz (2007: 183) cites Putnam to show that values are important for predicting components of social capital which Putnam (2000: 19) defines as "connections among individuals—social networks and the norms of reciprocity and trustworthiness that arise from them".

Support for Schwartz's argument for the importance of values to social capital come from Inglehart and colleagues (see Welzel et al, 2005: 143) who note that values as "intrinsic" or "internalized" are "a more powerful regulator of human behavior than extrinsic incentives" which places values as "a more important aspect of social capital than institutions". Minkov and Hofstede (2014: 809)

also explicitly recognise that Schwartz's universal value types are more suitable for analyzing culture at the individual level (i.e. cultural orientation) rather than at the societal level "across societies". Specifically, Minkov and Hofstede (2012: 148, 150, 152) use Schwartz's ten universal value types as an addendum and in tandem with child qualities to delineate clusters of geographical regions by national boundaries in order to study whether national culture as a concept is compromised by intracountry variation among subnational cultures in East and Southeast Asian, Sub-Sahara African, Latin American, and Anglo countries. Minkov and Hofstede (2012: 153) reason that Schwartz's universal value types are not useful on their own to delineate national clusters but work well when in tandem with other sets of values, such as child qualities. Schwartz and colleagues (see Roccas et al, 2002: 790) justify their reliance on Schwartz's ten types of universal values on the basis that "Schwartz postulates that three universal requirements of human existence, singly or in combination, give rise to the set of 10 distinct motivational goals: (a) basic needs of the individual as a biological organism (a source, for example, of stimulation values), (b) requirements of successful interaction among people (e.g., benevolence), and (c) requirements for the survival of groups and societies (e.g., conformity)". Collective action to ensure the basic survival of their group, Schwartz and colleagues argue, require "coordination" among members for which "they must express them as values". Variations among individuals in values can be explained by "each person's unique combination of biological endowments, social experiences, and exposure to cultural definitions of the desirable". Thus, Schwartz and colleagues conclude that people's "value priorities reflect strategies adopted to cope with these universal requirements" of survivability. Schwartz and Bardi (2001: 275, 288) justify their use of the ten types of universal values at the individual level by comparing "the values of the average individual in a sample"—

basing analysis on the average individual will have methodological implications for centering of the data (see below).

Individuals' responses to these ten questions have been recoded to account for reverse scale coding in the original survey, i.e. 1 representing "not at all like me" and 6 representing "very much like me". Results from principal components analysis (explained in Appendix B) suggests that nine out of these ten questions can be re-classified into two separate categories that when aggregated and averaged, measure as an index measurement both individualistic and collectivistic orientations, respectively. The use of principal components analysis is relevant following Inglehart and Carballo (1997: 36) who use principal components factor analysis on responses to questions on one's basic values to identify patterns in values. Doing so is in line with the meta-analyses conducted separately by Oyserman et al (2002) and Taras et al (2012) who find that at the *individual level*, both individualism (i.e. idiocentrism) and collectivism (i.e. allocentrism) are opposite poles of a single continuum—which is cultural orientation—despite Taras et al's (2012: 332) noting of "frequent arguments for theoretical independence of Individualism and Collectivism" or orthogonality as addressed earlier. It is also consistent with Schwartz (2008: 38; 2009b: 127) who views culture "as a latent, hypothetical variable that we can measure only through its manifestations". The indexed measurement of collectivism is then subtracted from that of individualism to calculate the overall cultural orientation of the individual as an indexed measure, as illustrated in equations [1], [2] and [3] below.

Individualism = (question 1 + question 2 + question 4 + question 6 + question 7) /5 [1]

Interpreting equation [1] above through Schwartz (1990: 144), question 1 gauges the value of personal creativity to the individual or "self-direction"; question 2 on the importance of personal wealth or "social power"; question 4 on the necessity to pamper oneself or "hedonism"; question 6 on the need for success and social recognition or "achievement"; and question 7 on the emphasis of personal adventure and risk-seeking or "stimulation" (see Appendix A, Table 12). These arguably reflect an individual's individualistic orientation or "individual types" among Schwartz's "universal value types". Thus, a score of 1 indicates low individualism and 6 indicating high individualism.

Collectivism = (question 3 + question 5 + question 8 + question 10) /4 [2]

On the other hand, in equation [2] above, Schwartz's categories of universal value types fit the following questions from Table 12 (see Appendix A) that yields an individual's collectivistic orientation: question 3 on the need for a safe environment or "security"; question 5 on the focus of caring for other individuals in the proximity or "prosocial"; question 8 on the importance of observing decorum or "restrictive conformity"; and question 10 on the pre-eminence given to social customs or "tradition". These collectively reflect an individual's collectivistic orientation or "collective type" among Schwartz's "universal value types". In apropos, Schwartz argues that the "maturity" value type (see question 9 on the high priority in caring for nature or "maturity") is present in *both* individualistic and collectivistic orientations. However, this question is excluded from my analysis as its inclusion risks conflating with the dependent variable as it asks for an individual's environmental attitudes. The index score increases from 1 indicating low collectivism to 6 indicating high collectivism.

Cultural orientation = Individualism – Collectivism [3]

A single index measure of cultural orientation is derived by subtracting the index score of collectivism in [2] from that of individualism in [1]. This coheres with the scale reliability coefficient or Cronbach's alpha which suggests that the coefficient when all questions excluding question 9 are analyzed is greater than that of individualism and collectivism using respective questions in Table 12 (see Appendix B for results). Taras et al (2012: 332) provide support for an indexed score of cultural orientation by reporting that functional equivalence is observed in checking the "convergence" of indices from studies that reported two separate scores for individualism and collectivism and those that treat the two as a single construct. The scores for my measure of cultural orientation range from the minimum score of -5 indicating mainly collectivistic (i.e. score for individualism lower than that of collectivism), to 0 indicating balanced (i.e. both cultural orientations register equally high or low scores), to a maximum score of 5 indicating predominantly individualistic (i.e. score for individualism exceeding that of collectivism).

A different set of questions in the WVS will be used to operationalize an individual's cultural orientation across waves 2, 3, 4, and 5 in the longitudinal dataset. An individual's desire to instill among eight qualities in his/her child(ren) is used as a proxy measure for cultural orientation. These eight qualities appear as eight separate questions corresponding to each quality and are present in all six survey waves; see Table 13 for these eight questions (see Appendix A). Such a proxy measure is adopted in the longitudinal analysis as it is the only question that can measure one's cultural orientation across multiple waves; the better alternative, Schwartz's (1990: 144) ten

value types (see Table 12 in Appendix A) which are used in analyzing the wave 5 dataset above, do not feature in waves 2, 3 and 4. Proponents of the child qualities measure such as Yoon (2010: 59) defend such an operationalization by arguing that cultural values require that they be transmitted in order to perpetuate the identity of the group of which an individual is a member. Such transmission requires selecting intentionally specific values to inculcate in subsequent generations, as Yoon (2010: 59) explains. Moreover, Yoon (2010: 59) argues that the family is the primary mode of inculcating such values which can include, for example, trust in unfamiliar actors such as neighbors, people of different religious beliefs, and people of different nationalities (Jennings, 2007: 37). With respect to the environment in particular, parents can socialize their children by influencing the latter's environmental attitudes through education and demonstration (see, for example, Grønhøj and Thøgersen, 2009; Grønhøj and Thøgersen, 2012; Matthies et al, 2012). However, child qualities suffer from two limitations when adopted as a proxy measure of cultural orientation. Firstly, child qualities are a less reliable measure of cultural orientation compared to Schwartz's universal value types as the former reports lower scale reliability coefficients, i.e. Cronbach's alpha, of less than 0.5 than the latter. 0.5 is a numerical threshold that scale reliability coefficients must exceed in order for the measure to be considered reliable according to the Kaiser test. Secondly, each child quality cannot be neatly segregated into the two distinct poles of cultural orientation, individualism and collectivism, when observed through factor analysis.

The above limitations, however, do not necessarily render child qualities an indefensible measure of cultural orientation. Both Yoon (2010: 34) and Schwartz (1990: 152; Fischer et al, 2010: 147, 148) criticize factor analysis as it allows "post-hoc interpretation" of results from exploratory

factor analysis of component measures. Yamagishi et al (1998b: 323-325) also criticise factor analysis by showing that disparate factors that can be grouped separately into two distinguishing group of factors may miss out on *other* factors that can belong to *both* these two groups of factors which can give rise to misleading interpretation. In particular, Schwartz (1990: 152) contends that results from exploratory factor analysis can be arbitrary as they can be subject to multiple interpretations and create disjointedness as dimensions may lack logical connection to one another, i.e. "coherence". Schwartz (2007: 172) argues that the relatively low values of Cronbach's alpha (reliabilities) obtained from exploratory factor analysis do not obstruct measurement as the more important issue is validity of the scale. Triandis and colleagues (see Triandis and Gelfand, 1998: 124; Singelis et al, 1995: 242, 248) also suggest that Cronbach alpha can be manipulated as the more items there are on a scale (e.g. as many as 40 items measuring individualism and collectivism *each*), the more reliable (i.e. higher value of Cronbach alpha) it is likely to be. Hence, Triandis and colleagues advise by drawing from Cronbach and Gleser (1965) that it is "more profitable" to obtain "rough answers" to most or all the questions (items) used in measuring the construct than "precisely measuring just one or two aspects of the constructs" as "several scores with relatively low alphas will give more valid information (covering the whole bandwidth) than fewer scores with high alphas". Triandis and colleagues (see Singelis et al, 1995: 242) argue that this is "especially the case when a large number of people are assessed, because errors of measurement tend to average over subjects, and the inaccurate scores of any one subject have little significance for the research". This defense applies particularly to the constructs of individualism and collectivism because they are "broad constructs (e.g., large bandwidth)" for which "high alphas have been difficult to obtain", which Schwartz and colleagues (see Devos et al, 2002: 487) agree. Simply put, the "broader the construct the lower the fidelity [i.e. reliability of the measure]"

(Cronbach, 1990). This is important when one considers that a Cronbach alpha score of 0.70 and above is "a *conventional cutoff* for acceptable reliability" (emphasis added) according to Oyserman et al (2002: 41). Both Yoon (2010: 34) and Schwartz (1990: 152) subsequently argue for *a priori* measures of one's cultural orientation based on theory. This finds support in Minkov and Hofstede (2011: 17) who argue that if culture is a "construct", then it is *not* about whether the model of a construct is "the absolutely right one or the true one" but "how coherent these dimensions are (they should be easily understood by the consumers of social science) and of what use they could be (they should predict and explain interesting and important phenomena)".

Yoon's reliance on child qualities as a proxy measure of an individual's cultural orientation is consistent with Ostrom's (1998a: 9; 2009a: 213; 2009c: 59; 2010c: 161; Ostrom and Ostom, 1997: 87) suggestion that norms can be learned via inter-generational transmission (see Chapter 5). Cross-cultural psychologists support this view such as Triandis (1989: 513) who argues that child-rearing practices reinforces learning of norms through rewarding and punishing individuals for conforming or not to in-group goals, respectively. Other cross-cultural psychologists such as Schwartz and colleagues (see Dobewall et al, 2014: 8) also suggest that children learn values from perceiving the importance of particular values through their parents. Even evolutionary psychologists such as Yamagishi and associates (see Chiu et al, 2010: 486-487) argue that individuals tend to absorb and internalize values *more* from other individuals who communicate to, i.e. teach, them in one's in-group, than ideas that the larger society merely agrees on. Oyserman et al (2002: 115), in particular, note that despite difficulties to tease out how institutions influence culture, they argue that parenting can influence the child's adoption of personal qualities from the parent(s), or "the child's subjective construal of the parent's behavior" together with other

influences via socialization and contact with organizations. Perhaps, the strongest support for the use of child qualities comes from Schwartz (2008: 53) who argues that "[c]hild rearing practices differ greatly across countries and may express various cultural value orientations" or culture frames, and suggest that culture and rule of law may interact with each other to the extent that the "value orientations that underlie the common child-rearing practices… will be reinforced to the extent that families produce sufficient offspring to meet societal needs and socialize them to be law-abiding citizens".

The use of child qualities finds empirical support in Minkov and Hofstede (2012: 141, 142, 144) who study whether the existence of a national culture is undermined by intra-country variations in subnational culture, as mentioned above. Minkov and Hofstede (2014: 811-812) find that child qualities "discriminate between nations very well, despite the fact that the nations are made up of nominally different religious groups" but "do not discriminate well between global religions (such as global Islam versus global Catholicism) as they consist of culturally diverse, albeit nominally identical, national variants". The effectiveness of child qualities in differentiating among countries is uneven as Minkov and Hofstede (2012: 153) find that they are more useful for delineating East and Southeast Asian clusters than for other parts of the world (e.g. Latin America). Yet, child qualities remain as an attractive proxy measure of culture as Inglehart (1997; Inglehart and Baker, 2000; see also Minkov and Hofstede, 2014: 809) also utilizes them as measures in his surveys. Yoon (2010: 59-60) subsequently relies on Oyserman et al and Schwartz to justify the operationalization of one's cultural orientation as his/her desired qualities for his/her children by matching each child quality (in Appendix A, Table 13) to Oyserman et al's (2002) seven individualistic and eight collectivistic components, as well as Schwartz's ten universal value types

(see Appendix A, Table 12). These child qualities are operationalized below for both collectivism and individualism such that responses are recoded in the reverse with 1 which indicates the child quality was "mentioned" by the respondent in support of it, and 0 to indicate that it was "not mentioned" by the respondent in rejecting it:

Individualism = (independence + feeling of responsibility + imagination + determination and perseverance) /4 [4]

Collectivism = (tolerance and respect for other people + religious faith + unselfishness + obedience) /4 [5]

A single index measure of cultural orientation is obtained from [4] and [5] above by subtracting the score for collectivism derived from [5] from that for individualism calculated in [4] to arrive at [6] below. The overall score thus ranges from the minimum of -1 indicating mainly collectivistic (i.e. score for individualism lower than that of collectivism), to 0 indicating balanced (i.e. both cultural orientations register equally high or low scores), to a maximum score of 1 indicating predominantly individualistic (i.e. score for individualism exceeding that of collectivism):

Cultural orientation = Individualism – Collectivism [6]

6.3.2.2 Trust in strangers

An individual's trust in other individuals is operationalized as one's trust in strangers. This is based on Inglehart and colleagues who challenge Putnam and the "network school" of social capital

which argues that CXN is possible depending on an individual's familiarity with other individuals when Inglehart and colleagues (see Welzel et al, 2005: 124) show that "elite-challenging" actions such as mass protests obviate the need for knowing others, as mentioned previously. Like cultural orientation above, trust in strangers is operationalized differently in the wave 5 and longitudinal analyses. In wave 5 but not the longitudinal analysis, trustees are divided into two overarching categories of actors: 1) social groups, and 2) organizations which include public, private and non-profit organizations. Interpersonal trust, i.e. one's trust in strangers, is operationalized by measuring respondents' perceptions of trustworthiness in target social groups using questions from wave 5 in Table 14 (see Appendix A). The use of such questions is supported by Yamagishi (2011: 255) who finds that respondents do not merely pay "lip service" to these large scale cross-national surveys such as the WVS, but can actually show that Americans are more trusting eliciting higher measures of general trust (trust in other people in general); this contradicts the putative view that the Japanese are more trusting of one another since they are more collectivistic and hence should be more cooperative with one another. Thus, any fear of the problems with self-reporting seems misplaced. Yamagishi's finding above seems to be supported by Schwartz and Bardi (2001: 271) who argue that "socially desirable responding does not confound self-reported values". This, in turn, is supported by Schwartz and associates (see Dobewall et al, 2014: 8) who find that people are "able to infer how important values are to close others from the cues they observe" with their results showing that "other-ratings of personal values can be used to validate self-report value measures". Schwartz (2007: 168) reports that self-reported scores on his survey of personal values "do indeed relate meaningfully to some behaviours". Schwartz (2014b: 12) contends that measuring culture based on shared "perceptions of the importance of core values" among individual members in their cultural groups is "not necessarily a problem for the intersubjective

consensus approach to culture". This is because "the cultural differences in response styles that standardization eliminates decrease country differences very little, do not change the overall pattern of results and therefore do not account for the patterns" as Fischer and Schwartz (2011: 1137-1138) observe, which assuages fears of eliciting socially desirable responses from respondents through surveys. Such reliance on external observation is supported by Yamagishi and colleagues (see Chiu et al, 2010: 489) who view that "intersubjective perceptions [of culture based on one's perception of the beliefs shared by all in his or her group] can be measured with self-reports" relying on one's conscious view of culture rather than just based on implicit learning of one's culture.

However, not all actors will be included in the analysis: one's family and people whom the respondent knows personally will be excluded (see Appendix A, Table 14) as they are not strangers to the respondent in Yamagishi's (2003: 357-358) view. Yoon (2010: 62) argues that excluding one's family members represents more closely individuals unfamiliar to the respondent. This selection of referents of trust also fits the context of Ostrom's (1998a) and Yamagishi's (2003: 356-357) arguments as they discuss the importance of the role of inter-personal trust among unfamiliar individuals in CPR management and an individual's prior assessment of target partner's reputation—such assessment is made redundant when target partner is a family member or someone whom the respondent already knows. Support for excluding trust in known individuals has been made by Inglehart and colleagues in their challenge to the "network school" of social capital and, in particular, Putnam, as aforementioned. Inglehart and colleagues' argument, however, seems to contradict Ahn and Ostrom (2008: 83-84) who argue for the importance of networks as one of three forms of social capital as *familiar* individuals can cooperate not because

of their "intrinsic motivation" to trust others, but because of repeated interactions to refrain from exploiting the trustor. Ostrom and Ahn (2001: 23) further argue that networks are "a crucial condition for the rise of the norm of generalized reciprocity" by enabling trustworthy individuals to band together through a network and change or invade a population's strategy whose majority consists of agents who always defect by changing the way these defecting agents interact through tit-for-tat strategies and transmit information about who is trustworthy and who is not. However, Ostrom need not contradict Inglehart and colleagues as she hints that it is communication among actors in an in-group that matters more in enabling CXN rather than familiarity among actors. Without communication, it will be difficult to explain how heterogenous actors stratified by social categories (e.g. age, sex, seniority) can cooperate with one another even though they may recognise and live with one another in the same cultural group as gleaned in her (see Ostrom and Ostrom, 1997: 83, 85, 86-88) criticism of Wildavsky's definition of culture. Moreover, what constitutes 'knowing' others is through learning about their reputations consistent with the signaling role communication plays and thus does not require any personal relationship such as knowing family members or others whom one knows personally. If so, trust in social groups external to one's family and known persons shall be operationalized from questions in Table 14 (see Appendix A) as an index measurement by aggregating the ordinal scores for each social group and averaging across the groups as explained in equation [7] below. Responses to these questions will be recoded as original coding was done using reverse scales; recoding would designate a score of 1 to represent "do not trust at all" to 4 representing "trust completely":

Trust in strangers (indexed) = (question 2 on trust in your neighborhood + question 4 on trust in people you meet for the first time + question 5 on trust in people of another religion + question 6 on trust in people of another nationality) /4 [7]

However, a different question in the longitudinal dataset is used to measure an individual's trust in other individuals across multiple survey waves. Unfamiliar actors are a crucial factor in Yamagishi's argument for the role of trust among actors. However, only one question that measures one's trust in all other individuals *generally*—i.e. generalized trust—is common to all six waves of the WVS (see Table 15 in Appendix A). This question, however, is uninformative as it does not discriminate among the referents of trust unlike the question that has been used in the wave 5 analysis which appears only in waves 5 and 6 (see Appendix A, Table 14). As explained above, the wave 5 question prompts the respondent to rate one's trust in six groups of actors, of which only the following four have been identified as strangers to the respondent: "people you meet for the first time"; "people of another religion"; "people of another nationality"; and "your neighborhood"; individuals categorized as "your family" and "people you know personally" are treated as those familiar to the respondent and hence are excluded from analysis. Thus, the absence of a more nuanced measure of trust in strangers (see Appendix A, Table 14) necessitates using generalized trust in Table 15 (see Appendix A) as an alternative proxy measure for one's trust in strangers when analyzing across waves. Generalized trust is essentially one's trust in a larger, amorphous collective of people that does not necessarily target any particular group compared to interpersonal trust which targets particular groups through personal interaction (Yogo, 2015: 656; Durlauf and Fafchamps, 2004: 8). Although Yamagishi and colleagues (see Cook et al, 2005: 123) warn that survey questions that purport to measure general trust such as that in Table 15 (Appendix

A) from the WVS measure "lack of cynicism or a general sense of optimism in dealing with others rather than anything we would call trust in a relational sense", they still adopt the term, general trust, as the term "has been employed so widely in the trust literature to refer to generalized orientations toward trusting, especially in cross-national studies". Generalized trust may be an admissible proxy measure of individuals' trust in strangers by assuming that unfamiliar actors outnumber familiar actors in respondents' concept of the 'amorphous collective' when responding to this question. Binary responses to the question on generalized trust will be reverse coded in this analysis such that 1 indicates "most people can be trusted", and 0 means "can't be too careful".

6.3.2.3 Trust in institutions

An individual's trust in institutions, unlike an individual's cultural orientation and trust in strangers above, is operationalized using identical questions for both wave 5 and longitudinal analyses. Recall that the importance of one's trust in institutions has been covered earlier by Ostrom in her arguments for the "macro" context which is the contextual level comprising of rules and norms operating above the "micro" context at the individual level, as well as Yamagishi and Ostrom who both argue for the importance of legitimacy of working rules. Moreover, Ahn and Ostrom (2008: 84) argue for the importance of institutions as one of three basic forms of social capital because they may provide "sufficient information and deterrents" to "greatly increase" the chance that the trustee will reciprocate even when the material temptation to break the trust is very high; the other two forms of social capital being networks (mentioned above) and trustworthiness (Ahn and Ostrom, 2008: 73). Ostrom (2003: 62-63) makes clear the instrumentality of institutions in resolving social dilemmas such as CPR management, and the legitimacy that individuals accord to the set of rules that these institutions safeguard as "appropriate mechanisms to enhance

reciprocal relationships". Yamagishi (2003: 355-358) also stresses the instrumentality of institutions as a system of monitoring and punishing individuals over national cultural frames through changing the rules of interpersonal interaction in his experiments via an experimenter. Yamagishi and Yamagishi (1994: 131-132) explicitly argue for the need to distinguish one's confidence in institutions defined as "expectation of [one's] competence" from trust defined as "expectation of [one's] goodwill and benign intent".[17] This is not a critical distinction, but nevertheless bears noting. This is because the WVS explicitly identifies institutions based on their competence in safeguarding the rules of engagement among actors. These institutions can impact on an individual's environmental attitudes through their competence in safeguarding the rules that they are tasked to keep, namely financial stewardship over monies collected via payment vehicles (e.g. taxation), control of information and communication among actors in a state, and repertoire of actions that are available to an individual to sanction other actors. In any case, their concept of confidence dovetails with its application in the WVS survey question which measures individuals' confidence in the various institutions (see Appendix A, Table 16).

Yet, while agreeing that rules play a role, proponents do not identify the institutions that advance these rules. Different institutions may enforce different rules depending on their legal jurisdiction. While Schwartz and colleagues (see Devos et al, 2002: 484) mention several institutions such as the political system, the police, the media, the health care system, and religious institutions in his

[17] However, Yamagishi and Yamagishi (1994: 131-132) treat this distinction as less central to their theories of trust which focuses more on the distinction between *trust* and *assurance*. They define trust as "expectation of [one's] goodwill and benign intent" while assurance is defined as "an expectation of benign behavior for reasons other than goodwill of the partner". Toshio Yamagishi (2003: 354-355) subsequently expounds on this distinction between trust and assurance by defining the former as expectation of one's "benign and cooperative behavior" based on "my belief that my interest means something to you", and the latter as the same expectation but "based on rational calculation of your interest". Analogously, Hardin (2003: 83-85) defines trust as "normatively based" trust and assurance as "incentive based" trust.

definition of confidence similar to Yamagishi's as mentioned previously, not all institutions are involved in the monitoring and enforcement of *environmental* rules and regulation. Fortunately, an individual's trust in a plethora of possible institutions are surveyed across *all* survey waves of the WVS which are shown in Table 16 (see Appendix A). Applied to both wave 5 and longitudinal analyses, I argue that the following political institutions influence environmental CPR management by setting and enforcing the rules through exacting formal punishment: the armed forces, the police, the courts, the national government, parliament, and the civil service. These institutions are selected as they satisfy Heywood's (2002: 26) definition of *government* which "can be taken to include any mechanism through which ordered rule is maintained, its central features being the ability to make collective decisions and the capacity to enforce them". This definition is arguably in line with the general impression of "government" that respondents might have when they answer questions in the WVS surveys that are aimed to elicit their trust in the government. No doubt some political institutions can only make (e.g. parliament, civil service) *or* enforce (e.g. armed forces, police, the courts) decisions, they *collectively* define the state machinery that makes and enforces decisions. However, as not all countries experience military rule, I shall create two variants of trust in the government for both analyses: including one's trust in the armed forces in one variant and excluding it in another (see [8] and [9] below). Also, although some risk of overlap among categories might exist, namely that parliament and civil service may encompass sub-national *as well as* national government bodies, I retain these categories to account for the effects of sub-national governments that respondents might take into account. Beyond these organizations, I include respondents' trust in the press and television. They not only enable actors to mutually monitor and hence exact both formal and informal punishment (e.g. via gossip) on one another, but are also integral to establishing and upholding an open political and legal system in their

capacity as the "fourth estate" (Whitten-Woodring and James, 2012), which are integral to establishing "open and fair courts" to resolve disputes (Ostrom, 2005b: 249).

However, I exclude all other organizations as their core functions do not include monitoring activities, or making or enforcing state decisions—such as religious organizations contrary to Schwartz's suggestion above. These excluded organizations also include environmental organizations to avoid conflating with the dependent variable. However, an obstacle to such an operationalization arises as no question exists in wave 4 of the WVS to measure one's trust in the courts which is an integral component. Instead, a variable measuring one's perception of the level of respect for human rights in one's country is employed as a proxy measure for wave 4 (see Table 17 in Appendix A). Most scholars agree on the instrumentality of the courts to uphold human rights but differ on *how much* the domestic courts should uphold such rights, such as compared with democratically elected legislatures (see, for example, Keith, 2002: 200; Perry, 2003: 637), or supranational legal bodies (see Hill, 2016: 20; Higgins, 2009). Responses to one's trust in these institutions shall be recoded due to reverse ordinal scales utilized such that 1 now represents "none at all" or "no respect at all" for human rights in the case of wave 4; and 4 represents "a great deal", or "a lot of respect for individual human rights". An index measurement of one's trust in governing institutions shall be operationalized by aggregating the ordinal scores for each institution and averaging across them in two versions of the analyses as mentioned above: including one's trust in the armed forces in one version (see [8] below) and excluding it in the second version (see [9] below):

Trust in institutions (indexed) = (question 2 on trust in the armed forces + question 6 on trust in the police + question 7 on trust in the courts + question 8 on trust in the government + question 10 on trust in parliament + question 11 on trust in the civil service + question 3 on trust in the press + question 4 on trust in the television) /8 [8]

Trust in institutions (indexed) = (question 6 on trust in the police + question 7 on trust in the courts + question 8 on trust in the government + question 10 on trust in parliament + question 11 on trust in the civil service + question 3 on trust in the press + question 4 on trust in the television) /7 [9]

6.3.2.4 Control variables at individual level

Identical control variables shall be used and operationalized for both wave 5 and longitudinal analyses. These are the respondent's age, gender, level of highest educational attainment and household income level. Franzen and Meyer (2010: 227-228) adopt these variables in their study of factors influencing environmental attitudes using data from the ISSP for years 1993 and 2000 and found them to be statistically significant. Similar variables have been included in analyses elsewhere (see Schumacher, 2015: 1427; Chen and Hua, 2015: 43; Adaman et al, 2011: 695). An individual's education and income levels are two control variables particularly relevant to both wave 5 and longitudinal analyses. Scholars such as O'Neill (1997: 547; 2001: 1869) and Meinard et al (2016: 70) advocate for the role of education to inform one's preferences as preferences can change when one possesses more information about the environmental good or service such as for novel species.[18] One's income, on the other hand, can lead individuals to elicit a higher WTP such

[18] For a sample of other literature on education's role in shaping preferences, see Soma (2006: 37) and Sunstein (1994: 794) on his criticism of revealed preference methods because "choices are a function of context and since they are inarticulate—poor predictors of future behavior—without some account of what lies behind them".

that government policies can perversely provide goods and services that benefit the rich at the expense of the poor because the rich can and will value the good more (Farley et al, 2015: 248; Matulis, 2014: 156).[19] Gender will be recoded as a binary measure such that 1 stands for male and 0 for female, while age, educational level and household income level will be retained in their original scales as shown in Table 18 on an individual's educational level and Table 19 on household income level (see Appendix A).

6.3.3 Independent variables: country level

Several contextual, i.e. country, level independent variables are analyzed in my dissertation as they are in line with Ostrom's argument for the "macro" context, which as earlier argued comprise of the rules and norms of the group. In this dissertation, the group refers to the country because it is usually at the national level that the state decides whether to adopt certain policy instruments over others in combating negative environmental externalities, such as voluntary donations, taxation or government spending as discussed concerning the dependent variable as Blamey and Farley et al argue (see above). Conceptualisation of the *group* as the country is also relevant as Yamagishi and Kiyonari (2000: 116) note that the sociological view of a group is based on individuals who share perceived or real similarities with one another and reciprocate one another's actions based on these similarities—such as people of the same nationality. However, Yamagishi and Kiyonari (2000: 117; see also Yamagishi et al, 2005b: 175) criticize this conceptualisation for ignoring individuals who reciprocate towards others not based on group identity but based on interdependent self-interests as elaborated previously. Specifically, rule of law and cultural frame are the two country level independent variables of most interest which I analyze for their effects on an individual's

[19] For a sample of other literature examining how one's wealth can affect valuation, see Stigler and Becker (1977).

WTP for environmental conservation. Both variables are identically conceptualized and operationalized for both wave 5 and longitudinal analyses. Control variables at the country level are identical and conceptualized similarly unless otherwise stated (see below).

6.3.3.1 Rule of law

The strength of a country's rule of law arguably reflects the strength of the "macroinstitutional structure" that Ostrom (2005b: 249, 254) contends can influence the fostering of interpersonal trust among members of self-governing groups regulating resource harvesting and encourage the formation and longevity of such groups through resolving intra-group conflicts. Thus, rule of law constitutes part of the macro context. Ostrom's conception of institutions dovetails with Yamagishi's (2003: 357) conception of systems of monitoring and sanctioning operating at both the "formal" and "informal" levels. Yamagishi does not detail the characteristics of each level. However, he and his colleagues imply that informal monitoring and sanctioning are rules tacitly acknowledged as legitimate among a small group of individuals as observed from the exit behaviors of Japanese and American participants from groups which have free riders. This is so with the use of gossip as punishment (Eriksson et al, 2017: 866), which is especially effective against norm transgressors as gossip is less costly than direct punishment but still harms the material welfare of the violators as Guala (2012: 9-10) argues. Formal systems of monitoring and sanctioning would constitute rules that are declared to and expressly accepted among the actors, such as working rules which may also be formal laws such as in the case of national environmental laws and regulation when the courts are the only arena where affected parties can agree on laws. This is so as Ostrom (1989: 38; see also Ostrom, 1992: 347-348; 2008b: 25; 2012b: 132) shows using the example of managing South California water basins whereby all parties except one

(Orange County) use lawsuits to "renegotiate their property rights" which transform the court into a "legal forum for engaging a constitutional process" which led to the court appointing a watermaster to collect and share information among the parties to the water basins. It appears that these systems operate by bringing group pressure to bear on the offending or deviant individual that increases with greater censure from other individuals, causing that offender to experience shame, guilt or other punishment and be compelled to change his/her behavior. In Yamagishi's experimental setting, the experimenter arguably substitutes for a country's macro-institutional structure by dictating and changing the rules governing participants' behaviors, such as (dis)allowing monitoring and censure among participants. This view is similar to Vernon Smith's (2010: 11) argument for the role of context which he defines as "instructions and procedures" in a laboratory setting—and which Ostrom and colleagues (see Poteete et al, 2009: 357) subsequently pick up in their argument for two-level context. If so, the quality of a country's macro-institutional structure is a possible explanatory factor.

In order to examine the above propositions, the quality of a country's macro-institutional structure is operationalized as scores on a country's quality of rule of law obtained from the Worldwide Governance Indicators (WGI) developed by Kaufmann, Kraay and Mastruzzi (2010). This measure "captures *perceptions* of the extent to which agents have *confidence* in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence" (emphasis added). A country's rule of law is an apt measure considering the South California water basin case that Ostrom raises as an instructive example which amounts to equating a country's working rules (or rules-in-use or *de facto* rules) with formal laws (or rules-in-form or *de jure* laws) following Ostrom's

conceptualisation of rule of law (see above). Moreover, a country's rule of law may be acceptable considering that Ostrom (2009b: 31; 2012a: 118) finds that it is not any specific rule that differentiates successful cases of CPR management from failed ones as she "move[s] up a level or two in generality to try to understand more general institutional regularities among the systems that were sustained over long periods of time" and identifies eight "design principles" for rules instead. Rather, Ostrom (1986: 12, 14; 2005a: 825) notes that a rule is effective to the extent that other rules are "simultaneously in force", as rules operate as configurations or constellations of rules rather than as single, specific rules (Ostrom, 1986: 7-8; 2014a: 15). That is, rules operate "configurally" or in an "interactive manner" with one another as change in one rule affect other rule(s) in the game (Gardner and Ostrom, 1991: 125, 126). In this respect, a country's rule of law is a broad enough independent variable as it sufficiently encompasses a country's entire system of laws. Not only this, the WGI is also relevant as it is based on confidence that individuals have in the laws following Yamagishi and Yamagishi's distinction between confidence and trust (see Chapter 5). Also, the WGI measure relies on individuals' perceptions that the laws are obeyed which Yamagishi and colleagues (see Yamagishi and Suzuki, 2010: 189, 195; Hashimoto and Yamagishi, 2015: 117, 121; Chiu et al, 2010: 483-484, 488) argue are important. They show that the Japanese behave collectivistically not because they are inherently collectivistic but that they believe that all other Japanese endorse collectivism which lead them to adopt collectivistic behavior as a "default strategy" so as not to offend their compatriots in order to avoid a bad reputation among themselves (see Chapter 5).

Of course, Ostrom (2009c: 64) is aware that the state is not an "inevitable and omnipotent solution [to] the collective-action problem". However, she and her colleagues argue that the state still has

an important role to play as "formal laws, or the characteristics of a political system broadly understood, can encourage or discourage individuals' efforts to voluntarily solve their collective-action problems"; besides formal law, "government agents, and courts are important sources for self-governing individuals as they seek technical advice, information, and complementary monitoring and sanctioning systems" (Ostrom and Ahn, 2001: 25). The WGI measure, then, is robust to the extent that it is based on "factor analyses on data from more than 20 different sources, such as Transparency International, Freedom House, Global Access and others" from which the rule of law is "extracted and validated in dimensional analyses" (see Welzel et al, 2005: 137). Each country's score is reported as an estimate ranging from approximately -2.5 which is the lowest score to 2.5 as the highest score. The WGI features yearly estimates for 215 countries/territories over the period from 1996 through 2014. As the WGI captures information on actors' confidence in the courts among other agents of law enforcement (e.g. the police), the WGI arguably reflects accurately the quality of a country's rule of law or macro-institutional structure that Ostrom describes. The quality of rule of law for each country in the WVS longitudinal dataset is determined by the year of data collection reported in the WVS. For example, the 2006 score for the rule of law for the United States will be included as data collection in the US was conducted in that year, whereas an average score is obtained instead for countries where data collection spans more than a year, e.g. an average of the 2005 and 2006 scores for Sweden is inputted as data collection in Sweden commenced in November 2005 and concluded in February 2006. Linear projections based on an average of year-on-year changes in the country's rule of law will be employed to calculate rule of law scores for years when data are missing. This is done by calculating using available data for an observation nearest to the missing observation either by

subtracting the average change for each year backcasted or, adding the average change for each year forecasted.

6.3.3.2 Cultural frame

The second contextual variable is a country's cultural frame. To recall, cultural frame reflects the dominant cultural orientation within a group (Chen et al, 2007: 261). *Not* to be confused with cultural orientation in this dissertation, Schwartz (2006: 139; see also Fischer et al, 2010: 146) labels cultural frame as "cultural *value* orientation" (emphasis added). Schwartz (2008: 60-61; 2009b: 127, 144) argues that cultural frames "characterize cultures, not individuals" as "country scores [of cultural frames] are not located in the mind of any individual, nor do differences between any pair of individuals capture cultural distances between societies". Instead, cultural frames "are external to individuals, expressed in the distribution of stimuli and expectations that members of a cultural group encounter" which makes cultural frame different from cultural orientation as a "psychological variable". National cultural frames are differentiated from individual cultural orientations (Hofstede, 2001b; Schwartz, 2004; Schwartz and Boehnke, 2004), and can amplify one's environmental attitudes if both are aligned (Yoon, 2010: 69). Moreover, national cultural frames can interact with the macro-institutional structure to influence one's environmental attitudes, as suggested by Ostrom (1998a: 8; 2008c: 17; Ostrom and Ahn, 2001: 27), Vernon Smith (2010: 13), Hickerson (1987: 1131-1132), Sunstein (1994: 818) and Bachmann (2010: 89-90) (see above).

However, at the heart of the debate over measuring cultural frame is whether it is reasonable to treat culture at the national level as homogenous throughout the entire country. Two implications

from this debate are that different countries have different 'national cultures' or cultural frames, and that variations within national culture at sub-national level while present are *not* adequate to overpower 'national culture'. Schwartz (2006: 154, 177-178) agrees with Inglehart that countries are 'meaningful' units of analysis with respect to analyzing cultures, that there is such a thing as "national culture". However, Taras et al and Baskerville raise separate objections to Hofstede's measure of cultural frame. Taras et al (2012: 337, 340) warn that the "criterion validity" of Hofstede's scores for cultural frame of each country in his dataset "deteriorate over time" with "each passing decade" starting from the 1960s and 1970s when Hofstede measured them which can lead to the underestimation of true effects of culture. Hofstede (2002: 1356) defends his relevance of his data by arguing that the "dimensions [of Hofstede's data] are assumed to have centuries-old roots; only data which remained stable across two subsequent surveys were maintained; and they have since been validated against all kinds of external measurements". Baskerville (2003: 1) questions whether the state is the apt unit of analysis for studying national culture and whether cultural frame scores are quantifiable. Hofstede (2003: 812; see also Hofstede, 2002: 1356) in his rejoinder to Baskerville argues that while states (or "nations") "are not the best units for studying cultures", there is no alternative measure of cultural frame as states are "usually the only kind of units available for comparison and better than nothing". Hofstede (2003: 813; see also Hofstede, 2002: 1357) further points out that his findings have been corroborated by findings from other studies and the "increasing frequency" with which others have used and continue to use Hofstede's work testify to the relevance of his measures. Hofstede (2001a: 15; Hofstede et al, 2010: 350) further elaborates on the derivation and interpretation of his cultural frame scores that they are interval measures as they "only describe differences between countries: their absolute value has no meaning". Minkov and Hofstede (2011: 18) defend Hofstede's individualism-

collectivism ratings for each country's cultural frame by arguing for inductive research which Hofstede's is presumably based on rather than deductive research as a model needs to "statistically predict interesting and important phenomena" which is "what gives a model its value, not the beauty of the theory behind it".

The above debate in a sense segues into the contention over whether such a phenomenon as national culture exists *despite* sub-national differences among cultures of different regions within a country. Schwartz finds that "strong forces towards integration that can produce substantial sharing of culture in nations" occur via "usually a single dominant language, educational system, army, and political system, and shared mass media, markets, services and national symbols (e.g. flags, sports teams)". However, "in nations where ethnic or other groups form distinctive cultural groups that live separate and substantially different lives", Schwartz (1999: 25) argues that "national culture presented here for such heterogeneous nations refer largely to the value culture of the dominant, majority group". Schwartz (2008: 60) supports Hofstede's argument for analyzing cultures at the country level in concluding that "countries are meaningful cultural units" as Schwartz (2009b: 134) finds that his mapping of cultural regions of the world are similar to those of Inglehart even though they use different cultural constructs, measurement methods and types of samples. Inglehart and Baker (2000: 37) defend the use of the nation as the level of culture that impacts on the individual because "once established, the cross-cultural differences linked with religion have become part of a national culture that is transmitted by the educational institutions and mass media of given societies to the people of that nation" which is in spite of "globalization" as "the nation remains a key unit of shared experience, and its educational and cultural institutions shape the values of almost everyone in that society".

However, as mentioned earlier, Minkov and Hofstede (2014: 801) argue that global religions may not exert much of an impact "on the cultural values of nations and in-country religious groups" compared to "a shared national history", i.e. "national influence", as they find that "national influence is much stronger than the influence of global religions". In terms of the "homogenizing" impact of national history, they argue that it is evident in the similar values that peoples of *different religions* share *within* a country, and its "discriminant" impact is observed in it differentiating individuals of a religious group from those of the same religious group *but in another country* in contrast with global religions. If so, this renders suspect the idea of a pan-religious community (e.g. global Islamic or Christian community) as global religions do not distinguish from one another in terms of values when "a shared national heritage is an important determinant of cultural similarity at the societal level whereas a shared global religion produces no such effect"; Minkov and Hofstede (2014: 819, 820) claim that this, thus, discredits Weber's Protestant work ethic and other similar theories. Schwartz (2008: 48; see also Schwartz, 2014a: 564) supports Minkov and Hofstede's observation that global religions may not produce distinct cultures by observing that, "[t]he variety of dominant religions (Hinduism, Roman Catholicism, Islam, Buddhism, Methodist Protestantism) in this region does not produce cultural heterogeneity on the basic orientations". Minkov and Hofstede (2012: 133) argue that the problem of within country variation in culture and seeming similarities in culture among countries is immaterial as they find that countries "overwhelmingly cluster along national lines on basic cultural values, cross-border intermixtures being relatively rare", even for countries such as Malaysia and Indonesia which share similar language, religion, ethnic groups, historical experiences and various traditions. Minkov and Hofstede (2012: 135) further add in favor of a national culture that just because individuals are

heterogenous does not mean that differences among individuals preclude the existence of phenomena that exist higher than at the individual level (e.g. national culture, ethnic groups). Minkov and Hofstede (2014: 807) explain that "national culture... acts as a gravitational force that most often keeps a nation's regions together in terms of cultural values, despite any potential differences between those regions, and separates them from the regions of other nations, including adjacent ones"; this should apply even to geographical regions with distinctive religions as they found that subnational regions within countries in wave 5 of the WVS 2005-2008 "formed fairly clear national clusters, even in Africa, where nations were created without any regard for cultural specificities". Minkov and Hofstede (2012: 153) warn, however, that differences among national cultures can be distinguished depending on the variables used to distinguish them (e.g. child qualities, Schwartz's ten types of universal values), *not* that these variables show that nations have distinct cultures in the abstract sense.

In order to test the above hypotheses that relate to cultural frame's impact on an individual's WTP for environmental conservation, data on each country's cultural frame is obtained from Triandis (see Suh et al, 1998: 485-486) and from Hofstede and Hofstede (2012). These scholars measure cultural frames independent of aggregated measures of individuals' cultural orientations at the individual level in order to avoid individualistic fallacy: the score ranges from 0 (collectivistic) to 10 (individualistic). Hofstede (1980, 2001b) measures national cultural frames by surveying the attitudes of International Business Machines (IBM) Corporation international employees twice. Triandis, on the other hand, according to Suh et al (1998: 485-486) relied on his "personal judgment" based on his readings of empirical research as well as his "observations of people's everyday behavior" for some of the countries. Hofstede's measurement, in comparison with

Triandis', has the advantage of empirical data to rely on covering 50 countries, while Triandis' data is more recent compared to Hofstede's which was collected between 1967 and 1973. Such a measure of cultural frame may seem to contravene Taras et al's objection towards the assumption of intemporal measure of cultural frame aforementioned. Schwartz (2008: 61; 2009b: 144) acknowledges that "[o]ne-time, static measures of the overall culture of a country are therefore somewhat problematic" as "[e]thnic, occupational, religious, and other sub-groups within societies may experience different cultural pressures and develop different value preferences" which "induce social tension, conflict, and change" but he demonstrates that the "cultural value profiles of dominant cultural groups can characterize societies in a fruitful manner". This is consistent with Hofstede's (2002: 1356) defense above that his data is based on "centuries-old roots".

The debate over change in cultural frame centers on whether culture changes over what time frame, and how much is this change significant to warrant the recognition that national culture as measured by cultural frame has indeed changed. Hofstede and McCrae (2004: 65) note that, "The IBM national dimension scores (or at least their relative positions) [on which Hofstede calculates cultural frame] do seem to have remained as valid in the 1990s as they were around 1970", which suggests the relative stability of cultural frame over time. However, Taras et al (2012: 330) argue that "change is certainly not rapid, but it appears to be occurring faster than expected by Hofstede" by pointing out that the WVS has "found evidence of "a massive cultural change" even within the relatively brief period covered by the data", to which they accuse Hofstede of dismissing theories of cultural change as "naïve". Triandis et al (1988: 324) seem to agree with Taras et al as the former observe that "[c]ultural elements change slowly" as societies become more "complex" such as Japan which saw an increase in the number of voluntary organizations which indicates a

seeming shift in Japan's national culture from collectivist to individualist. Likewise, Schwartz (2008: 39; 2009b: 128) recognises that cultural frame can change in response to "shifting power relations" among "subgroups within societies" as they espouse "conflicting values" which make national cultures "not fully coherent" as well as external shocks such as "epidemics, technological advances, increasing wealth, contact with other cultures, wars, and other exogenous factors"; however, change in cultural frame is "slow". Moreover, Schwartz (2008: 39; 2009b: 129) notes that "[c]ultural value emphases evolve and change over time as societies generate preferred responses to these problems".

However, Hofstede and colleagues (see Minkov et al, 2013: 1095) find some evidence in the literature that culture is "something relatively stable, accounting for durable differences between societies" even amidst fast changes in political mood which may encounter resistance to change from culture. Minkov and Hofstede (2011: 12-13) defend that "cultures do evolve but they tend to move together in more or less one and the same cultural direction" and thus "cultural differences between them are not necessarily lost", to which they cite Inglehart (2008) as evidence by arguing that Inglehart shows that while Western European countries from 1970 to 2006 "did evolve and even tended to show some incomplete convergence", but "at least on a number of subjectively selected variables, their paths practically never crossed during those 36 years". Hofstede et al (2010: 337) note that Hofstede's country scores on individualism-collectivism as one his four cultural dimensions "show no loss of validity, indicating that the country differences these dimensions describe are indeed basic and long-term". Similarly, Schwartz (2009a: 3) cites Inglehart and Baker (2000) to show that "cultural differences are quite stable: The relative positions of countries on cultural value orientations change very slowly". Schwartz reports that,

"In sum, differences between countries in cultural value orientations are quite stable: The relative positions of countries on these orientations change very slowly". Inglehart's (1997) report of "a steady increase in post-materialist values across various periods in most countries but little change in the relative positions of countries" is consistent with Schwartz's (2008: 45) own study of variance in cultural frames across 36 countries (i.e. samples) which was "virtually identical at both times". Schwartz (2008: 45) concludes, like Hofstede, that "not only do country level value differences remain stable, they also show no sign of converging" despite "[c]ultural convergence in dress, food, and music" which is "*not* replicated in the more basic aspect of culture, prevailing [cultural] value orientations" (emphasis added). Thus, it is reasonable to assume that national cultural frames are assumed to be constant or slow to change. Though published in different years, measurements of a country's cultural frame in one particular year by Suh et al (1998) and Hofstede and Hofstede (2012) are assumed to apply for the same country regardless the year data was collected for waves 2, 3, 4 and 5 in both wave 5 and longitudinal analyses.

6.3.3.3 Control variables at country level

Identical country-level control variables are used for both wave 5 and longitudinal analyses. Control variables at the country level will include a country's population size, GDP per capita, its environmental quality and income inequality. The following variables are also included to control for unobserved heterogeneity due to temporal and geographical differences: dummy variables for survey waves, the Organisation for Economic Co-operation and Development (OECD) membership and geographical region (e.g. Europe, East Asia, North America). Ostrom (2005b: 252-253) speculates that the size of a group, wealth endowments of individual members and wealth inequalities among group members can impact on the performance of autonomous group

management of natural resources, but she recognizes that why some individuals behave as predicted by game theory while others do not is because the "context of the situation makes a difference as to whether individuals cooperate to solve social dilemmas or simply pursue short-term material interests". However, Ostrom (2009a: 209-211) argues that "no single variable has the same effect in all settings", such as group size, property rights regime and group heterogeneity. Moreover, McGinnis and Ostrom (1992: 2, 9-12, 20; see also McGinnis and Ostrom, 2008: 198) recognise the nested nature of global environmental problems, arguing that principles of CPR management applied at the local level can be applied to the global level because: 1) the "analytical structure" of "some" global problems is similar to "many" local CPRs; 2) local CPRs provide the starting point for building global level solutions, i.e. theories and models; and 3) many global problems are themselves the product of local level CPR degradation although McGinnis and Ostrom are aware of the peril of drawing "casual analogies", such as the range of actors involved which differ at the local and global levels (e.g. corporate actors). Ostrom (2005c: 269; see also Ostrom, 1999a: 528) submits these arguments in support of "polycentric governance" where polycentric system is defined as having "multiple semiautonomous units of governance located at small, regional, national, and now international scales of organization" where "some of these governance units may be organized in the private sector while others are organized in the public sector"[20] instead of decentralized markets and highly centralized governance systems.

Studies using the above country level control variables is not without precedent. The effects of GDP per capita and income inequality as measured by a country's Gini coefficient have been

[20] Ostrom and Cox (2010: 4) define polycentricity as "multiple sources of governance". Another definition of polycentricity is "a system where citizens are able to organize not just one but multiple governing authorities at differing scales" (Ostrom, 1999b: 39). Ostrom (2012e: 82) argues "very strongly for the need for polycentric institutions to cope with climate change".

studied elsewhere using hierarchical linear regression although their impacts on environmental attitudes have been mixed (see, for example, Franzen and Meyer, 2010: 227-229; Givens and Jorgenson, 2013: 424; Gelissen. 2007: 400; Marquart-Pyatt, 2012: 1091; Knight and Messer, 2012: 529, 530, 532; Franzen and Vogl, 2013: 1005; Wang and Gordon, 2011: 586). Data for GDP per capita (The World Bank Group, 2016a) and population size (The World Bank Group, 2016b) of each country are obtained from the World Development Indicators. The Standardized World Income Inequality Database (SWIID) will be referred to for respective country data on Gini coefficient (Solt, 2009). Environmental quality is commonly included as a country level variable affecting environmental attitudes, although statistical results show that its impact on environmental attitudes is inconclusive (see, for example, Franzen and Meyer, 2010: 226; Givens and Jorgenson, 2013: 424-425; Gelissen, 2007: 402-403; Marquart-Pyatt, 2012: 1091; Knight and Messer, 2012: 8-9; Franzen and Vogl, 2013: 1005). Although past studies have applied different indicators of environmental quality, I shall utilize greenhouse gas emissions of each country from the World Development Indicators (The World Bank Group, 2016c) as a proxy measure of its environmental quality to encompass the maximum number of countries possible for longitudinal analysis; the more greenhouse gases a country emits, the worse its environmental quality. Of all the country level control variables in the longitudinal analysis, environmental quality is the only variable which uses a proxy measure that is different from that in the wave 5 analysis. Greenhouse gas emissions is used to overcome most of the data gaps found in the Environmental Performance Index (see Yale Center for Environmental Law and Policy, and Center for International Earth Science Information Network, 2016) which is utilized in analyzing the wave 5 dataset. Each country's regional location shall be drawn from the International Organization for Standardization (2016). Tay (2013: 44) applies dummy variables for survey wave years, geographical regions and

OECD membership in his analysis of individuals' tolerance for income inequality nested in countries in a three-level hierarchical model. OECD membership is based on data drawn from the Organisation for Economic Co-operation and Development (2016) itself. Missing data points for greenhouse gas emissions, GDP per capita and the Gini coefficient shall be calculated from linear projections of the next nearest observation by adding to it averages of yearly changes in these variables in cases of forecasting, or by subtracting from it such averages in cases of backcasting. Values of these variables are averaged across the years surveyed for countries where surveys span more than a year.

6.4 Model

The main analytical model is a generalized linear mixed model (GLMM) using multilevel ordered logistic regression, i.e. hierarchical logistic regression. The same model will be utilized in analyzing both the wave 5 and longitudinal datasets. Hierarchical logistic regression is apt for the following reasons. Firstly, the multilevel nature of environmental valuation is suggested by Ostrom in her arguments for polycentric governance mentioned above. This is because both the causes of pollution and individuals' responses to environmental degradation seem to be nested within territories such as countries. That is, the global environment is treated as a global-scale CPR which is comprised of multiple CPRs at the national and sub-national scales for which individuals within each country propose their own solutions. This is similar to Ostrom's (2007: 247) observation of community-based governance of CPRs as an alternative to market mechanisms and government intervention—but which by no means she champions community solutions as the *sole* solution especially at the global level (Ostrom, 2010e: 555; 2012b: 133-134, 139; 2012e: 70; 1998b: 160; 2010b: 2; Ostrom and Nagendra, 2007: 176-177; McGinnis and Ostrom, 2008: 202; see also Levi,

1996: 241). This is seen in Ostrom's (1998a: 17-18) warnings that reciprocity "alone" is "unlikely" to solve the more difficult CPR problems and can either be perverse by limiting one's cooperation to trusted social circles such as kith and kin, and/or generate negative social networks (e.g. cartels, monopolies, organizations that contravene legal and moral standards of society, and restrict freedoms), as well as distribute benefits unequally disadvantaging the poor and ignoring the necessity of managing the CPR at multiple levels "with vertical and horizontal interplay among institutions" (Ostrom, 2008b: 27). That environmental problems and individuals' responses to these problems tend to be nested within countries find support in Hofstede (1998: 25) who notes that "each society had over the course of history developed its own pattern of solutions" to enabling "human togetherness" which is the common theme underlying the individualism-collectivism dimension for the 40 societies he studies.

Secondly, cross-cultural psychologists also support the use of multi-level modeling in studying the effects of culture on various phenomena. In addition to natural experiments and ecologically valid experiments, Oyserman and Uskul (2008: 168) observe that "evidence [for culture's impact on phenomena] must be mostly correlational" because "culture-related variables cannot be subjected to experimentation" at the "societal level" as it is "neither possible to manipulate a society's native language nor to randomly assign children to educational systems", but this would also mean that studies based on correlational methods are "therefore open to alternate explanations or to influences by additional variables that have not yet been considered". Oyserman and Uskul (2008: 155-156) thus advocate that "[m]ultilevel models provide a structured process model within which to make inferences about the psychological meaning of societal-level and group-level differences". In fact, Oyserman and Uskul (2008: 164-165) emphatically support the use of hierarchical

regression techniques such as hierarchical linear modeling "which allow individuals to be nested in social contexts rather than ignoring the potential for individuals from the same contexts to be more similar in their responses than individuals from different contexts"; if "cultural research is to make predictions about individuals, it must involve the impact of societal-level factors on individual level variables". However, Oyserman and Uskul (2008: 155-156, 164-165) caution on the need to avoid ecological fallacy "when individual-level meaning is drawn from societal-level data", and individualistic fallacy "when individual-level data and analyses are used to draw society-level conclusions". Schwartz (2008: 61; 2009b: 144) notes that dominant or prevailing cultural value orientations of countries, i.e. cultural frames, can be not only dependent or independent variables, but also as "a moderator of the relations among other variables" such as "the effect of gender on the importance people attribute to their personal values [which] depends on the prevailing cultural orientations in a society". Schwartz (2007: 182) employs hierarchical linear modeling at two levels (individual and country) to "jointly examine individual and country level sources of attitudes toward immigrants, of components of social capital, and of political activism" by computing regressions "both within and across countries".

Thirdly, on methodological grounds, Yamagishi criticizes Schwartz's calculation of cultural orientation—for which his measures based on personal values are adopted in this dissertation. Yamagishi argues that that Schwartz is basing his measurement on the individual's values as a reflection of a country's culture by taking the mean of aggregated individuals' scores in a country without taking into account that the country level effects can affect the individual's responses to questions on personal values. This is even though these questions may be identical in measuring culture across all countries such that equivalence is needed not just for the test items but also the

individuals who are, however, not equivalent as they are affected by country specific effects leading to an erroneous "apple-orange comparison". Or, as Yamagishi (2014: 32) puts it, "The problem arises from the fact that the individual responders in the measurement of a value question are nested within countries whereas test items are crossed with test takers"—which supports Baarsma and Lambooy's (2005: 469) suggestion that different people in different societies such as different countries interpret a WTP question differently.

I apply GLMMs which are random effects models so as to examine the effects of contextual—i.e. country level—variables on individuals' environmental attitudes. GLMMs are extensions of the generalized linear models (GLMs), the latter which are appropriate when the response variable is a binary variable—thus, taking the form of a logistic regression (Wu, 2010: 61). GLMMs are then introduced in longitudinal or clustered data to account for random effects in the models. Random effects are essentially "correlation between the repeated observations within each individual or cluster and variation between individuals or clusters" (Wu, 2010: 62). GLMMs are thus relevant to this longitudinal analysis for two reasons. Firstly, the dependent variable, which is an attitudinal measure of an individual's WTP for pollution abatement, is treated as a binary response for the payment vehicles examined based on questions listed in Table 11 (see Appendix A) as mentioned above: voluntary income payments, compulsory taxes or government spending. Secondly, analysis of the effects of proposed contextual variables requires the assumption of clustering effects of contextual variables by country on individuals' environmental attitudes—assuming that repeated observations in a cluster (i.e. country) are "conditionally independent" of one another in view of random effects (Wu, 2010: 62). Practically, this means that the slopes and intercepts for each individual are different across countries. This cross-country variance is influenced by the list of

contextual variables that I have proposed earlier: macro-institutional structure, cultural frame, and various country level control variables such as GDP per capita and environmental quality.

The proposed model is generated from above variables as operationalized: cultural orientation as in [3] for wave 5 analysis or [6] for longitudinal analysis; one's trust in strangers as in [7] for wave 5 analysis or generalized trust for longitudinal analysis; and one's trust in institutions as in [8] and [9] for both wave 5 and longitudinal analyses. These are described below:

$$\text{environmental_attitudes}_{ij} = \beta_{0j} + \beta_{1j}\text{cultural_orientation}_{ij} + \beta_{2j}\text{trust_ people_ general}_{ij} + \beta_{3j}\text{trust_institutions_(indexed)}_{ij} + \gamma\chi_{ij} + \mu_{ij} \quad [10]$$

$$\beta_{0j} = \rho_{00} + \rho_{01}\text{rule_of_law}_j + \rho_{02}\text{cultural_frame}_j + \rho_{03}(\text{rule_of_law}_j * \text{cultural_frame}_j) + \delta\lambda_{0j} + \sigma_{0j} \quad [11]$$

$$\beta_{1j} = \rho_{10} + \rho_{11}\text{rule_of_law}_j + \rho_{12}\text{cultural_frame}_j + \sigma_{1j} \quad [12]$$

$$\beta_{2j} = \rho_{20} + \rho_{21}\text{rule_of_law}_j + \rho_{22}\text{cultural_frame}_j + \sigma_{2j} \quad [13]$$

$$\beta_{3j} = \rho_{30} + \rho_{31}\text{rule_of_law}_j + \rho_{32}\text{cultural_frame}_j + \sigma_{3j} \quad [14]$$

The mixed model is thus as follow:

Substitute [11], [12] [13] and [14] into [10],

$$\begin{aligned}&\text{environmental_attitudes}_{ij}\\ &= [\rho_{00} + \rho_{01}\text{rule_of_law}_j + \rho_{02}\text{cultural_frame}_j + \rho_{03}(\text{rule_of_law}_j * \text{cultural_frame}_j) + \delta\lambda_{0j} + \sigma_{0j}] + (\rho_{10} + r_{11}\text{rule_of_law}_j + \rho_{12}\text{cultural_frame}_j + \sigma_{1j}) * \text{cultural_orientation}_{ij} + (\rho_{20} + \rho_{21}\text{rule_of_law}_j + \rho_{22}\text{cultural_frame}_j + \sigma_{2j}) * \text{trust_ people_ general}_{ij} + (\rho_{30} + \rho_{31}\text{rule_of_law}_j + \rho_{32}\text{cultural_frame}_j + \sigma_{3j}) * \text{trust_institutions_(indexed)}_{ij} + \gamma\chi_{ij} + \mu_{ij}\end{aligned}$$

$$\begin{aligned}&= \rho_{00} + \rho_{01}\text{rule_of_law}_j + \rho_{02}\text{cultural_frame}_j + \rho_{03}(\text{rule_of_law}_j * \text{cultural_frame}_j) + \delta\lambda_{0j} + \sigma_{0j} +\\ &\rho_{10} * \text{cultural_orientation}_{ij} + \rho_{11}\text{rule_of_law}_j * \text{cultural_orientation}_{ij} +\\ &\rho_{12} * \text{cultural_frame}_j * \text{cultural_orientation}_{ij} + \sigma_{1j} * \text{cultural_orientation}_{ij} + \rho_{20} * \text{trust_ people_}\\ &\text{general}_{ij} + \rho_{21} * \text{rule_of_law}_j * \text{trust_ people_ general}_{ij} + \rho_{22} * \text{cultural_frame}_j * \text{trust_ people_}\\ &\text{general}_{ij} + \sigma_{2j} * \text{trust_people_ general}_{ij} + \rho_{30} * \text{trust_ institutions_(indexed)}_{ij} +\end{aligned}$$

ρ_{31}*rule_of_law$_j$*trust_ institutions_(indexed)$_{ij}$ +
ρ_{32}*cultural_frame$_j$*trust_institutions_(indexed)$_{ij}$ + σ_{3j}*trust_institutions_(indexed)$_{ij}$ + $\gamma\chi_{ij}$ + μ_{ij}

The mixed model above examines in tandem the effects of both within country level and cross-level interaction effects on individuals' environmental attitudes. This model resembles the multi-level model that Yamagishi and his colleagues (see Romano et al, 2017: 12706-12707) use to understand the factors influencing one's trust and cooperation across 17 societies. Interaction shall occur on two fronts. Firstly, cross level interaction occurs between country level variables which are national cultural frames and quality of national rule of law on the one hand, and individual level variables which are individuals' cultural orientations, one's trust in strangers and institutions on the other hand. Secondly, within level interaction occurs at the country level between national cultural frames and a country's rule of law. Stata version 14 will be the statistical software utilized for analysing both wave 5 and longitudinal datasets which are essentially cross-sectional, the command adopted for generalized linear mixed models being *melogit*. β denotes the regression coefficients for respective individual level independent variables, γ the coefficients for each respective individual level control variable χ, and μ as the error term for *i* through *n* individuals and *j* through *k* countries. ρ denotes the regression coefficients for respective country level independent variables, δ the coefficients for respective country level control variables λ, and σ is the corresponding error term. The dependent variable, "environmental_attitudes", is derived from questions in Table 11 and is operationalized as a respondent's inclination to pay for pollution mitigation through any of the three discrete payment vehicles as mentioned: voluntary donation through direct income payments, compulsory taxation or government spending. The independent variable, "cultural_orientation", is obtained from [3] which are in turn derived from [1] and [2] based on individuals' responses to questions listed in Table 12 (see Appendix A) for wave 5

analysis; for longitudinal analysis, it is derived from [6] which in turn are calculated from [5] and [4] based on individuals' responses to Table 13 (Appendix A). The independent variable, "trust_ people_ general", is interpersonal trust calculated from individuals' responses to questions in Table 14 (Appendix A) for wave 5 analysis, while the variable is calculated as generalized trust based on individuals' responses to the question listed in Table 15 (see Appendix A). The independent variable, "trust_institutions_(indexed)", is operationalized identically for both wave 5 and longitudinal analyses based on responses to questions in Tables 16 and 17 (see Appendix A) and comes in two variants as elaborated above. In one variant, [8], one's trust in the military is included. The second variant, [9], excludes one's trust in the military. Individual-level control variables include a respondent's age, gender, education level and household income, questions measuring the latter two variables are shown in Tables 18 and 19 (see Appendix A). The country level variable, "rule_of_law", is directly inputted into the model using the WGI developed by Kaufmann, Kraay and Mastruzzi (2010), while data on another country level variable, "cultural_frame", is obtained from Suh et al (1998) and Hofstede and Hofstede (2012).

All independent variables *except* categorical dummy variables (e.g. gender) at both individual and country levels will be centered on the overall or grand mean, i.e. grand mean centering, of each respective variable. This enables interpretation of the marginal effect (i.e. regression slope) of the interaction variables above for an individual with average trust in strangers and institutions and cultural orientation in a country with average rule of law and cultural frame (Hox, 2010: 62) using the *margins, dydx* command in Stata version 14. Centering or "demeaning" of the independent variables also controls for multicollinearity between interaction terms on the one hand and its elements on the other (Husted, 2005: 358). However, separate values of environmental attitudes

as dependent variable apply to different genders (i.e. gender = 0 for female; 1 for male), countries in different regions (OECD = 0 for non-OECD countries and 1 for otherwise; various geographical regions, e.g. Oceania = 0 for non-Oceanian countries and 1 otherwise), and different survey waves (year of survey in wave 5 dataset or survey wave in the longitudinal dataset = 1 if surveyed during that time; 0 otherwise). This is because the *margins, dydx* command in Stata is unable to recognize decimal values for categorical dummy variables[21] that have been centered whether at the grand mean or group mean; Williams (2012: 330) advises that *margins, dydx* will give wrong answers if categorical variables are not specified as 0 and 1. Lastly, Williams (2012: 329) cautions that it is a misnomer to label as 'marginal effects' of an interaction term if either of its component terms (e.g. trust_ people_ general; see mixed model in section 6.4 above) increase by one unit while holding the other term constant (e.g. rule_of_law) in the interaction term and both component terms are continuous variables (e.g. rule_of_law*trust_ people_ general; see mixed model in section 6.4 above).[22] This is because *margins, dydx* is unable to calculate the marginal effects of the interaction term without changing the value of its respective component terms which are also included as discrete independent variables in the statistical model; *margins, dydx* thus computes the 'marginal effects' of an interaction term based on different combinations of different values of each component term.

[21] Categorical variables are also known as factor variables and indicator variables (Williams, 2012: 313-314).

[22] Stata treats ordinal variables as continuous variables. Note that generalized trust for the longitudinal wave is still centered at the grand mean even though it is a binary or dichotomous independent variable as it is still an ordinal (i.e. continuous) variable though with a shorter scale using just two values for measurement (i.e. 0 and 1). That is, it is possible to say that generalized trust = 1 is 'greater' or 'higher level' than generalized trust = 0. This analogy, however, cannot apply to categorical dummy variables as gender = 1 (i.e. male) is not 'greater' or 'higher level' than gender = 0 (i.e. female). Hence, this does not contradict Williams' (2012: 330) argument which advises against centering categorical dummy variables on the grand mean in calculating marginal effects of interaction terms.

To avoid skewed results, observations are excluded in both wave 5 and longitudinal analyses based on the following responses to the questions that are utilized to operationalize the variables of interest with their respective coding values in parentheses: "don't know" (-1); "no answer" (-2); "not applicable" (-3); "not asked" (-4); and "missing, not asked by interviewer" (-5). These responses were coded numerically and in the negative which would impact on the coefficients generated from the model above. Moreover, excluding observations with missing or unknown responses would prevent the process of grand mean centering of variables of interest from taking the averages of all observations that will also include these negative values which actually symbolize absent or unknown responses rather than actual responses. Excluding these observations results in 37 of the original 58 countries/territories surveyed in wave 5 being included in the dataset as respondents in some countries were not surveyed at all on some questions of interest (see Table 32 in Appendix E); for the longitudinal dataset, 88 of the original 172 countries/territories (including repeat countries/territories) are retained for income payments and taxation payment vehicles, while 56 of the original 118 countries/territories (including repeat countries/territories) are retained for government spending as the payment vehicle as respondents in some countries were similarly not asked at all on some questions of interest (see Table 33 in Appendix F). The number of countries retained for analysis meets Oyserman and Uskul's (2008: 166) requirement of a minimum of six countries on top of "similarly representative samples" being surveyed by the WVS Association for each country, as well as Schwartz and colleagues' (see Fischer et al, 2010: 143) requirement of at least 20 countries.

The following are the number of observations for each payment vehicle (i.e. voluntary income payments, compulsory taxes, government spending) for wave 5 analysis *only* when respondents'

trust in the armed forces are both included and excluded: i) for WTP as direct income payments, N = 37,332 observations when trust in military included and N = 37,601 observations when trust in military is excluded; ii) for WTP as taxes, N = 37,321 observations when trust in military included and N = 37,595 observations when trust in military is excluded; and iii) for WTP as government spending, N = 37,357 observations when trust in military is included and N = 37,626 observations when trust in military is excluded. Taking N = 37,321 observations as the lowest bound among the numbers of observations above, this would mean an average of at least 37,321 observations/37 countries or territories = 1,008 observations per country/territory; this approximates to the minimum of 1,000 respondents that the World Values Survey Association (1981) stipulates for each country/territory surveyed. The number of observations for each of the three payment vehicles when one's trust in the military is included or not for the longitudinal dataset *only* are as follows: i) for WTP as direct income payments, N = 87,873 observations when trust in military included and N = 88,760 observations when trust in military is excluded; ii) for WTP as taxes, N = 88,206 observations when trust in military included and N = 89,106 observations when trust in military is excluded; and iii) for WTP as government spending, N = 55,410 observations when trust in military is included and N = 55,989 observations when trust in military is excluded. Note that the number of observations for government spending is substantially lower compared to those for the other two payment vehicles as the government spending question was not surveyed in wave 3. Taking N = 87,873 observations as the lowest bound among the numbers of observations for income payments and taxation and N = 55,410 observations for government spending, this would yield an average of at least 87,873 observations/88 countries or territories = 998 observations per country or territory for income payments and taxation, and 55,410 observations/56 countries or territories = 989 observations per

country or territory for government spending; these also approximate to the minimum of 1,000 respondents that the World Values Survey Association (1981) stipulates for each country or territory surveyed. This is important considering that whole countries have been dropped from the dataset as respondents in some countries were not surveyed at all on some questions of interest.

6.5 Conclusion

This chapter has advanced several hypotheses for testing in relation to the arguments that have been put forth by Ostrom, Yamagishi, and cross-cultural psychologists such as Hofstede, Triandis, and Schwartz. These hypotheses are crafted to reflect the two-level context that Ostrom observes, as well as the contention between Yamagishi and cross-cultural psychologists over the role of culture in individuals' decisions such as actions over CXN problems like CPR management. Subsequently, multilevel modeling has been advanced as the methodology of choice as it seems to find support from Ostrom, Yamagishi and the cross-cultural psychologists. This is in spite of the differences in operationalization that they sometimes disagree on, even among the cross-cultural psychologists themselves. The hypotheses and research method thus allows analysis to commence examining how one's cultural orientation and trust in strangers and institutions impact on one's willingness-to-pay for environmental conservation specific to each payment vehicle—voluntary income payments, compulsory taxes, and government spending—which is mediated by contextual or country level variables such as rule of law and cultural frame. The results shall be reported in Chapter 7.

CHAPTER 7 RESULTS

7.1 Introduction

This chapter reports the results from analyzing both wave 5 and longitudinal datasets using the statistical model proposed in Chapter 6. Chapter 6 proposes four hypotheses to test the arguments of Ostrom as well as those of Yamagishi against those of the cross-cultural psychologists such as Hofstede, Triandis and Schwartz. Hierarchical linear modeling using hierarchical logistic regression is selected since individuals are nested in countries in a two-level context in the manner Ostrom suggests and which Yamagishi and the cross-cultural psychologists support. Table 3 below reports the odds ratios of respective independent variables after running multilevel ordered logistic regression on both wave 5 and longitudinal datasets of the WVS. Odds ratios are reported instead of log odds to enable better interpretability. Note that odds ratios reported are for the average or mean respondent who is female and who does not reside in any of the countries used in the analysis as a result of grand mean centering of all independent variables at both the individual and country levels except gender and categorical dummy variables such as OECD membership, geographical region and survey years for wave 5 analysis, or survey waves for longitudinal analysis (see Chapter 6). In spite of the diversity of payment vehicles and the two scenarios where one's trust in the military is included and excluded, some patterns can be discerned with respect to the four hypotheses proposed after controlling for variables of interest at the individual level (age, sex, educational level and household income level) and country level (environmental quality, GDP per capita, income inequality, population size, and region and year survey dummies). Results shall be reported in four sections, one for each of the four hypotheses proposed earlier. Results on the effects of culture shall be analyzed first: Hypothesis 1 followed by Hypothesis 2. Subsequently, results on the rule of law will be reported which will cover Hypothesis 3, followed by Hypothesis

4. This is then followed by summarizing from the results the impacts of independent variables at the individual level or the micro context which is then followed by the country level or the macro context, and then cross-level interaction effects before concluding.

Summary statistics are shown below for wave 5 (see Table 1 below) and longitudinal (see Table 2 below) datasets. The marginal effects of various interaction terms will be reported in terms of *change in predicted probability* while holding other covariates at their respective means using Stata 14's *margins, dydx* command; this is different from the *odds ratios* reported in the main results in Table 3 (see below). These marginal effects are graphed using grand mean centered values of the component terms that make up their respective various interaction terms that have been re-labelled their original un-centered values in order to better explain the effects of interaction terms.

Table 1. Descriptive statistics for all models using the wave 5 dataset of the World Values Survey.

Payment vehicle	**Direct income payments**				**Taxation**				**Government spending**			
	Includes trust in military		**Excludes trust in military**		**Includes trust in military**		**Excludes trust in military**		**Includes trust in military**		**Excludes trust in military**	
Indepen-dent variables	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
Individual level variables												
Cultural orientation	-0.837	1.088	-0.8378	1.089	-0.837	1.088	-0.837	1.089	-0.837	1.088	-0.838	1.089
Trust in strangers	2.401	0.616	2.401	0.616	2.401	0.616	2.401	0.616	2.401	0.616	2.401	0.616
Trust in governing	2.530	0.644	2.490	0.659	2.529	0.645	2.490	0.660	2.529	0.645	2.490	0.660

institutions												
Age	41.327	16.324	41.347	16.330	41.338	16.322	41.361	16.330	41.336	16.324	41.358	16.330
Age^2	1974.348	1514.398	1976.235	1515.474	1975.242	1514.457	1977.413	1515.79	1975.149	1514.207	1977.148	1515.185
Gender (male = 1)	0.505	0.500	0.503	0.500	0.504	0.500	0.503	0.500	0.504	0.500	0.503	0.500
Highest education attainment	5.430	2.394	5.429	2.394	5.429	2.392	5.427	2.393	5.426	2.393	5.424	2.393
Household income level	4.836	2.278	4.833	2.277	4.835	2.279	4.832	2.278	4.834	2.280	4.831	2.278
Country level variables												
Rule of law	0.420	0.889	0.421	0.889	0.421	0.889	0.422	0.889	0.421	0.888	0.422	0.888

Cultural frame	4.617	2.199	4.621	2.198	4.619	2.200	4.624	2.199	4.618	2.199	4.623	2.197
Environ-mental perfor-mance index	57.226	14.942	57.250	14.950	57.241	14.938	57.267	14.946	57.226	14.933	57.249	14.940
Gross domestic product per capita	18165.5	21836.36	18170.53	21821.61	18179.34	21836.11	18186.27	21821.08	18163.61	21823.64	18168.8	21809.23
Gini coefficient	37.655	9.242	37.651	9.250	37.655	9.244	37.651	9.252	37.667	9.249	37.665	9.258
Population size (million)	103	237	103	237	103	237	103	237	103	236	103	236

Number of observat-ions	37,332	37,601	37,321	37,595	37,357	37,626
Number of countries	37	37	37	37	37	37

Table 2. Descriptive statistics for all models using the longitudinal dataset of the World Values Survey.

Payment vehicle	**Direct income payments**				**Taxation**				**Government spending**			
	Includes trust in military		**Excludes trust in military**		**Includes trust in military**		**Excludes trust in military**		**Includes trust in military**		**Excludes trust in military**	
Indepen-dent variables	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
Individual level variables												
Cultural orientation	0.021	0.400	0.021	0.400	0.021	0.400	0.022	0.400	0.016	0.403	0.016	0.403
Trust in strangers	0.270	0.444	0.269	0.444	0.270	0.444	0.270	0. 444	0.265	0.441	0.265	0.441

Trust in governing institutions	2.476	0.592	2.436	0.606	2.475	0.591	2.435	0.605	2.499	0.608	2.459	0.621
Age	40.584	15.895	40.615	15.905	40.594	15.889	40.627	15.900	40.437	16.080	40.480	16.096
Age^2	1899.744	1463.396	1902.555	1465.012	1900.353	1462.926	1903.377	1464.611	1893.72	1481.211	1897.696	1483.748
Gender (male = 1)	0.508	0.500	0.506	0.500	0.508	0.500	0.506	0.500	0.511	0.500	0.509	0.500
Highest education attainment	4.742	2.240	4.741	2.240	4.743	2.239	4.742	2.239	4.735	2.253	4.733	2.252
Household income level	4.771	2.458	4.770	2.459	4.770	2.460	4.769	2.460	4.818	2.366	4.816	2.365

Country level variables												
Rule of law	0.342	0.985	0.344	0.985	0.342	0.985	0. 343	0.985	0.349	0.957	0.350	0.957
Cultural frame	4.856	2.178	4.858	2.177	4.855	2.177	4.857	2.176	4.749	2.175	4.751	2.173
Green-house emissions	792865.2	1556094	791985.3	1555308	791070.3	1550810	790424	1550718	892361.3	1707571	891493.7	1707517
Gross domestic product per capita	17365.42	19610.78	17371.51	19594.93	17361.58	19593.41	17364.83	19575.58	17874.61	20656.92	17879.49	20632.14
Gini coefficient	38.214	8.963	38.201	8.967	38.207	8.957	38.197	8.962	38.811	8.632	38.804	8.648

Population size (million)	112	239	112	239	112	239	112	239	132	270	132	271
Number of observat-ions	87,873		88,760		88,206		89,106		55,410		55,989	
Number of countries	54		54		54		54		47		47	

Table 3. Results from multilevel ordered logistic regression on both wave 5 and longitudinal datasets of the World Values Survey.

Dataset	**Wave 5**						**Longitudinal**					
Payment vehicle	**Direct income payments**		**Taxation**		**Government spending**		**Direct income payments**		**Taxation**		**Government spending**	
Indepen-dent variables	**Includes trust in military (1)**	**Excludes trust in military (2)**	**Includes trust in military (3)**	**Excludes trust in military (4)**	**Includes trust in military (5)**	**Excludes trust in military (6)**	**Includes trust in military (7)**	**Excludes trust in military (8)**	**Includes trust in military (9)**	**Excludes trust in military (10)**	**Includes trust in military (11)**	**Excludes trust in military (12)**
Individual level variables												
Cultural orientation	0.973 (0.0209)	0.974 (0.0208)	0.991 (0.0278)	0.989 (0.0272)	1.002 (0.0249)	1.000 (0.0253)	0.972 (0.0285)	0.972 (0.0286)	1.034 (0.0332)	1.033 (0.0335)	0.847*** (0.0446)	0.844*** (0.0444)
Trust in strangers	1.401*** (0.0651)	1.401*** (0.0649)	1.347*** (0.0533)	1.348*** (0.0537)	0.806*** (0.0351)	0.807*** (0.0352)	1.141*** (0.0367)	1.142*** (0.0363)	1.157*** (0.0353)	1.156*** (0.0361)	0.808*** (0.0380)	0.813*** (0.0383)

Trust in governing institutions	1.326*** (0.0706)	1.327*** (0.0700)	1.403*** (0.0637)	1.403*** (0.0625)	0.887** (0.0437)	0.875*** (0.0414)	1.303*** (0.0449)	1.293*** (0.0424)	1.429*** (0.0388)	1.414*** (0.0347)	0.849*** (0.0331)	0.833*** (0.0314)
Age	1.000 (0.0009)	1.000 (0.0009)	1.000 (0.0009)	1.000 (0.0009)	1.000 (0.0009)	0.999 (0.0009)	0.997*** (0.0006)	0.997*** (0.0006)	0.997*** (0.0006)	0.997*** (0.0006)	1.000 (0.0008)	1.000 (0.0008)
Age^2	1.000 (4.11e-05)	1.000 (4.09e-05)	1.000 (3.92e-05)	1.000 (3.90e-05)	1.000 (4.26e-05)	1.000 (4.25e-05)	1.000* (2.70e-05)	1.000* (2.68e-05)	1.000** (2.62e-05)	1.000** (2.61e-05)	1.000 (3.57e-05)	1.000 (3.55e-05)
Gender	0.941** (0.0227)	0.944** (0.0227)	0.993 (0.0226)	0.994 (0.0225)	0.962 (0.0234)	0.958* (0.0232)	0.938*** (0.0140)	0.940*** (0.0140)	0.946*** (0.0138)	0.947*** (0.0137)	0.958** (0.0193)	0.951** (0.0191)
Highest education attainment	1.103*** (0.00684)	1.103*** (0.00680)	1.069*** (0.00622)	1.069*** (0.00619)	0.918*** (0.00568)	0.917*** (0.00566)	1.091*** (0.00428)	1.090*** (0.00425)	1.084*** (0.00413)	1.083*** (0.00410)	0.907*** (0.00486)	0.907*** (0.00484)

Household income level	1.050*** (0.00625)	1.050*** (0.00623)	1.053*** (0.00590)	1.053*** (0.00589)	0.941*** (0.00559)	0.941*** (0.00558)	1.037*** (0.00355)	1.038*** (0.00353)	1.032*** (0.00344)	1.033*** (0.00343)	0.949*** (0.00449)	0.949*** (0.00447)
Country level variables												
Rule of law	0.963 (0.319)	0.974 (0.320)	0.779 (0.240)	0.781 (0.240)	1.184 (0.426)	1.177 (0.425)	2.928*** (0.377)	2.924*** (0.375)	2.626*** (0.322)	2.636*** (0.322)	0.865 (0.156)	0.870 (0.158)
Cultural frame	0.890 (0.118)	0.883 (0.116)	0.952 (0.117)	0.947 (0.116)	0.812 (0.116)	0.813 (0.117)	0.412*** (0.0914)	0.409*** (0.0911)	0.519*** (0.0918)	0.512*** (0.0922)	0.939 (0.0945)	0.938 (0.0950)
Rule of law*Cultu -ral frame	1.126 (0.0924)	1.128 (0.0917)	1.106 (0.0844)	1.105 (0.0839)	0.809** (0.0718)	0.808** (0.0720)	0.410*** (0.0355)	0.405*** (0.0348)	0.530*** (0.0461)	0.516*** (0.0445)	0.893 (0.0712)	0.893 (0.0716)

Cross level interact-ions												
Rule of law*Cultu-ral orientation	1.015 (0.0404)	1.017 (0.0403)	1.058 (0.0565)	1.060 (0.0555)	0.946 (0.0452)	0.947 (0.0463)	0.987 (0.0461)	0.989 (0.0463)	0.963 (0.0498)	0.969 (0.0505)	0.835* (0.0785)	0.831** (0.0779)
Rule of law*Trust in strangers	1.212** (0.108)	1.215** (0.108)	1.182** (0.0894)	1.184** (0.0902)	0.838** (0.0713)	0.839** (0.0715)	1.104** (0.0557)	1.106** (0.0552)	1.142*** (0.0552)	1.140*** (0.0564)	0.888 (0.0748)	0.885 (0.0747)
Rule of law*Trust in governing	1.009 (0.103)	0.985 (0.1000)	1.065 (0.0929)	1.055 (0.0902)	0.953 (0.0921)	0.983 (0.0912)	1.038 (0.0558)	1.027 (0.0525)	1.087** (0.0464)	1.081** (0.0418)	0.875* (0.0606)	0.890* (0.0595)

institutions												
Cultural frame*Cul-tural orientation	1.017 (0.0170)	1.016 (0.0169)	0.992 (0.0220)	0.991 (0.0216)	0.999 (0.0197)	0.998 (0.0201)	1.038* (0.0221)	1.037* (0.0222)	1.039 (0.0244)	1.037 (0.0246)	1.027 (0.0432)	1.031 (0.0434)
Cultural frame*Trust in strangers	0.984 (0.0366)	0.982 (0.0364)	1.000 (0.0316)	0.998 (0.0317)	0.967 (0.0340)	0.967 (0.0341)	1.014 (0.0237)	1.012 (0.0234)	0.997 (0.0222)	0.995 (0.0227)	0.972 (0.0370)	0.973 (0.0371)
Cultural frame*Trust in governing institutions	0.947 (0.0402)	0.960 (0.0404)	0.960 (0.0347)	0.970 (0.0343)	0.994 (0.0394)	0.978 (0.0371)	0.994 (0.0247)	1.001 (0.0236)	1.006 (0.0197)	1.011 (0.0179)	1.023 (0.0319)	1.013 (0.0304)

Environ-mental perfor-mance index	0.987 (0.0185)	0.987 (0.0183)	0.991 (0.0172)	0.991 (0.0171)	1.021 (0.0205)	1.022 (0.0205)	1.000*** (1.37e-07)	1.000*** (1.37e-07)	1.000*** (1.41e-07)	1.000*** (1.40e-07)	1.000 (1.06e-07)	1.000 (1.07e-07)
Gross domestic product per capita	1.000 (1.12e-05)	1.000 (1.11e-05)	1.000 (1.05e-05)	1.000 (1.04e-05)	1.000 (1.23e-05)	1.000 (1.23e-05)	1.000*** (4.73e-06)	1.000*** (4.72e-06)	1.000 (4.85e-06)	1.000 (4.84e-06)	1.000 (9.63e-06)	1.000 (9.69e-06)
Gini coefficient	0.960* (0.0213)	0.961* (0.0212)	0.966* (0.0199)	0.966* (0.0198)	1.037 (0.0248)	1.037 (0.0248)	0.987* (0.00725)	0.988* (0.00720)	0.988* (0.00703)	0.988* (0.00698)	1.046*** (0.0137)	1.047*** (0.0138)
Population size	1.000 (5.16e-10)	1.000 (5.11e-10)	1.000 (4.77e-10)	1.000 (4.74e-10)	1.000 (5.50e-10)	1.000 (5.52e-10)	1.000*** (6.53e-10)	1.000*** (6.50e-10)	1.000 (6.15e-10)	1.000 (6.14e-10)	1.000* (6.25e-10)	1.000* (6.29e-10)
Constant	1.809	1.790	0.652	0.666	4.439*	4.354*	4.268	4.274	1.868	1.890	5.809***	5.812***

	(1.407)	(1.379)	(0.473)	(0.480)	(3.807)	(3.742)	(4.823)	(4.854)	(1.651)	(1.706)	(2.239)	(2.255)
Number of observat-ions	37,332	37,601	37,321	37,595	37,357	37,626	87,873	88,760	88,206	89,106	55,410	55,989
Number of countries	37	37	37	37	37	37	54	54	54	54	47	47

Notes:

1) Standard errors in parentheses. *p< 0.1, **p< 0.05, ***p< 0.01.
2) The dependent variable is an individual's willingness-to-pay through the respective payment vehicles specified for each column and is expressed as a dummy variable: coded 1 for "agree" and "strongly agree"; 0 for "disagree" and "strongly disagree".

7.2 Hypothesis 1: weak support

Weak evidence is found for the role of cultural orientation in influencing individuals' attitudes towards paying for environmental pollution mitigation as mentioned in Hypothesis 1. This hypothesis has been advanced by scholars of pro-environmental behavior such as Cho et al (2013), Kopelman (2009), Roy and Goll (2014), Peng and Lin (2009), McCarty and Shrum (2001), and Turkyilmaz et al (2015), as mentioned previously. Cultural orientation is conceptualized as an individual level independent variable as argued by Schwartz, Triandis and Yoon. The odds ratios of cultural orientation are statistically significant ($p < 0.01$), but *only* for the case of government spending as payment vehicle in the longitudinal analysis (see Table 3, columns 11 and 12). This is contrary to the results reported in wave 5 analysis which show that cultural orientation is statistically insignificant, whether alone or in interaction with other variables (see Table 3, columns 1 to 6). The results suggest that as individuals become *more* individualistic (i.e. less allocentric) in their cultural orientations by one unit, they are *less likely* to free-ride on government spending to mitigate pollution without any personal contribution by an odds ratio of 0.844 when one's trust in the armed forces is *excluded* (see Table 3, column 12), or by an odds ratio of 0.847 when one's trust in the military is *included* (see Table 3, column 11). At first glance, these results contradict the expectation that individualistic persons are *more likely* to free-ride on the government. However, a closer inspection of the results in Table 4 (below) reveals that people of individualistic orientations are less likely to free-ride on government spending as the rule of law of a country improves by one unit. This is evidenced in the marginal effects of the interaction term between rule of law and cultural orientation on one's willingness to free ride on the government in terms of the change in probability of free-riding which are statistically significant when rule of law is high at 1 and 2. When one's cultural orientation is -1 (collectivistic) and rule of law of a country is 1,

probability of free-riding decreases by 0.045 when one's trust in the military is included (see Table 4, column 11) and decreases by 0.046 when one's trust in military is excluded (see Table 4, column 12). When one's cultural orientation is 1 (slightly individualistic) and rule of law improves to 2, probability of free-riding on the government decreases *even further* by 0.109 when one's trust in the military is included (see Table 4, column 11) and 0.112 when one's trust in the military is excluded (see Table 4, column 12). Thus, the rule of law of a country has a mediating impact on one's willingness to free ride on government spending by dampening it when rule of law is high at 1 and 2. This is seen in Figure 1 (k) and (l) below where change in probability of one's propensity to free ride on the government decreases gradually as cultural orientation increases when rule of law is 1 (magenta line). However, the probability of free-riding decreases even further when rule of law is 2 as cultural orientation increases as seen in the downward sloping (gold) line.

These results seem to be in line with the view that actors who are individualistic in cultural orientation require laws to regulate and ensure cooperation with other unfamiliar persons in order to overcome the former's distrust of the latter. If so, this is consistent with Hofstede's (2001b: 436) argument that collectivistic and individualistic individuals behave differently when faced with the need to cooperate with the other party. Individualistic people, in particular, need to engage in a joint task with other individuals *prior* to the establishment of personal ties with other parties—which is the obverse of collectivistic individuals (Hofstede, 2001b: 239). Such a result also supports Hashimoto and Yamagishi's (2016: 288; see also Yamagishi, 2011: 255-256) observation that people in a group behave collectivistically when rule of law is weak or absent—and thus the converse, that individuals tend to behave individualistically when rule of law is strong. It follows from this explanation that when rule of law is strong, individualistic individuals are unlikely to

take advantage of the government because a strong rule of law supports individualistic behavior which reduces social uncertainty as individuals need not fear being exploited by individuals outside of one's in-group (Yamagishi and Yamagishi, 1994: 160). Thus, it can be misleading to view cultural orientation *per se* impacting on individuals' environmental WTP as cultural orientation influences WTP in interaction with another variable which is the rule of law of a country as a country level or macro context independent variable. Nevertheless, these results are highly suspect in two ways when comparing them against the odds ratios reported for *Cultural orientation* for other payment vehicles in the wave 5 and longitudinal analyses (Table 3, columns 1 to 10). Firstly, conventional WTP questions in environmental valuation surveys are *not* phrased in terms of *unwillingness-to-pay* as the government spending question is framed in Table 11 (see Appendix A). Instead, they are framed in terms of *willingness-to-pay* to elicit monetary bids from respondents more similar to the way the questions on income payment and taxation are posed to respondents in Table 11. Secondly, the government spending question does not explicitly elicit responses with respect to a specific payment vehicle when concerning the 'costs' an individual might incur otherwise if he/she needs to pay, whether it is through voluntary income payments (essentially a donation) or through compulsory taxes. This is at odds with conventional WTP questions that do so, such as in the style the direct income payment and taxation questions are asked in Table 11. Answering the government payment question can thus confuse respondents as they are unnecessarily burdened in considering how they need not *possibly* pay which can be dependent on whether the payment vehicle in comparison is voluntary donations or compulsory tax payments. These two payment vehicles are very different which can influence respondents' decisions to pay which gives rise to payment vehicle bias (Morrison et al, 2000: 412, 421).

Table 4. Marginal effects of interaction between an individual's cultural orientation and his/her country's rule of law for both wave 5 and longitudinal datasets of the World Values Survey.

Dataset		**Wave 5**						**Longitudinal**					
Values of independent variables		**Direct income payments**		**Taxation**		**Government spending**		**Direct income payments**		**Taxation**		**Government spending**	
Cultural Orientat -ion	**Rule of law**	**Includes trust in military (1)**	**Excludes trust in military (2)**	**Includes trust in military (3)**	**Excludes trust in military (4)**	**Includes trust in military (5)**	**Excludes trust in military (6)**	**Includes trust in military (7)**	**Excludes trust in military (8)**	**Includes trust in military (9)**	**Excludes trust in military (10)**	**Includes trust in military (11)**	**Excludes trust in military (12)**
-5	**-2**	-0.012 (0.018)	-0.013 (0.018)	-0.023 (0.017)	-0.023 (0.017)	0.034 (0.031)	0.032 (0.032)						
-5	**-1**	-0.010 (0.012)	-0.010 (0.012)	-0.018 (0.014)	-0.019 (0.014)	0.018 (0.019)	0.018 (0.019)						
-5	**0**	-0.007 (0.006)	-0.007 (0.006)	-0.008 (0.008)	-0.008 (0.008)	0.005 (0.007)	0.005 (0.007)						
-5	**1**	-0.004 (0.007)	-0.004 (0.007)	0.006 (0.010)	0.006 (0.010)	-0.005 (0.005)	-0.005 (0.005)						
-5	**2**	-0.001 (0.015)	0.000 (0.015)	0.019 (0.019)	0.019 (0.019)	-0.010 (0.008)	-0.010 (0.008)						

-4	**-2**	-0.013 (0.019)	-0.014 (0.019)	-0.025 (0.020)	-0.025 (0.020)	0.033 (0.032)	0.032 (0.032)						
-4	**-1**	-0.010 (0.012)	-0.011 (0.012)	-0.019 (0.015)	-0.019 (0.015)	0.018 (0.018)	0.017 (0.018)						
-4	**0**	-0.007 (0.006)	-0.007 (0.006)	-0.008 (0.008)	-0.009 (0.008)	0.005 (0.006)	0.004 (0.007)						
-4	**1**	-0.004 (0.007)	-0.004 (0.007)	0.006 (0.010)	0.006 (0.010)	-0.005 (0.006)	-0.005 (0.006)						
-4	**2**	-0.001 (0.015)	0.000 (0.015)	0.019 (0.020)	0.019 (0.020)	-0.011 (0.009)	-0.011 (0.009)						
-3	**-2**	-0.013 (0.020)	-0.014 (0.020)	-0.027 (0.023)	-0.028 (0.023)	0.032 (0.031)	0.031 (0.031)						
-3	**-1**	-0.010 (0.013)	-0.011 (0.013)	-0.019 (0.017)	-0.020 (0.016)	0.017 (0.017)	0.017 (0.017)						
-3	**0**	-0.007 (0.006)	-0.007 (0.006)	-0.008 (0.009)	-0.009 (0.008)	0.005 (0.006)	0.004 (0.006)						
-3	**1**	-0.004 (0.007)	-0.004 (0.007)	0.006 (0.010)	0.006 (0.010)	-0.005 (0.006)	-0.005 (0.006)						
-3	**2**	-0.001 (0.015)	0.000 (0.015)	0.020 (0.021)	0.020 (0.020)	-0.012 (0.010)	-0.012 (0.010)						

-2	**-2**	-0.014 (0.021)	-0.014 (0.021)	-0.029 (0.026)	-0.030 (0.026)	0.031 (0.030)	0.030 (0.030)						
-2	**-1**	-0.011 (0.013)	-0.011 (0.013)	-0.020 (0.018)	-0.021 (0.018)	0.017 (0.016)	0.016 (0.016)						
-2	**0**	-0.008 (0.006)	-0.007 (0.006)	-0.008 (0.009)	-0.009 (0.009)	0.005 (0.006)	0.004 (0.006)						
-2	**1**	-0.004 (0.007)	-0.004 (0.007)	0.006 (0.010)	0.006 (0.010)	-0.005 (0.006)	-0.005 (0.006)						
-2	**2**	-0.001 (0.015)	0.000 (0.015)	0.020 (0.021)	0.020 (0.021)	-0.012 (0.011)	-0.012 (0.012)						
-1	**-2**	-0.014 (0.022)	-0.015 (0.022)	-0.031 (0.029)	-0.032 (0.029)	0.030 (0.028)	0.028 (0.028)	0.001 (0.027)	0.000 (0.027)	0.025 (0.025)	0.022 (0.026)	0.044 (0.046)	0.046 (0.047)
-1	**-1**	-0.011 (0.014)	-0.011 (0.014)	-0.020 (0.019)	-0.022 (0.019)	0.016 (0.015)	0.016 (0.016)	-0.002 (0.016)	-0.003 (0.016)	0.021 (0.019)	0.018 (0.019)	0.013 (0.024)	0.014 (0.024)
-1	**0**	-0.008 (0.006)	-0.007 (0.006)	-0.008 (0.009)	-0.009 (0.009)	0.005 (0.006)	0.004 (0.006)	-0.003 (0.004)	-0.003 (0.004)	0.009 (0.007)	0.008 (0.007)	-0.017* (0.010)	-0.017* (0.010)
-1	**1**	-0.004 (0.007)	-0.004 (0.007)	0.006 (0.010)	0.006 (0.010)	-0.005 (0.006)	-0.005 (0.006)	-0.002 (0.002)	-0.002 (0.002)	0.001 (0.004)	0.001 (0.004)	-0.045*** (0.012)	-0.046*** (0.012)
-1	**2**	-0.001 (0.015)	0.000 (0.015)	0.020 0.022)	0.020 (0.021)	-0.013 (0.013)	-0.013 (0.013)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.004)	-0.001 (0.004)	-0.072*** (0.023)	-0.073*** (0.023)

0	**-2**	-0.014	-0.015	-0.032	-0.034	0.028	0.027	0.001	0.000	0.026	0.023	0.038	0.039
		(0.023)	(0.023)	(0.032)	(0.032)	(0.026)	(0.026)	(0.027)	(0.027)	(0.027)	(0.028)	(0.035)	(0.036)
0	**-1**	-0.011	-0.011	-0.021	-0.022	0.016	0.015	-0.002	-0.003	0.021	0.018	0.012	0.013
		(0.014)	(0.014)	(0.020)	(0.019)	(0.014)	(0.015)	(0.016)	(0.016)	(0.019)	(0.019)	(0.022)	(0.022)
0	**0**	-0.008	-0.008	-0.008	-0.009	0.005	0.004	-0.003	-0.003	0.008	0.008	-0.018	-0.018
		(0.006)	(0.006)	(0.009)	(0.009)	(0.006)	(0.006)	(0.005)	(0.005)	(0.007)	(0.007)	(0.011)	(0.011)
0	**1**	-0.004	-0.004	0.006	0.006	-0.005	-0.005	-0.002	-0.002	0.001	0.001	-0.053***	-0.054***
		(0.007)	(0.007)	(0.010)	(0.010)	(0.006)	(0.007)	(0.003)	(0.002)	(0.004)	(0.004)	(0.016)	(0.016)
0	**2**	-0.001	0.000	0.020	0.020	-0.014	-0.014	-0.001	-0.001	-0.001	-0.001	-0.093***	-0.094***
		(0.015)	(0.015)	(0.022)	(0.022)	(0.014)	(0.014)	(0.002)	(0.002)	(0.004)	(0.004)	(0.035)	(0.035)
1	**-2**	-0.014	-0.015	-0.034	-0.035	0.026	0.025	0.001	0.000	0.027	0.024	0.031	0.033
		(0.024)	(0.024)	(0.034)	(0.033)	(0.023)	(0.024)	(0.027)	(0.027)	(0.030)	(0.030)	(0.025)	(0.025)
1	**-1**	-0.011	-0.011	-0.021	-0.023	0.015	0.014	-0.002	-0.003	0.020	0.018	0.012	0.012
		(0.014)	(0.014)	(0.020)	(0.020)	(0.013)	(0.014)	(0.016)	(0.016)	(0.019)	(0.019)	(0.020)	(0.020)
1	**0**	-0.008	-0.008	-0.008	-0.009	0.005	0.004	-0.003	-0.003	0.008	0.007	-0.019	-0.019
		(0.006)	(0.006)	(0.009)	(0.009)	(0.006)	(0.006)	(0.005)	(0.005)	(0.007)	(0.006)	(0.012)	(0.012)
1	**1**	-0.004	-0.004	0.006	0.006	-0.005	-0.005	-0.002	-0.002	0.001	0.001	-0.060***	-0.061***
		(0.007)	(0.007)	(0.010)	(0.010)	(0.007)	(0.007)	(0.003)	(0.003)	(0.004)	(0.004)	(0.019)	(0.019)
1	**2**	-0.001	0.000	0.020	0.020	-0.014	-0.014	-0.001	-0.001	-0.001	-0.001	-0.109**	-0.112**
		(0.015)	(0.015)	(0.022)	(0.022)	(0.015)	(0.015)	(0.002)	(0.002)	(0.004)	(0.004)	(0.043)	(0.043)

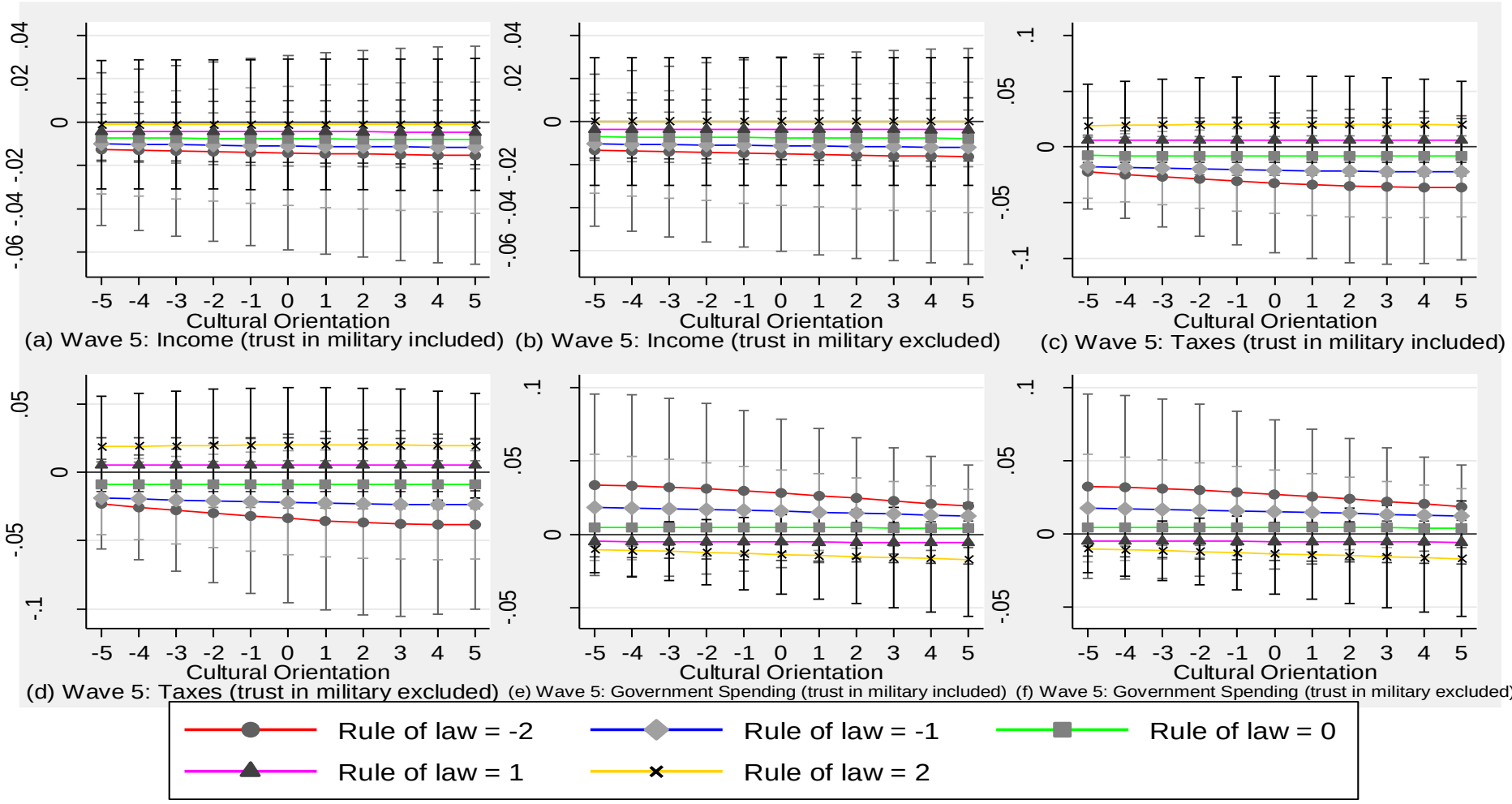
2	**-2**	-0.015 (0.024)	-0.016 (0.024)	-0.035 (0.035)	-0.037 (0.035)	0.025 (0.021)	0.024 (0.021)						
2	**-1**	-0.011 (0.015)	-0.012 (0.015)	-0.022 (0.021)	-0.023 (0.020)	0.014 (0.012)	0.014 (0.013)						
2	**0**	-0.008 (0.007)	-0.008 (0.007)	-0.008 (0.009)	-0.009 (0.009)	0.005 (0.006)	0.004 (0.006)						
2	**1**	-0.004 (0.007)	-0.004 (0.007)	0.006 (0.010)	0.006 (0.010)	-0.005 (0.007)	-0.005 (0.007)						
2	**2**	-0.001 (0.015)	0.000 (0.015)	0.020 (0.022)	0.020 (0.021)	-0.015 (0.016)	-0.015 (0.017)						
3	**-2**	-0.015 (0.025)	-0.016 (0.025)	-0.036 (0.035)	-0.037 (0.035)	0.023 (0.018)	0.022 (0.019)						
3	**-1**	-0.011 (0.015)	-0.012 (0.015)	-0.022 (0.021)	-0.023 (0.021)	0.014 (0.011)	0.013 (0.012)						
3	**0**	-0.008 (0.007)	-0.008 (0.007)	-0.008 (0.009)	-0.009 (0.009)	0.004 (0.005)	0.004 (0.006)						
3	**1**	-0.005 (0.007)	-0.004 (0.007)	0.006 (0.010)	0.005 (0.010)	-0.005 (0.007)	-0.006 (0.007)						
3	**2**	-0.001 (0.015)	0.000 (0.015)	0.020 (0.021)	0.020 (0.021)	-0.016 (0.017)	-0.016 (0.018)						

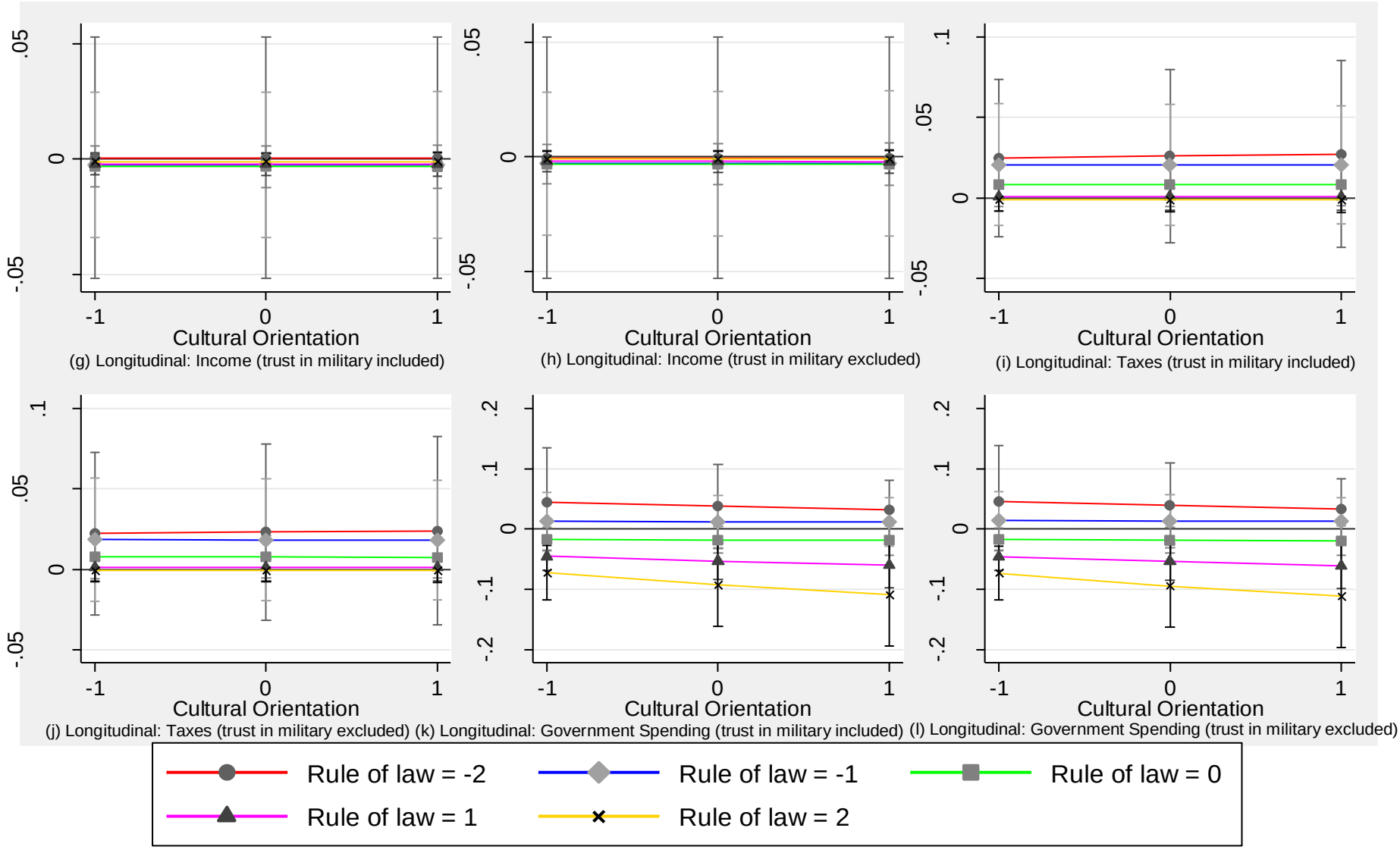
4	**-2**	-0.015 (0.025)	-0.016 (0.025)	-0.036 (0.035)	-0.038 (0.034)	0.021 (0.016)	0.020 (0.016)						
4	**-1**	-0.012 (0.015)	-0.012 (0.015)	-0.022 (0.021)	-0.023 (0.021)	0.013 (0.010)	0.013 (0.010)						
4	**0**	-0.008 (0.007)	-0.008 (0.007)	-0.008 (0.009)	-0.009 (0.009)	0.004 (0.005)	0.004 (0.005)						
4	**1**	-0.005 (0.008)	-0.004 (0.007)	0.006 (0.010)	0.005 (0.010)	-0.005 (0.007)	-0.006 (0.007)						
4	**2**	-0.001 (0.015)	0.000 (0.015)	0.020 (0.021)	0.020 (0.020)	-0.016 (0.019)	-0.016 (0.019)						
5	**-2**	-0.015 (0.026)	-0.016 (0.026)	-0.037 (0.033)	-0.038 (0.032)	0.019 (0.014)	0.019 (0.014)						
5	**-1**	-0.012 (0.015)	-0.012 (0.015)	-0.022 (0.021)	-0.024 (0.020)	0.013 (0.009)	0.012 (0.009)						
5	**0**	-0.008 (0.007)	-0.008 (0.007)	-0.008 (0.009)	-0.009 (0.009)	0.004 (0.005)	0.004 (0.005)						
5	**1**	-0.005 (0.008)	-0.004 (0.007)	0.006 (0.010)	0.005 (0.010)	-0.006 (0.007)	-0.006 (0.008)						
5	**2**	-0.001 (0.016)	0.000 (0.015)	0.020 (0.020)	0.020 (0.020)	-0.017 (0.020)	-0.017 (0.020)						

Notes:

1) Standard errors in parentheses. *p< 0.1, **p< 0.05, ***p< 0.01.
2) The dependent variable is an individual's willingness-to-pay through the respective payment vehicles specified for each column and is expressed as a dummy variable: coded 1 for "agree" and "strongly agree"; 0 for "disagree" and "strongly disagree".

Figure 1. Marginal effects of the interaction between an individual's cultural orientation and his/her country's rule of law for all three payment vehicles in wave 5 and longitudinal datasets.




.05
0
-.05
-1
0
1
Cultural Orientation
(g) Longitudinal: Income (trust in military included)
(h) Longitudinal: Income (trust in military excluded)
.1
(i) Longitudinal: Taxes (trust in military included)
(j) Longitudinal: Taxes (trust in military excluded)
.2
-.1
-.2
(k) Longitudinal: Government Spending (trust in military included)
(l) Longitudinal: Government Spending (trust in military excluded)
Rule of law = -2
Rule of law = -1
Rule of law = 0
Rule of law = 1
Rule of law = 2

7.3 Hypothesis 2: weak support

The evidence for Hypothesis 2 which suggests that amplification effects on one's environmental valuation when an individual's cultural orientation and his/her state's cultural frame are aligned that Yoon (2010: 69) has posited earlier is also largely not supported. Yoon is not alone in suggesting such amplification effects as cross-cultural psychologists have suggested likewise, including Triandis and Gelfand (2012: 503-504), and Schwartz (2006: 170-173). However, the change in predicted probability of the cross-level interaction effects between one's cultural orientation and his/her state's cultural frame are largely statistically insignificant in both wave 5 and longitudinal analyses except for government spending in the longitudinal dataset (see Table 5, columns 11 and 12, below). These results indicate that the marginal effect of the interaction term between an individual's cultural orientation and his/her country's cultural frame on one's willingness to free-ride on the government is statistically significant when cultural frame is at 2, 3, 4 and 5, i.e. when a country is collectivistic. Probability of free riding on the government *decreases* by 0.033 when cultural orientation is -1 (collectivistic) and cultural frame is 2 (strongly collectivistic), and slightly less so by 0.031 when cultural orientation is 1 (individualistic) and cultural frame is 5 (borderline collectivistic) when one's trust in the military is *included* (see Table 5, column 11). Likewise, probability of free-riding on the government decreases by 0.035 when cultural orientation is -1 (collectivistic) and cultural frame is 2 (strongly collectivistic), and slightly less so by 0.031 when cultural orientation is 1 (individualistic) and cultural frame is 5 (borderline collectivistic) when one's trust in the military is *excluded* (see Table 5, column 12).

It seems that an individual is *less* likely to free ride on government spending as one becomes more individualistic in cultural orientation increasing from -1 to 1 for any value of cultural frame as

probability of free-riding decreases more as seen in the downward sloping lines when cultural frame is at 2 (lime green line), 3 (magenta line), 4 (gold line) and 5 (orange line) in Figure 2 (k) and (l). However, comparing the slopes of cultural frames at these values suggests that the rate of decrease in probability in free-riding is *lesser* as the slopes become gentler as cultural frame increases from 2 (strongly collectivistic) to 5 (borderline collectivistic), i.e. a country becomes more individualistic. Thus, an individual is *less* likely to free-ride on the government as his/her country becomes *less collectivistic* but only up to the point when the country is borderline collectivistic (cultural frame = 5); the effect of the interaction term is statistically insignificant for the rest of the results when cultural frame is greater than 5 (i.e. individualistic) as reported in Table 5 below. This may contradict arguments that people's "postmaterialist" values in advanced economies lead these individuals to support environmental protection as advanced by Inglehart and Oyserman (2004: 92-93; see also Inglehart, 1995; Inglehart and Abramson, 1999) when results in Table 5 and Figure 2 below show no effect on government spending as individuals become *more* individualistic. Such values emphasize self-expression as individuals become wealthier and thus less collectivistic as they can turn their attention to 'postmaterial' wants beyond survival or material needs. Several scholars challenge Inglehart and his colleagues' claims of 'postmaterialism': one, on grounds that variables other than 'postmaterialist' values may explain pro-environmentalism[23]; and two, on measures of postmaterialism.[24] In any case, such results are suspect for reasons that have to do with the government spending question as explained above (see section 7.2 above). Even when results are statistically significant, they apply to government spending in the longitudinal analysis only and not other payment vehicles in both wave 5 and

[23] For criticisms that it is wealth and not postmaterialism that lead people to be more environmentally aware, see, for example, Kidd and Lee (1997) and Trump (1991).

[24] For methodological criticisms of Inglehart's measures of the effects of postmaterialism, see, for example, Duch and Taylor (1994) and Davis and Davenport (1999).

longitudinal analyses which is similar to Hypothesis 1 (see section 7.2 above). If so, amplification effects of culture on one's WTP brought about by alignments between cultural orientation and cultural frame remain doubtful.

Table 5. Marginal effects of interaction between an individual's cultural orientation and his/her country's cultural frame for both wave 5 and longitudinal datasets of the World Values Survey.

Dataset		**Wave 5**						**Longitudinal**					
Values of independent variables		**Direct income payments**		**Taxation**		**Government spending**		**Direct income payments**		**Taxation**		**Government spending**	
Cultural Orientat-ion	**Cultu-ral Frame**	**Includes trust in military (1)**	**Excludes trust in military (2)**	**Includes trust in military (3)**	**Excludes trust in military (4)**	**Includes trust in military (5)**	**Excludes trust in military (6)**	**Includes trust in military (7)**	**Excludes trust in military (8)**	**Includes trust in military (9)**	**Excludes trust in military (10)**	**Includes trust in military (11)**	**Excludes trust in military (12)**
-5	**0**	-0.015 (0.010)	-0.014 (0.010)	0.007 (0.026)	0.007 (0.026)	0.001 (0.009)	0.001 (0.010)						
-5	**1**	-0.014 (0.009)	-0.013 (0.009)	0.005 (0.021)	0.005 (0.020)	0.001 (0.008)	0.001 (0.009)						
-5	**2**	-0.013* (0.008)	-0.012 (0.008)	0.003 (0.016)	0.003 (0.015)	0.001 (0.007)	0.001 (0.008)						
-5	**3**	-0.011* (0.006)	-0.010 (0.006)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)						
-5	**4**	-0.008* (0.005)	-0.008 (0.005)	-0.001 (0.008)	-0.001 (0.007)	0.000 (0.005)	0.000 (0.005)						

-5	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)						
-5	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.010)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)						
-5	**7**	0.003 (0.011)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.014)	0.000 (0.012)	-0.001 (0.012)						
-5	**8**	0.008 (0.015)	0.007 (0.015)	-0.009 (0.020)	-0.010 (0.019)	0.000 (0.017)	-0.002 (0.017)						
-5	**9**	0.012 (0.019)	0.011 (0.019)	-0.011 (0.025)	-0.012 (0.024)	-0.001 (0.022)	-0.002 (0.022)						
-5	**10**	0.016 (0.022)	0.014 (0.022)	-0.014 (0.030)	-0.014 (0.029)	-0.001 (0.027)	-0.003 (0.028)						
-4	**0**	-0.016 (0.011)	-0.015 (0.011)	0.007 (0.026)	0.007 (0.025)	0.001 (0.009)	0.001 (0.009)						
-4	**1**	-0.015 (0.010)	-0.014 (0.010)	0.005 (0.021)	0.005 (0.020)	0.001 (0.008)	0.001 (0.009)						
-4	**2**	-0.013 (0.008)	-0.012 (0.008)	0.003 (0.016)	0.003 (0.015)	0.001 (0.007)	0.001 (0.008)						
-4	**3**	-0.011* (0.006)	-0.010 (0.006)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)						

-4	**4**	-0.008* (0.005)	-0.008 (0.005)	-0.001 (0.008)	-0.001 (0.007)	0.000 (0.005)	0.000 (0.005)						
-4	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)						
-4	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.010)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)						
-4	**7**	0.003 (0.011)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.014)	0.000 (0.012)	-0.001 (0.012)						
-4	**8**	0.008 (0.015)	0.007 (0.015)	-0.009 (0.020)	-0.010 (0.019)	0.000 (0.017)	-0.002 (0.017)						
-4	**9**	0.012 (0.019)	0.011 (0.019)	-0.011 (0.025)	-0.012 (0.025)	-0.001 (0.022)	-0.002 (0.022)						
-4	**10**	0.016 (0.022)	0.015 (0.022)	-0.014 (0.030)	-0.014 (0.030)	-0.001 (0.027)	-0.003 (0.028)						
-3	**0**	-0.017 (0.013)	-0.016 (0.012)	0.007 (0.026)	0.007 (0.025)	0.001 (0.009)	0.001 (0.009)						
-3	**1**	-0.016 (0.011)	-0.014 (0.011)	0.005 (0.021)	0.005 (0.020)	0.001 (0.008)	0.001 (0.009)						
-3	**2**	-0.014 (0.009)	-0.013 (0.009)	0.003 (0.016)	0.003 (0.015)	0.001 (0.007)	0.001 (0.008)						

-3	**3**	-0.011* (0.007)	-0.010 (0.007)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)						
-3	**4**	-0.008 (0.005)	-0.008 (0.005)	-0.001 (0.008)	-0.001 (0.007)	0.000 (0.005)	0.000 (0.005)						
-3	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)						
-3	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.010)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)						
-3	**7**	0.003 (0.011)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.015)	0.000 (0.012)	-0.001 (0.012)						
-3	**8**	0.008 (0.015)	0.007 (0.015)	-0.009 (0.020)	-0.010 (0.020)	0.000 (0.017)	-0.002 (0.017)						
-3	**9**	0.012 (0.019)	0.011 (0.019)	-0.011 (0.025)	-0.012 (0.025)	-0.001 (0.022)	-0.002 (0.022)						
-3	**10**	0.016 (0.023)	0.015 (0.022)	-0.014 (0.031)	-0.014 (0.030)	-0.001 (0.027)	-0.003 (0.028)						
-2	**0**	-0.018 (0.014)	-0.017 (0.014)	0.007 (0.025)	0.007 (0.025)	0.001 (0.009)	0.001 (0.009)						
-2	**1**	-0.016 (0.012)	-0.015 (0.012)	0.005 (0.020)	0.005 (0.020)	0.001 (0.008)	0.001 (0.009)						

-2	**2**	-0.014 (0.010)	-0.013 (0.009)	0.003 (0.016)	0.003 (0.015)	0.001 (0.007)	0.001 (0.007)						
-2	**3**	-0.012 (0.007)	-0.011 (0.007)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)						
-2	**4**	-0.008 (0.005)	-0.008 (0.005)	-0.001 (0.008)	-0.001 (0.007)	0.000 (0.005)	0.000 (0.005)						
-2	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)						
-2	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.010)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)						
-2	**7**	0.003 (0.011)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.015)	0.000 (0.012)	-0.001 (0.012)						
-2	**8**	0.008 (0.015)	0.007 (0.015)	-0.009 (0.020)	-0.010 (0.020)	0.000 (0.017)	-0.002 (0.017)						
-2	**9**	0.012 (0.019)	0.011 (0.019)	-0.012 (0.025)	-0.012 (0.025)	-0.001 (0.022)	-0.002 (0.022)						
-2	**10**	0.016 (0.023)	0.015 (0.023)	-0.014 (0.031)	-0.014 (0.030)	-0.001 (0.027)	-0.003 (0.028)						
-1	**0**	-0.019 (0.016)	-0.017 (0.015)	0.007 (0.025)	0.007 (0.025)	0.001 (0.009)	0.001 (0.009)	0.000 (0.000)	0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)	-0.036 (0.024)	-0.038 (0.024)

-1	**1**	-0.017 (0.013)	-0.016 (0.013)	0.005 (0.020)	0.005 (0.020)	0.001 (0.008)	0.001 (0.008)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.002)	-0.002 (0.002)	-0.035* (0.021)	-0.037* (0.020)
-1	**2**	-0.015 (0.010)	-0.014 (0.010)	0.003 (0.016)	0.003 (0.015)	0.001 (0.007)	0.001 (0.007)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.002)	-0.002 (0.002)	-0.033** (0.017)	-0.035** (0.016)
-1	**3**	-0.012 (0.007)	-0.011 (0.007)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.003)	-0.002 (0.003)	-0.031** (0.012)	-0.033*** (0.012)
-1	**4**	-0.008 (0.005)	-0.008 (0.005)	-0.001 (0.008)	-0.001 (0.007)	0.000 (0.005)	0.000 (0.005)	-0.003 (0.002)	-0.003 (0.002)	0.000 (0.004)	0.000 (0.004)	-0.029*** (0.009)	-0.030*** (0.009)
-1	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)	-0.003 (0.003)	-0.003 (0.003)	0.006 (0.006)	0.006 (0.005)	-0.026*** (0.008)	-0.026*** (0.008)
-1	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.010)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)	0.003 (0.008)	0.003 (0.008)	0.017* (0.010)	0.016 (0.010)	-0.023* (0.012)	-0.023* (0.012)
-1	**7**	0.003 (0.011)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.015)	0.000 (0.012)	-0.001 (0.012)	0.013 (0.014)	0.013 (0.014)	0.029* (0.015)	0.027* (0.016)	-0.019 (0.019)	-0.018 (0.019)
-1	**8**	0.008 (0.015)	0.007 (0.015)	-0.009 (0.020)	-0.010 (0.020)	0.000 (0.017)	-0.002 (0.017)	0.018 (0.016)	0.018 (0.016)	0.034* (0.019)	0.032* (0.019)	-0.015 (0.027)	-0.013 (0.028)
-1	**9**	0.012 (0.019)	0.011 (0.019)	-0.012 (0.025)	-0.012 (0.025)	-0.001 (0.022)	-0.002 (0.023)	0.015 (0.015)	0.015 (0.015)	0.030 (0.020)	0.028 (0.020)	-0.011 (0.037)	-0.008 (0.037)
-1	**10**	0.016 (0.023)	0.015 (0.023)	-0.014 (0.031)	-0.014 (0.030)	-0.001 (0.027)	-0.003 (0.028)	0.009 (0.011)	0.009 (0.011)	0.022 (0.019)	0.021 (0.019)	-0.005 (0.047)	-0.002 (0.048)

0	**0**	-0.020	-0.018	0.007	0.007	0.001	0.001	0.000	0.000	-0.001	-0.001	-0.044	-0.047
		(0.017)	(0.017)	(0.025)	(0.024)	(0.009)	(0.009)	(0.000)	(0.000)	(0.002)	(0.001)	(0.034)	(0.035)
0	**1**	-0.018	-0.016	0.005	0.005	0.001	0.001	-0.001	-0.001	-0.002	-0.002	-0.041	-0.044
		(0.014)	(0.014)	(0.020)	(0.020)	(0.008)	(0.008)	(0.001)	(0.001)	(0.002)	(0.002)	(0.028)	(0.028)
0	**2**	-0.015	-0.014	0.003	0.003	0.001	0.001	-0.001	-0.001	-0.002	-0.002	-0.039*	-0.041*
		(0.011)	(0.011)	(0.015)	(0.015)	(0.007)	(0.007)	(0.001)	(0.001)	(0.003)	(0.002)	(0.022)	(0.022)
0	**3**	-0.012	-0.011	0.001	0.001	0.001	0.001	-0.002	-0.002	-0.002	-0.002	-0.036**	-0.037**
		(0.008)	(0.008)	(0.011)	(0.011)	(0.006)	(0.006)	(0.002)	(0.002)	(0.003)	(0.003)	(0.016)	(0.016)
0	**4**	-0.009	-0.008	-0.001	-0.001	0.000	0.000	-0.003	-0.003	0.000	0.000	-0.032***	-0.033***
		(0.005)	(0.005)	(0.008)	(0.007)	(0.005)	(0.005)	(0.002)	(0.002)	(0.004)	(0.004)	(0.011)	(0.011)
0	**5**	-0.005	-0.005	-0.003	-0.004	0.000	0.000	-0.003	-0.003	0.006	0.006	-0.029***	-0.029***
		(0.005)	(0.005)	(0.007)	(0.007)	(0.005)	(0.005)	(0.003)	(0.003)	(0.005)	(0.005)	(0.010)	(0.010)
0	**6**	-0.001	-0.001	-0.005	-0.006	0.000	-0.001	0.003	0.003	0.017*	0.016	-0.025*	-0.024*
		(0.007)	(0.007)	(0.010)	(0.010)	(0.008)	(0.008)	(0.008)	(0.008)	(0.010)	(0.010)	(0.014)	(0.014)
0	**7**	0.003	0.003	-0.007	-0.008	0.000	-0.001	0.013	0.013	0.029*	0.027*	-0.020	-0.019
		(0.011)	(0.011)	(0.015)	(0.015)	(0.012)	(0.012)	(0.014)	(0.014)	(0.015)	(0.016)	(0.021)	(0.021)
0	**8**	0.007	0.007	-0.009	-0.010	0.000	-0.002	0.019	0.019	0.035*	0.034*	-0.016	-0.014
		(0.015)	(0.015)	(0.020)	(0.020)	(0.017)	(0.017)	(0.017)	(0.017)	(0.020)	(0.020)	(0.029)	(0.029)
0	**9**	0.012	0.011	-0.012	-0.012	-0.001	-0.002	0.017	0.016	0.034	0.032	-0.011	-0.008
		(0.019)	(0.019)	(0.025)	(0.025)	(0.022)	(0.023)	(0.017)	(0.017)	(0.023)	(0.023)	(0.038)	(0.038)

0	**10**	0.016 (0.023)	0.015 (0.023)	-0.014 (0.031)	-0.014 (0.030)	-0.001 (0.027)	-0.003 (0.028)	0.011 (0.014)	0.010 (0.013)	0.026 (0.023)	0.024 (0.023)	-0.005 (0.048)	-0.002 (0.048)
1	**0**	-0.021 (0.018)	-0.019 (0.018)	0.007 (0.024)	0.007 (0.024)	0.001 (0.009)	0.001 (0.009)	0.000 (0.001)	0.000 (0.001)	-0.002 (0.002)	-0.001 (0.002)	-0.052 (0.045)	-0.056 (0.046)
1	**1**	-0.019 (0.015)	-0.017 (0.014)	0.005 (0.020)	0.005 (0.020)	0.001 (0.008)	0.001 (0.008)	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.003)	-0.002 (0.002)	-0.048 (0.036)	-0.052 (0.036)
1	**2**	-0.016 (0.011)	-0.014 (0.011)	0.003 (0.015)	0.003 (0.015)	0.001 (0.007)	0.001 (0.007)	-0.002 (0.001)	-0.002 (0.001)	-0.003 (0.003)	-0.002 (0.003)	-0.044 (0.027)	-0.047* (0.028)
1	**3**	-0.012 (0.008)	-0.011 (0.008)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)	-0.003 (0.002)	-0.003 (0.002)	-0.002 (0.003)	-0.002 (0.003)	-0.040** (0.019)	-0.042** (0.019)
1	**4**	-0.009 (0.006)	-0.008 (0.006)	-0.001 (0.008)	-0.001 (0.007)	0.000 (0.005)	0.000 (0.005)	-0.004 (0.002)	-0.003 (0.002)	0.000 (0.004)	0.000 (0.004)	-0.036*** (0.013)	-0.037*** (0.013)
1	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)	-0.003 (0.004)	-0.003 (0.004)	0.006 (0.005)	0.006 (0.005)	-0.031*** (0.012)	-0.031*** (0.012)
1	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.010)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)	0.003 (0.008)	0.003 (0.008)	0.016* (0.009)	0.015* (0.009)	-0.026 (0.016)	-0.026 (0.016)
1	**7**	0.003 (0.011)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.015)	0.000 (0.012)	-0.001 (0.012)	0.013 (0.014)	0.012 (0.014)	0.029* (0.015)	0.027* (0.015)	-0.021 (0.023)	-0.020 (0.023)
1	**8**	0.007 (0.015)	0.007 (0.015)	-0.009 (0.020)	-0.010 (0.020)	0.000 (0.017)	-0.002 (0.017)	0.020 (0.018)	0.019 (0.018)	0.037* (0.021)	0.035* (0.021)	-0.016 (0.032)	-0.014 (0.031)

1	**9**	0.012 (0.019)	0.011 (0.019)	-0.012 (0.025)	-0.012 (0.025)	-0.001 (0.022)	-0.002 (0.023)	0.018 (0.019)	0.018 (0.019)	0.037 (0.026)	0.035 (0.026)	-0.011 (0.040)	-0.008 (0.040)
1	**10**	0.016 (0.023)	0.015 (0.023)	-0.014 (0.030)	-0.014 (0.030)	-0.001 (0.027)	-0.003 (0.028)	0.012 (0.016)	0.012 (0.016)	0.031 (0.028)	0.028 (0.027)	-0.006 (0.049)	-0.002 (0.048)
2	**0**	-0.022 (0.020)	-0.020 (0.019)	0.007 (0.024)	0.007 (0.023)	0.001 (0.008)	0.001 (0.008)						
2	**1**	-0.019 (0.016)	-0.018 (0.015)	0.005 (0.020)	0.005 (0.019)	0.001 (0.008)	0.001 (0.008)						
2	**2**	-0.016 (0.012)	-0.015 (0.012)	0.003 (0.015)	0.003 (0.015)	0.001 (0.007)	0.001 (0.007)						
2	**3**	-0.012 (0.008)	-0.012 (0.008)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)						
2	**4**	-0.009 (0.006)	-0.008 (0.006)	-0.001 (0.008)	-0.001 (0.008)	0.000 (0.004)	0.000 (0.005)						
2	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)						
2	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.010)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)						
2	**7**	0.003 (0.011)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.015)	0.000 (0.012)	-0.001 (0.012)						

2	**8**	0.007 (0.014)	0.007 (0.014)	-0.009 (0.020)	-0.010 (0.020)	0.000 (0.017)	-0.002 (0.017)						
2	**9**	0.012 (0.018)	0.011 (0.018)	-0.011 (0.025)	-0.012 (0.025)	-0.001 (0.022)	-0.002 (0.023)						
2	**10**	0.016 (0.022)	0.015 (0.023)	-0.014 (0.030)	-0.014 (0.029)	-0.001 (0.027)	-0.003 (0.028)						
3	**0**	-0.023 (0.021)	-0.021 (0.020)	0.007 (0.024)	0.006 (0.023)	0.001 (0.008)	0.001 (0.008)						
3	**1**	-0.020 (0.016)	-0.018 (0.016)	0.005 (0.019)	0.005 (0.019)	0.001 (0.008)	0.001 (0.008)						
3	**2**	-0.016 (0.012)	-0.015 (0.012)	0.003 (0.015)	0.003 (0.015)	0.001 (0.007)	0.001 (0.007)						
3	**3**	-0.013 (0.009)	-0.012 (0.008)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)						
3	**4**	-0.009 (0.006)	-0.008 (0.006)	-0.001 (0.008)	-0.001 (0.008)	0.000 (0.004)	0.000 (0.005)						
3	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)						
3	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.011)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)						

3	**7**	0.003 (0.011)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.015)	0.000 (0.012)	-0.001 (0.012)						
3	**8**	0.007 (0.014)	0.007 (0.014)	-0.009 (0.020)	-0.010 (0.020)	0.000 (0.017)	-0.002 (0.017)						
3	**9**	0.012 (0.018)	0.011 (0.018)	-0.011 (0.025)	-0.012 (0.024)	-0.001 (0.022)	-0.003 (0.023)						
3	**10**	0.016 (0.022)	0.015 (0.022)	-0.013 (0.030)	-0.014 (0.029)	-0.001 (0.027)	-0.003 (0.028)						
4	**0**	-0.024 (0.022)	-0.022 (0.021)	0.007 (0.023)	0.006 (0.023)	0.001 (0.008)	0.001 (0.008)						
4	**1**	-0.021 (0.017)	-0.019 (0.017)	0.005 (0.019)	0.005 (0.019)	0.001 (0.008)	0.001 (0.008)						
4	**2**	-0.017 (0.013)	-0.015 (0.012)	0.003 (0.015)	0.003 (0.015)	0.001 (0.007)	0.001 (0.007)						
4	**3**	-0.013 (0.009)	-0.012 (0.009)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)						
4	**4**	-0.009 (0.006)	-0.008 (0.006)	-0.001 (0.008)	-0.001 (0.008)	0.000 (0.004)	0.000 (0.005)						
4	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)						

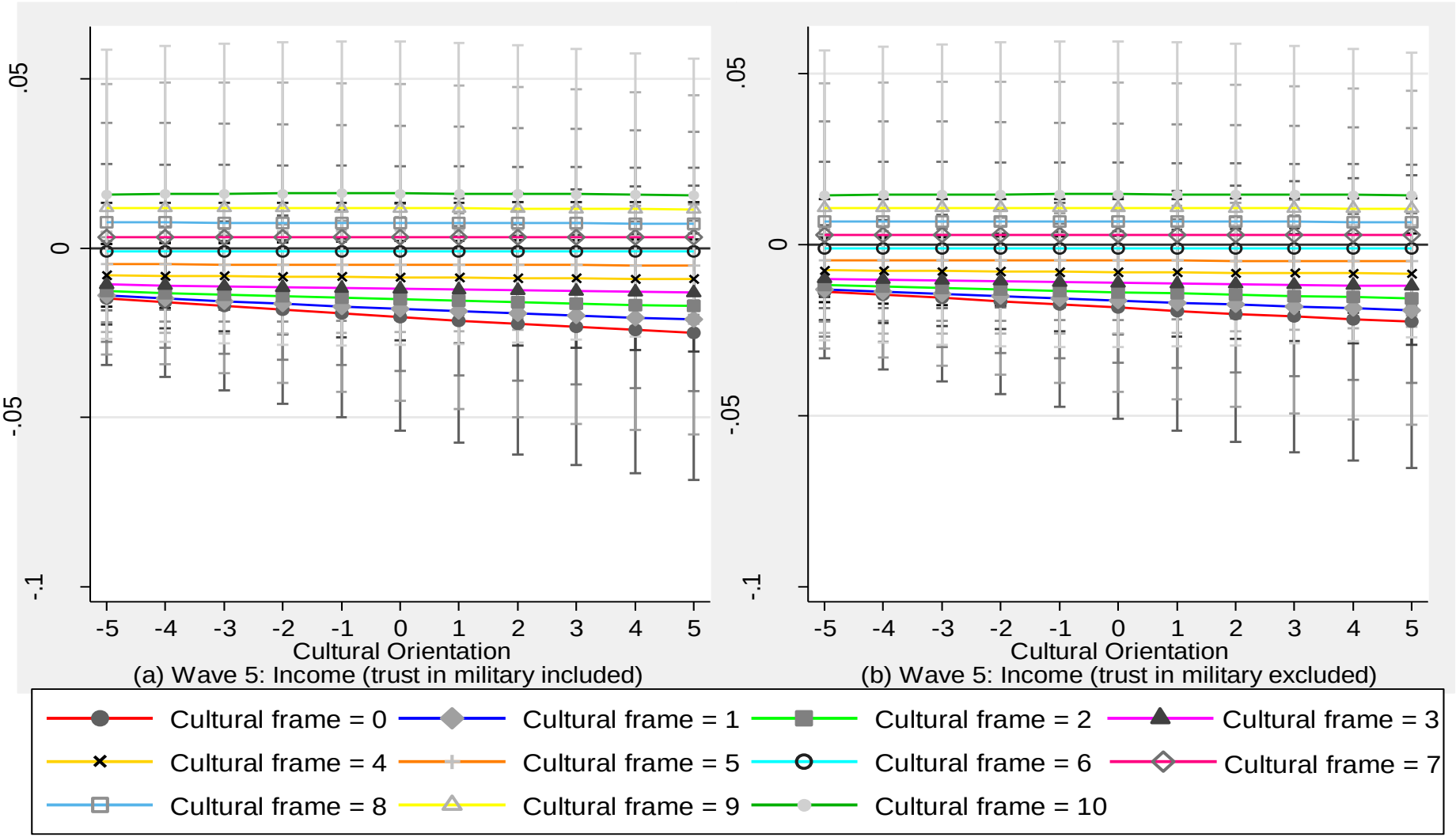
4	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.011)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)						
4	**7**	0.003 (0.011)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.015)	0.000 (0.012)	-0.001 (0.012)						
4	**8**	0.007 (0.014)	0.007 (0.014)	-0.009 (0.020)	-0.010 (0.019)	0.000 (0.017)	-0.002 (0.017)						
4	**9**	0.012 (0.018)	0.011 (0.018)	-0.011 (0.025)	-0.012 (0.024)	-0.001 (0.022)	-0.003 (0.023)						
4	**10**	0.016 (0.021)	0.015 (0.022)	-0.013 (0.029)	-0.014 (0.028)	-0.001 (0.027)	-0.003 (0.028)						
5	**0**	-0.025 (0.022)	-0.023 (0.022)	0.007 (0.023)	0.006 (0.022)	0.001 (0.008)	0.001 (0.008)						
5	**1**	-0.021 (0.017)	-0.019 (0.017)	0.005 (0.019)	0.005 (0.019)	0.001 (0.008)	0.001 (0.008)						
5	**2**	-0.017 (0.013)	-0.016 (0.013)	0.003 (0.015)	0.003 (0.015)	0.001 (0.007)	0.001 (0.007)						
5	**3**	-0.013 (0.009)	-0.012 (0.009)	0.001 (0.011)	0.001 (0.011)	0.001 (0.006)	0.001 (0.006)						
5	**4**	-0.009 (0.006)	-0.008 (0.006)	-0.001 (0.008)	-0.001 (0.008)	0.000 (0.004)	0.000 (0.005)						

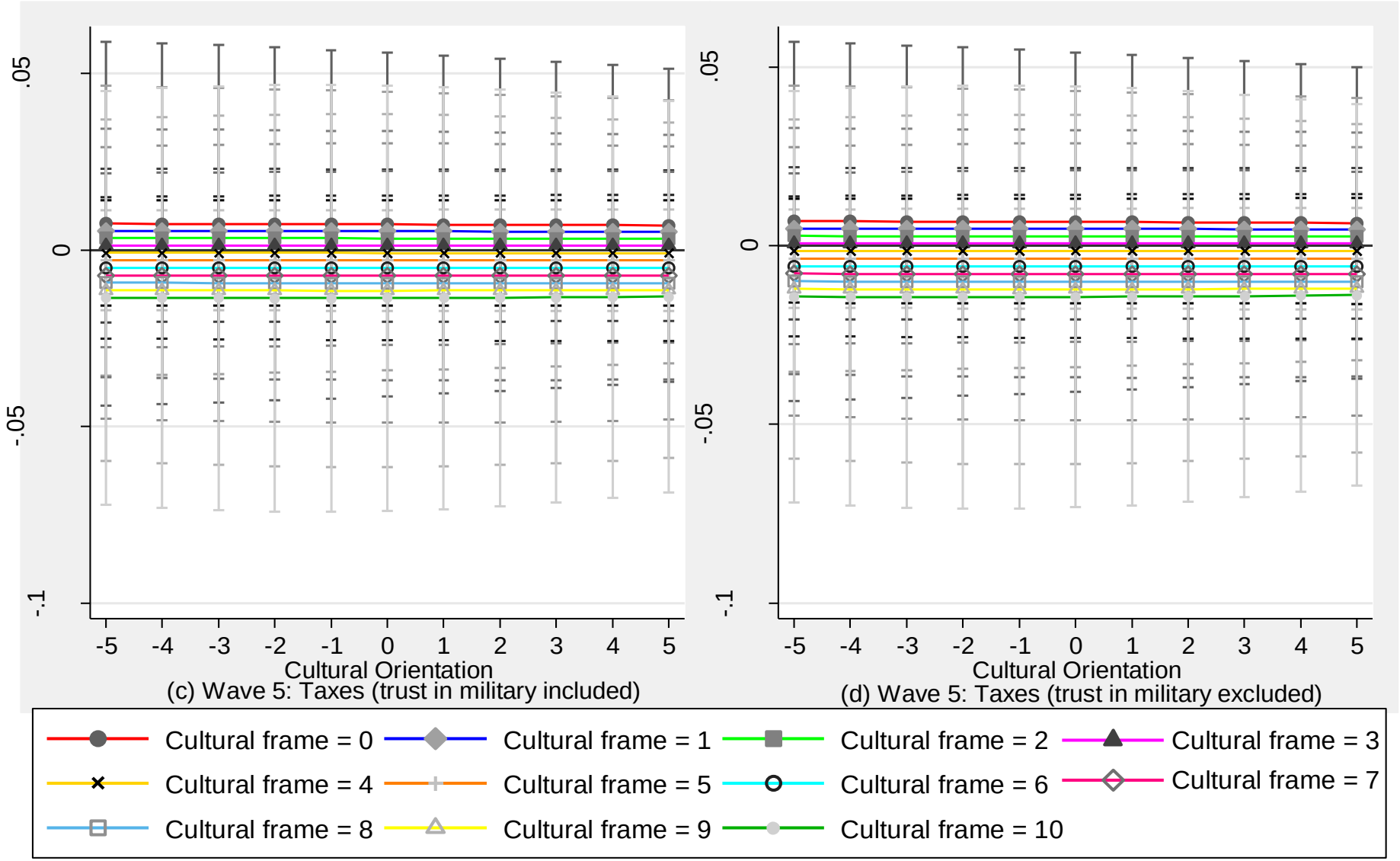
5	**5**	-0.005 (0.005)	-0.005 (0.005)	-0.003 (0.007)	-0.004 (0.007)	0.000 (0.005)	0.000 (0.005)						
5	**6**	-0.001 (0.007)	-0.001 (0.007)	-0.005 (0.011)	-0.006 (0.010)	0.000 (0.008)	-0.001 (0.008)						
5	**7**	0.003 (0.010)	0.003 (0.011)	-0.007 (0.015)	-0.008 (0.015)	0.000 (0.012)	-0.001 (0.012)						
5	**8**	0.007 (0.014)	0.007 (0.014)	-0.009 (0.020)	-0.010 (0.019)	0.000 (0.017)	-0.002 (0.018)						
5	**9**	0.011 (0.017)	0.011 (0.018)	-0.011 (0.024)	-0.012 (0.023)	-0.001 (0.022)	-0.003 (0.023)						
5	**10**	0.016 (0.021)	0.014 (0.021)	-0.013 (0.028)	-0.014 (0.027)	-0.001 (0.027)	-0.003 (0.028)						

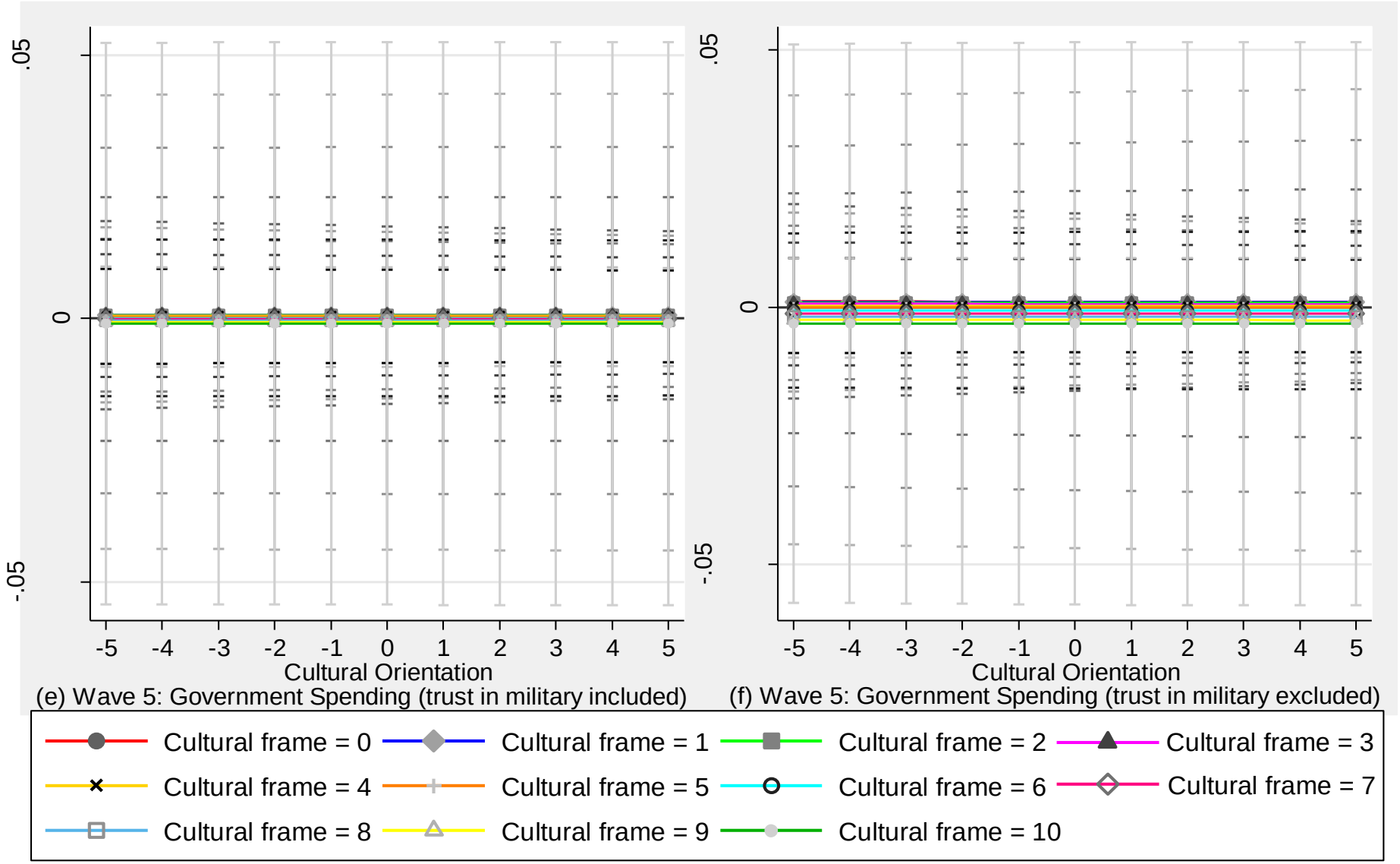
Notes:

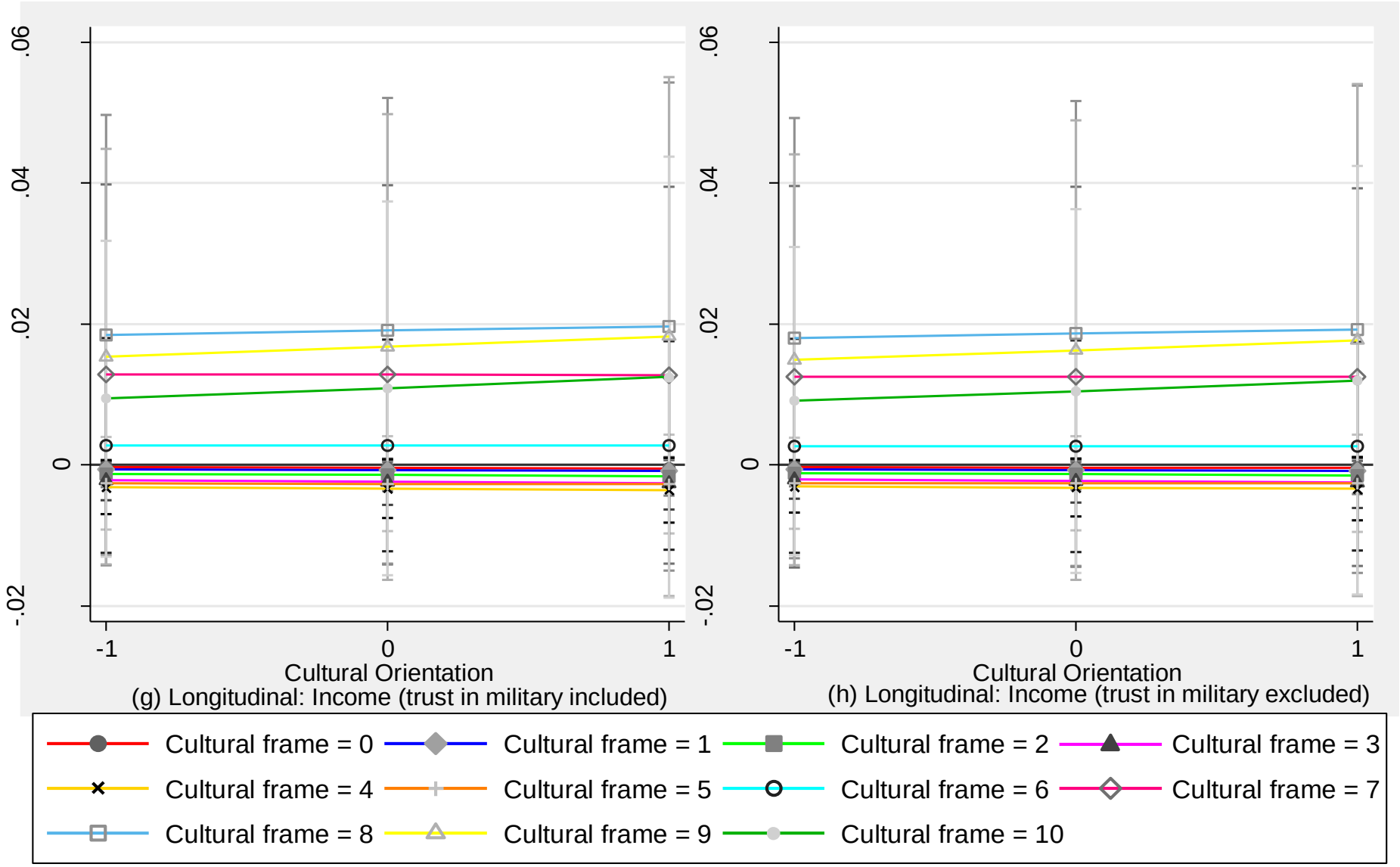
1) Standard errors in parentheses. *p< 0.1, **p< 0.05, ***p< 0.01.
2) The dependent variable is an individual's willingness-to-pay through the respective payment vehicles specified for each column and is expressed as a dummy variable: coded 1 for "agree" and "strongly agree"; 0 for "disagree" and "strongly disagree".

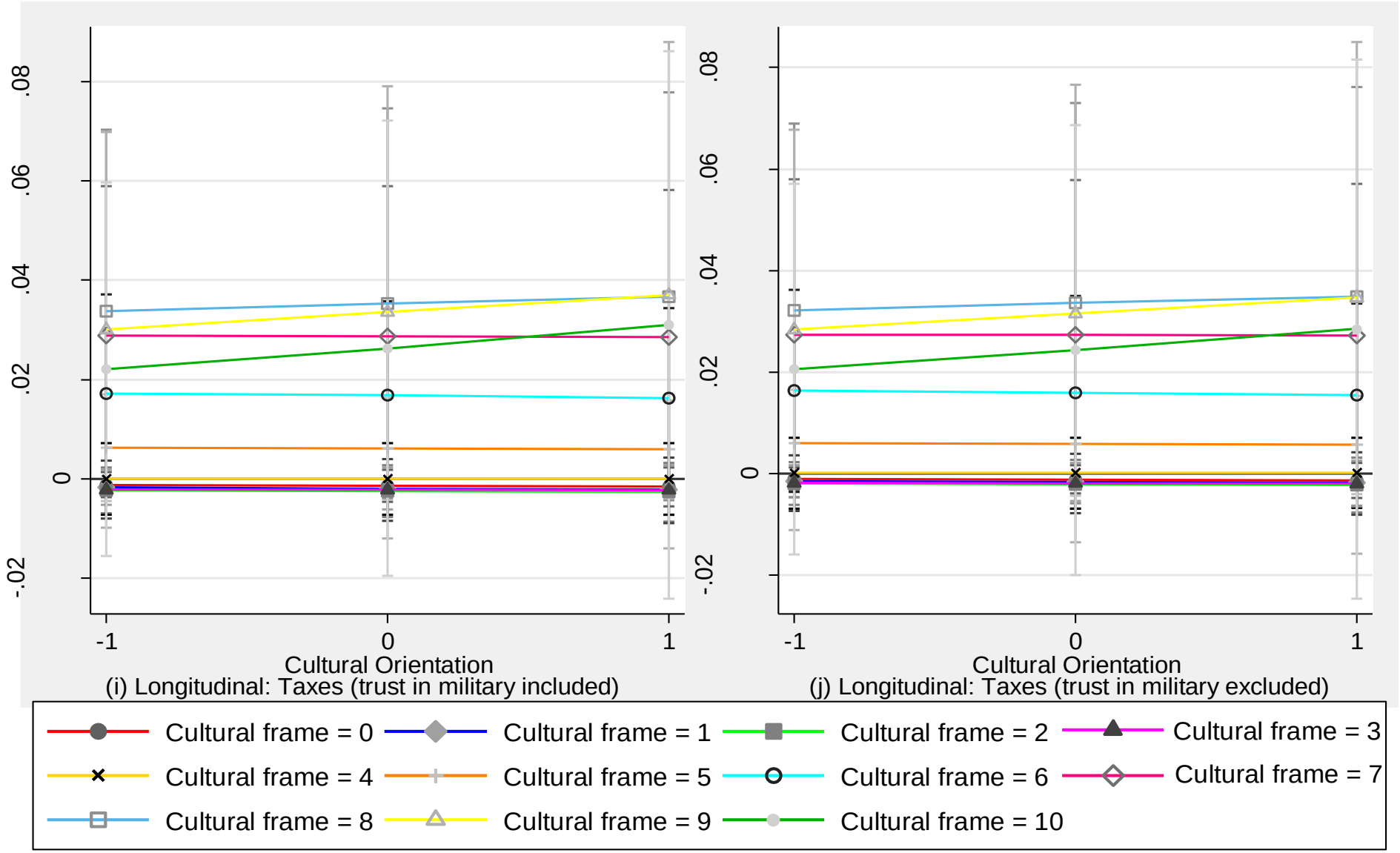
Figure 2. Marginal effects of the interaction between an individual's cultural orientation and his/her country's cultural frame for all three payment vehicles in wave 5 and longitudinal datasets.

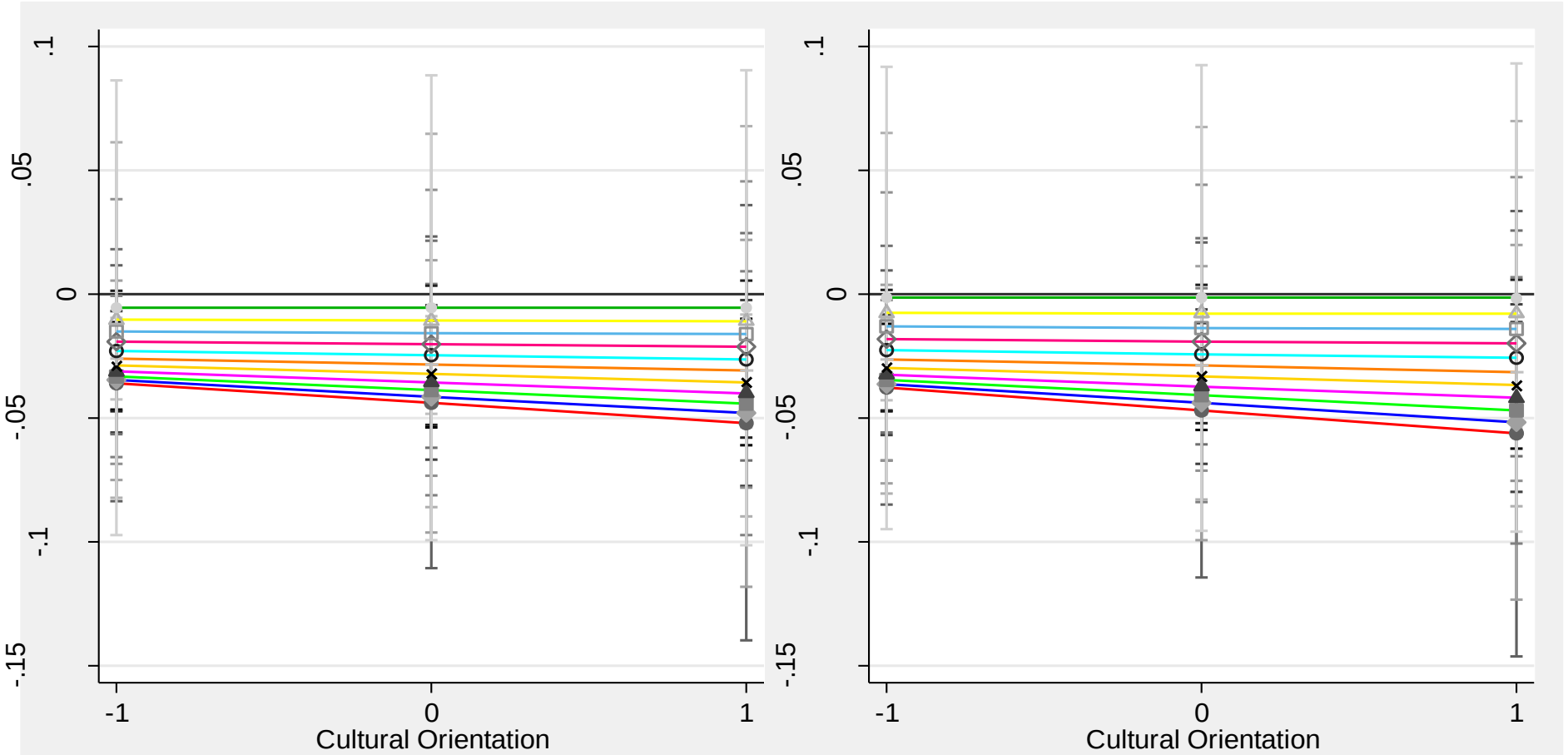



.05
0
-.05
-.1
-5 -4 -3 -2 -1 0 1 2 3 4 5
Cultural Orientation
(c) Wave 5: Taxes (trust in military included)
.05
0
-.05
-.1
-5 -4 -3 -2 -1 0 1 2 3 4 5
Cultural Orientation
(d) Wave 5: Taxes (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10


.05
0
-.05
-5 -4 -3 -2 -1 0 1 2 3 4 5
Cultural Orientation
(e) Wave 5: Government Spending (trust in military included)
.05
0
-.05
-5 -4 -3 -2 -1 0 1 2 3 4 5
Cultural Orientation
(f) Wave 5: Government Spending (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10


.06
.04
.02
0
-.02
-1
0
1
Cultural Orientation
(g) Longitudinal: Income (trust in military included)
(h) Longitudinal: Income (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10


-.02
0
.02
.04
.06
.08
-1
0
1
Cultural Orientation
(i) Longitudinal: Taxes (trust in military included)
(j) Longitudinal: Taxes (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10



(k) Longitudinal: Government Spending (trust in military included) (l) Longitudinal: Government Spending (trust in military excluded)

7.4 Hypothesis 3: qualified support

Results from the longitudinal analysis suggest support for Hypothesis 3 that Ostrom's macro-institutional structure impacts on individuals' valuations—but in a qualified way. Recall that the instrumentality of the rule of law has been championed primarily by Yamagishi and Ostrom. Yamagishi (2003: 354-355) argues that formal and informal rules on monitoring and sanctioning others within an in-group is essential to explain an in-group's seemingly 'collectivistic' behavior, which is driven by the group's need to punish in-group members who do not reciprocate other in-group members' favors in the need to maintain and defend exclusive access to the in-group's pooled resources—a belief that in-group members will punish member(s) for not reciprocating other members' favors which all members in the in-group perceive all other in-group members to share. Ostrom (2005b: 254) argues that the "macro-institutional structure" which she uses to describe a country's political and legal structure can foster interpersonal trust among actors such as natural resource harvesters in a self-governing community as undermining the structure can negatively affect the longevity of such arrangements which are autonomous from the state. Table 3 above reports that the odds ratios for the rule of law *per se* (see odds ratios for *Rule of law* in Table 3, columns 7 to 10) registers a statistically significant positive impact ($p < 0.01$) on individuals' WTP for income payments (columns 7 and 8) and taxation (columns 9 and 10). This means that as a country's rule of law *improves* by one unit, individuals are *more willing to pay* to mitigate pollution by odds ratios that range from: i) 2.626 when one's trust in the military is included (column 9) and 2.636 when it is excluded (column 10) for taxation; and ii) 2.928 when individuals' trust in the military is included (column 7) and 2.924 otherwise (column 8) for income payments. However, the odds ratios for the rule of law *per se* are statistically insignificant in the longitudinal analysis for government spending (columns 11 and 12). This is different from the

wave 5 results which show the odds ratios for the rule of law *per se* exerting statistically insignificant impact on individuals' WTP across all three payment vehicles (see Table 3, columns 1 to 6).

Hence, at first glance, Hypothesis 3 that predicts that a country's rule of law would influence environmental attitudes does *not* find support in Table 3 above as the impact of rule of law, *ceteris paribus*¸ is statistically insignificant across all three payment vehicles—at least according to the results from wave 5 analysis (see *Rule of law* in Table 3, columns 1 to 6). However, upon closer inspection, rule of law exhibits a highly statistically significant impact through its interaction with an individual's trust in strangers across all three payment vehicles in both scenarios when one's trust in the military is included and excluded in both wave 5 and longitudinal analyses (see Table 6 below). Results in Table 6 show that change in predicted probabilities are moving in the expected direction for all three payment vehicles in both wave 5 and longitudinal analyses: increments in the probability that one is willing to pay as trust in strangers increases and rule of law increases for income payments (see columns 1, 2, 7 and 8) and taxation (see columns 3, 4, 9 and 10), and decreases in the probability that one will free ride on the government (see columns 5, 6, 11 and 12). However, these coefficients are only statistically significant ($p < 0.05$) when rule of law is at 0, 1 and 2 across all payment vehicles for both wave 5 and longitudinal analyses (see Table 6 below). For income payments, the increase in probability of WTP ranges from 0.049 to 0.156 when trust in military is included (see Table 6, column 1) and from 0.049 to 0.157 when trust in military is excluded (see Table 6, column 2) in the wave 5 analysis; for the longitudinal analysis, the increase in probability of WTP ranges from 0.005 to 0.014 when trust in military is included (see Table 6, column 7), and from 0.005 to 0.013 when trust in military is excluded (see Table 6, column

8). For taxes, the increase in probability of WTP ranges from 0.050 to 0.140 when trust in military is included (see Table 6, column 3), and from 0.050 to 0.140 when trust in military is excluded (see Table 6, column 4) in the wave 5 analysis; for longitudinal analysis, the increase in probability of WTP ranges from 0.012 to 0.023 when trust in military is included (see Table 6, column 9), and from 0.011 to 0.022 when trust in military is excluded (see Table 6, column 10). Decreases in free-riding range from 0.023 to 0.110 when trust in military is included (see Table 6, column 5), and from 0.023 to 0.110 when trust in military is excluded (see Table 6, column 6) in the wave 5 analysis; for longitudinal analysis, decreases in free-riding range from 0.029 to 0.092 when trust in military is included (see Table 6, column 11), and from 0.028 to 0.092 when trust in military is excluded (see Table 6, column 12).

These results are depicted in Figure 3 (see below). Increments in probability that one is willing to pay whether through income or taxes are positive (i.e. above 0) when rule of law is at values of 0 (lime green line), 1 (magenta line) and 2 (gold line) for income (see Figure 3 (a), (b), (g) and (h)) and taxes (see Figure 3 (c), (d), (i) and (j)). Decreases in probability that one will free ride on the government is also greater when rule of law is 0, 1 and 2 (see Figure 3 (e), (f), (k) and (l)). However, while decreases in probability of free-riding on government spending are greater when rule of law is 2 compared to lower values of rule of law at 0 and 1 as trust in strangers increases (see Figure 3 (e), (f), (k) and (l)), increases in probability of one's WTP via income and taxes increase with rule of law only for wave 5 analysis as trust in strangers increases (see Figure 3 (a) and (b) for income and (c) and (d) for taxes). That increases in probability of one's WTP are *lower* when rule of law is at 2 in contrast to when rule of law is at 0 and 1 in the longitudinal analysis (see Figure 3 (g) and (h) for income and (i) and (j) for taxes) suggest some contamination of the

generalized trust question that includes not just strangers but also may include other referents of trust such as immigrants and refugees; one's WTP may be lower if the law of the country is perceived by its citizens to strongly favor immigrants and refugees at the former's expense. However, this requires further research to parse out people's views towards the generalized trust question which is beyond the scope of this dissertation. An alternative explanation may come from Torgler and García-Valiñas (2007: 541) who argue that strong rule of law can ironically influence people to be less likely to pay as they perceive governments to be able to solve environmental problems without their contribution, although their explanation pertains only to taxes.

Table 6. Marginal effects of interaction between an individual's trust in stangers and his/her country's rule of law for both wave 5 and longitudinal datasets of the World Values Survey.

Dataset		**Wave 5**						**Longitudinal**					
Values of independent variables		**Direct income payments**		**Taxation**		**Government spending**		**Direct income payments**		**Taxation**		**Government spending**	
Trust in others	**Rule of law**	**Includes trust in military (1)**	**Excludes trust in military (2)**	**Includes trust in military (3)**	**Excludes trust in military (4)**	**Includes trust in military (5)**	**Excludes trust in military (6)**	**Includes trust in military (7)**	**Excludes trust in military (8)**	**Includes trust in military (9)**	**Excludes trust in military (10)**	**Includes trust in military (11)**	**Excludes trust in military (12)**
0	**-2**							-0.024	-0.024	-0.036	-0.036	0.010	0.012
								(0.030)	(0.030)	(0.027)	(0.028)	(0.031)	(0.032)
0	**-1**							0.000	-0.001	-0.008	-0.008	-0.008	-0.007
								(0.018)	(0.018)	(0.018)	(0.019)	(0.020)	(0.020)
0	**0**							0.014**	0.013**	0.018***	0.018**	-0.029***	-0.028***
								(0.006)	(0.006)	(0.007)	(0.007)	(0.010)	(0.010)
0	**1**							0.012***	0.012***	0.023***	0.022***	-0.052***	-0.051***
								(0.004)	(0.004)	(0.006)	(0.006)	(0.013)	(0.013)
0	**2**							0.007**	0.007**	0.017***	0.016**	-0.078***	-0.078***
								(0.003)	(0.003)	(0.006)	(0.006)	(0.029)	(0.029)

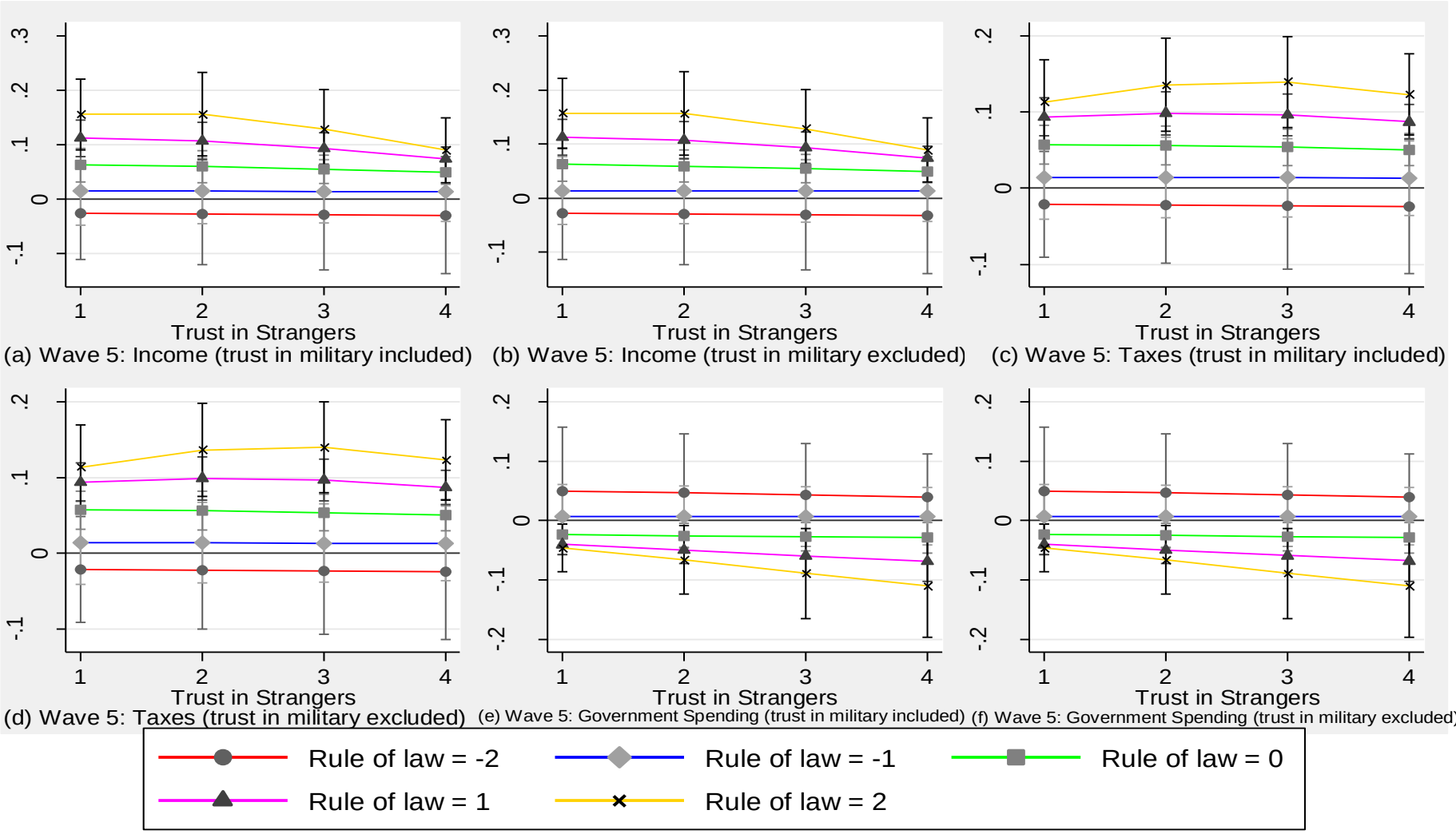
1	**-2**	-0.026 (0.043)	-0.028 (0.043)	-0.021 (0.036)	-0.022 (0.036)	0.050 (0.055)	0.049 (0.055)	-0.023 (0.028)	-0.024 (0.028)	-0.034 (0.024)	-0.034 (0.025)	0.009 (0.028)	0.011 (0.028)
1	**-1**	0.015 (0.032)	0.014 (0.032)	0.014 (0.028)	0.014 (0.028)	0.007 (0.027)	0.007 (0.027)	0.000 (0.018)	-0.001 (0.018)	-0.008 (0.018)	-0.008 (0.019)	-0.008 (0.021)	-0.007 (0.021)
1	**0**	0.063*** (0.016)	0.063*** (0.016)	0.057*** (0.013)	0.057*** (0.013)	-0.023** (0.009)	-0.023** (0.009)	0.013** (0.005)	0.013** (0.005)	0.017*** (0.006)	0.017*** (0.006)	-0.032*** (0.012)	-0.030*** (0.012)
1	**1**	0.112*** (0.017)	0.112*** (0.017)	0.094*** (0.013)	0.094*** (0.013)	-0.040*** (0.008)	-0.040*** (0.008)	0.010*** (0.003)	0.010*** (0.003)	0.019*** (0.005)	0.019*** (0.005)	-0.060*** (0.016)	-0.059*** (0.016)
1	**2**	0.156*** (0.033)	0.157*** (0.033)	0.113*** (0.028)	0.114*** (0.028)	-0.046** (0.020)	-0.046** (0.021)	0.005** (0.002)	0.005** (0.002)	0.012*** (0.004)	0.011*** (0.004)	-0.092** (0.037)	-0.092** (0.037)
2	**-2**	-0.027 (0.048)	-0.029 (0.048)	-0.022 (0.039)	-0.023 (0.039)	0.047 (0.050)	0.046 (0.050)						
2	**-1**	0.014 (0.031)	0.014 (0.031)	0.014 (0.027)	0.014 (0.027)	0.007 (0.026)	0.007 (0.026)						
2	**0**	0.060*** (0.015)	0.060*** (0.015)	0.056*** (0.013)	0.056*** (0.013)	-0.025** (0.011)	-0.025** (0.011)						
2	**1**	0.107*** (0.018)	0.107*** (0.018)	0.099*** (0.014)	0.099*** (0.015)	-0.050*** (0.011)	-0.049*** (0.012)						
2	**2**	0.156*** (0.039)	0.157*** (0.039)	0.136*** (0.031)	0.136*** (0.031)	-0.066** (0.029)	-0.066** (0.029)						

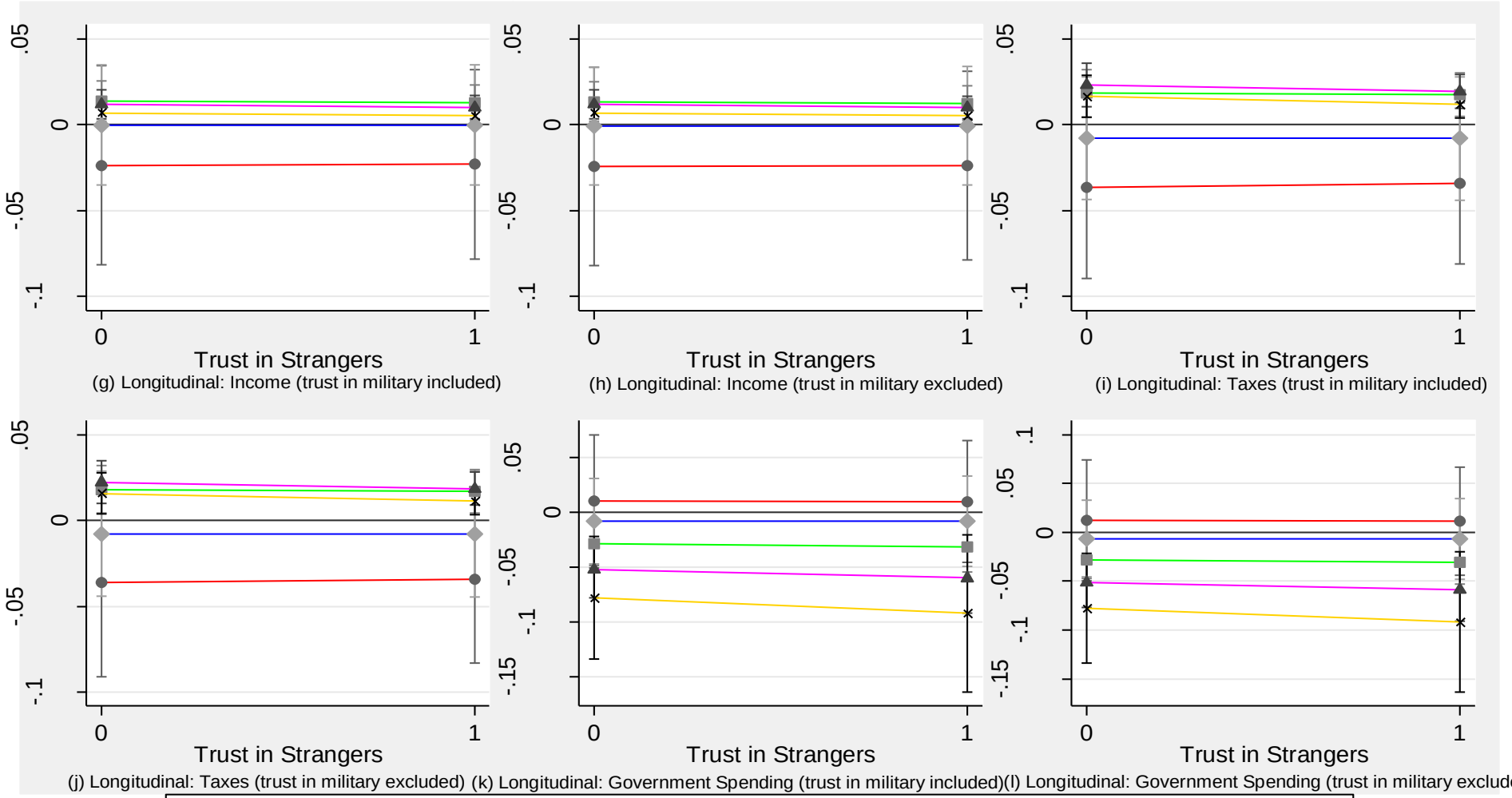
3	**-2**	-0.029 (0.052)	-0.030 (0.052)	-0.023 (0.042)	-0.024 (0.043)	0.043 (0.044)	0.043 (0.044)						
3	**-1**	0.014 (0.030)	0.014 (0.030)	0.014 (0.026)	0.013 (0.026)	0.007 (0.025)	0.007 (0.026)						
3	**0**	0.055*** (0.013)	0.055*** (0.013)	0.054*** (0.012)	0.054*** (0.012)	-0.027** (0.012)	-0.027** (0.012)						
3	**1**	0.093*** (0.015)	0.093*** (0.015)	0.096*** (0.014)	0.097*** (0.014)	-0.059*** (0.015)	-0.059*** (0.015)						
3	**2**	0.128*** (0.037)	0.128*** (0.037)	0.140*** (0.031)	0.140*** (0.031)	-0.089** (0.039)	-0.089** (0.039)						
4	**-2**	-0.030 (0.055)	-0.032 (0.055)	-0.024 (0.045)	-0.025 (0.046)	0.039 (0.037)	0.039 (0.037)						
4	**-1**	0.014 (0.028)	0.013 (0.028)	0.013 (0.025)	0.013 (0.025)	0.007 (0.025)	0.007 (0.025)						
4	**0**	0.049*** (0.011)	0.049*** (0.011)	0.050*** (0.011)	0.050*** (0.011)	-0.029** (0.013)	-0.029** (0.013)						
4	**1**	0.074*** (0.011)	0.074*** (0.011)	0.087*** (0.011)	0.087*** (0.011)	-0.068*** (0.018)	-0.068*** (0.017)						
4	**2**	0.090*** (0.030)	0.089*** (0.030)	0.123*** (0.027)	0.123*** (0.027)	-0.110** (0.044)	-0.110** (0.044)						

Notes:

1) Standard errors in parentheses. *p< 0.1, **p< 0.05, ***p< 0.01.
2) The dependent variable is an individual's willingness-to-pay through the respective payment vehicles specified for each column and is expressed as a dummy variable: coded 1 for "agree" and "strongly agree"; 0 for "disagree" and "strongly disagree".

Figure 3. Marginal effects of the interaction between an individual's trust in strangers and his/her country's rule of law for all three payment vehicles in wave 5 and longitudinal datasets.




.05
0
-.05
-.1
0
1
Trust in Strangers
(g) Longitudinal: Income (trust in military included)
(h) Longitudinal: Income (trust in military excluded)
(i) Longitudinal: Taxes (trust in military included)
(j) Longitudinal: Taxes (trust in military excluded)
-.15
.1
(k) Longitudinal: Government Spending (trust in military included)
(l) Longitudinal: Government Spending (trust in military excluded)
Rule of law = -2
Rule of law = -1
Rule of law = 0
Rule of law = 1
Rule of law = 2

When examining effects of rule of law on one's WTP, its interaction with one's trust in institutions needs to be examined as well. Table 7 (see below) shows that the signs of the coefficients are in the expected direction for all three payment vehicles in both wave 5 and longitudinal analyses. When coefficients are statistically significant, one is more willing to pay via income (see Table 7, columns 1, 2, 7 and 8) and taxes (see Table 7, columns 3, 4, 9 and 10) as the coefficients are positive, and less likely to free ride on the government (see Table 7, columns 5, 6, 11 and 12) as the coefficients are negative. For income payments, the increase in probability of WTP ranges from 0.053 to 0.071 when trust in military is included (see Table 7, column 1) and from 0.053 to 0.072 when trust in military is excluded (see Table 7, column 2) in the wave 5 analysis; for the longitudinal analysis, the increase in probability of WTP ranges from 0.004 to 0.053 when trust in military is included (see Table 7, column 7), and from 0.004 to 0.054 when trust in military is excluded (see Table 7, column 8). For taxes, the increase in probability of WTP ranges from 0.050 to 0.109 when trust in military is included (see Table 7, column 3), and from 0.052 to 0.106 when trust in military is excluded (see Table 7, column 4) in the wave 5 analysis; for longitudinal analysis, the increase in probability of WTP is from 0.010 to 0.073 when trust in military is included (see Table 7, column 9), and from 0.009 to 0.070 when trust in military is excluded (see Table 7, column 10). Decreases in probability of free-riding range from 0.022 to 0.024 when trust in military is included (see Table 7, column 5), and from 0.021 to 0.023 when trust in military is excluded (see Table 7, column 6) in the wave 5 analysis; for longitudinal analysis, decreases in probability of free-riding range from 0.018 to 0.093 when trust in military is included (see Table 7, column 11), and from 0.022 to 0.090 when trust in military is excluded (see Table 7, column 12).

However, the impact of the interaction effect between one's trust in institutions and a country's rule of law is uneven across all three payment vehicles as there seem to be fewer statistically significant coefficients for government spending for both wave 5 (see Table 7, columns 5 and 6) and longitudinal (see Table 7, columns 11 and 12) analyses when contrasted with income payments (see Table 7, columns 1, 2, 7 and 8) and taxes (see Table 7, columns 3, 4, 9 and 10). Furthermore, it also seems that there are slightly more statistically significant coefficients for taxes (see Table 7, columns 3, 4, 9 and 10) than for income payments (see Table 7, columns 1, 2, 7 and 8) when comparing results between those in the wave 5 and those in the longitudinal datasets. While statistically significant coefficients tend to appear for most values of rule of law at -1, 0, 1 and 2 for all three payment vehicles in both wave 5 and longitudinal analyses, the number of such coefficients vary for each payment vehicle. Increases in probability that one is willing to pay is seen for income *mostly* when rule of law ranges from -1 to 1 in the wave 5 dataset (see Table 7, columns 1 and 2), but *mostly* when rule of law ranges from -1 to 2 for the longitudinal dataset (see Table 7, columns 7 and 8). For taxes, positive increments in probability that one is willing to pay is seen *mostly* from -1 to 2 for the wave 5 dataset (see Table 7, columns 3 and 4), but *definitely* so when rule of law ranges from -1 to 2 for the longitudinal dataset (see Table 7, columns 9 and 10) identical to those of income in the longitudinal dataset above; thus, statistically significant coefficients are seen over a larger range of values of rule of law for taxes (-1 to 2) than for income (-1 to 1) in the wave 5 dataset. For government spending, decreases in free-riding on the government is only seen *largely* when rule of law ranges from 0 to 1 in the wave 5 dataset when trust in institutions is low at 1 and 2 (see Table 7, columns 5 and 6), but *definitely* seen when rule of law ranges from 0 to 2 in the longitudinal dataset (see Table 7, columns 11 and 12)—statistically significant coefficients appear over a shorter range of values of rule of law for government

spending (0 to 1) in contrast with both income payments (-1 to 1) and taxes (-1 to 2) above in the wave 5 dataset.

Moreover, that probability that one is more willing to pay via donation or taxation or less willing to free ride on government spending does *not* necessarily increase *more* as rule of law increases. Figure 4 below depicts the results from Table 7. For example, for both income payments (see Figure 4 (g), (h)) and taxes (see Figure 4 (i), (j)) in the longitudinal dataset, increases in the probability that one is willing to pay is *lower* when rule of law is at 2 (gold line) than when rule of law is at -1 (blue line), 0 (lime green line) and 1 (magenta line) as one's trust in institutions increases though the rate of increase in the probability of WTP declines as trust in institutions increases. This is the obverse when contrasted with government spending for the longitudinal dataset (see Figure 4 (k), (l)) when decreases in the probability of free riding on government spending decreased further when rule of law is at the highest at 2 (gold line) compared with when rule of law is at 0 (lime green line) and 1 (magenta line) as one's trust in institutions increases. Furthermore, results from the longitudinal analysis *somewhat* differ from those in the wave 5 analysis. Increases in the probability that one is willing to pay via income payments *including* one's trust in military (see Figure 4 (a)) and taxes (see Figure 4 (c) and (d)) is *higher* and reductions in probability of free riding on government spending *including* one's trust in military (see Figure 4 (e)) *lower* when rule of law is at 2 (gold line) compared to when rule of law is at -1 (blue line) and 0 (lime green line) as one's trust in institutions increases. However, increases in probability that one is willing to pay via income payments is *lower* when one's trust in military is *excluded* (see Figure 4 (b)) and decreases in probability of free riding on government spending *lesser* when one's trust in military is *excluded* (see Figure 4 (f)) when rule of law is high at 1 (magenta line)

compared to when rule of law is at -1 (blue line) income and 0 (lime green line) as one's trust in institutions increases.

The following conclusions can be drawn from the results above. Firstly, one can conclude that inclusion of an individual's trust in the military may account for this discrepancy for income and government spending in the wave 5 dataset: that the military is crucial to the rule of law and its inclusion in the list of governing institutions that can be trusted further increases one's willingness to pay, or lower willingness to free ride. However, the same cannot be said for *all* three payment vehicles in the longitudinal dataset where increases in WTP and decreases in free riding are *lower* as rule of law increases. Instead, explanations similar to the above for the interaction effect between one's trust in strangers and rule of law are offered here: either the generalized trust question features other groups of strangers that contaminates the question or that individuals are somehow less willing to pay if they perceive that their governments are doing an excellent job at combating environmental problems (Torgler and García-Valiñas, 2007: 541). Secondly, payment vehicle bias may explain the greater number of statistically significant coefficients for taxes than for income and government spending in both wave 5 and longitudinal analyses overall as observed above. Studies elsewhere have suggested that the payment vehicle can influence respondents' willingness to pay (Morrison et al, 2000: 412, 421), such as through the involuntary nature of taxes against the voluntary nature of income payments. Ostrom (2000a; see also Powe, 2007: 28-30) elaborates that uncertainty between the payment and the delivery of the good can erode trust; trust in the laws to uphold transactions and fairness in burden sharing of societal costs are also prerequisites—if understated—in translating valuation to action. Tunstall and Coker (1992: 121) support Ostrom's observation, noting evidence of attitudes towards the payment mechanism can,

together with the value of the good, influence answers to WTP questions in CV surveys. It seems that respondents in the WVS consider over a larger range of values of rule of law for compulsory tax payments in contrast with voluntary income payments and government spending in both short run seen in wave 5 and long run seen in the longitudinal analyses.

In any case, that one's trust in strangers and one's trust in governing institutions demonstrate highly statistically significant impact, all things being equal, vindicate Ostrom's theory of trust and of the role of social capital at large in environmental valuation. Yamagishi's (2003: 356-357) argument for his institutional view of culture against the individualism-collectivism thesis that prompts Hypothesis 3 finds support in this interaction effect if interpersonal trust is dependent on the strength of the rules undergirding the relationships between actors. Moreover, results above also support Yamagishi's (see Yamagishi and Suzuki, 2010: 195) argument for the role of an individual's perception in explaining collectivist culture as seen in the interaction between one's trust in institutions which is perceived and rule of law which is also perceptions based as Kaufmann, Kraay and Mastruzzi (2010) explain concerning the WGI; both perceived trust in institutions and perceived rule of law interact with each other in the expected direction as noted above from the results (see Table 7 and Figure 4 below). What these results indicate is that it would be misleading to view that the rule of law *by itself* can exert an impact on WTP as its effect is mediated through its interaction with one's trust in strangers and institutions—and through interaction with cultural frame as discussed with respect to Hypothesis 4 (see section 7.5 below)—for all three payment vehicles in both wave 5 and longitudinal analyses.

Table 7. Marginal effects of interaction between an individual's trust in institutions and his/her country's rule of law for both wave 5 and longitudinal datasets of the World Values Survey.

Dataset		**Wave 5**						**Longitudinal**					
Values of independent variables		**Direct income payments**		**Taxation**		**Government spending**		**Direct income payments**		**Taxation**		**Government spending**	
Trust in others	**Rule of law**	**Includes trust in military (1)**	**Excludes trust in military (2)**	**Includes trust in military (3)**	**Excludes trust in military (4)**	**Includes trust in military (5)**	**Excludes trust in military (6)**	**Includes trust in military (7)**	**Excludes trust in military (8)**	**Includes trust in military (9)**	**Excludes trust in military (10)**	**Includes trust in military (11)**	**Excludes trust in military (12)**
1	**-2**	0.063 (0.066)	0.079 (0.066)	0.043 (0.055)	0.049 (0.054)	-0.001 (0.051)	-0.019 (0.044)	0.038 (0.027)	0.042* (0.025)	0.032* (0.019)	0.032* (0.018)	0.025 (0.032)	0.014 (0.028)
1	**-1**	0.066 (0.040)	0.075* (0.040)	0.062* (0.034)	0.065* (0.033)	-0.010 (0.027)	-0.020 (0.025)	0.053** (0.021)	0.054*** (0.020)	0.061*** (0.015)	0.060*** (0.014)	0.003 (0.017)	-0.004 (0.015)
1	**0**	0.069*** (0.018)	0.072*** (0.018)	0.078*** (0.014)	0.079*** (0.014)	-0.017* (0.010)	-0.021** (0.010)	0.043*** (0.011)	0.042*** (0.010)	0.073*** (0.010)	0.070*** (0.010)	-0.018*** (0.007)	-0.022*** (0.006)
1	**1**	0.071*** (0.021)	0.068*** (0.020)	0.088*** (0.014)	0.088*** (0.014)	-0.022** (0.010)	-0.021** (0.010)	0.024*** (0.008)	0.022*** (0.007)	0.061*** (0.013)	0.056*** (0.012)	-0.038*** (0.008)	-0.039*** (0.008)
1	**2**	0.074* (0.044)	0.064 (0.043)	0.092*** (0.028)	0.091*** (0.028)	-0.024 (0.018)	-0.021 (0.018)	0.011* (0.006)	0.010* (0.005)	0.039*** (0.014)	0.035*** (0.012)	-0.056*** (0.016)	-0.055*** (0.016)

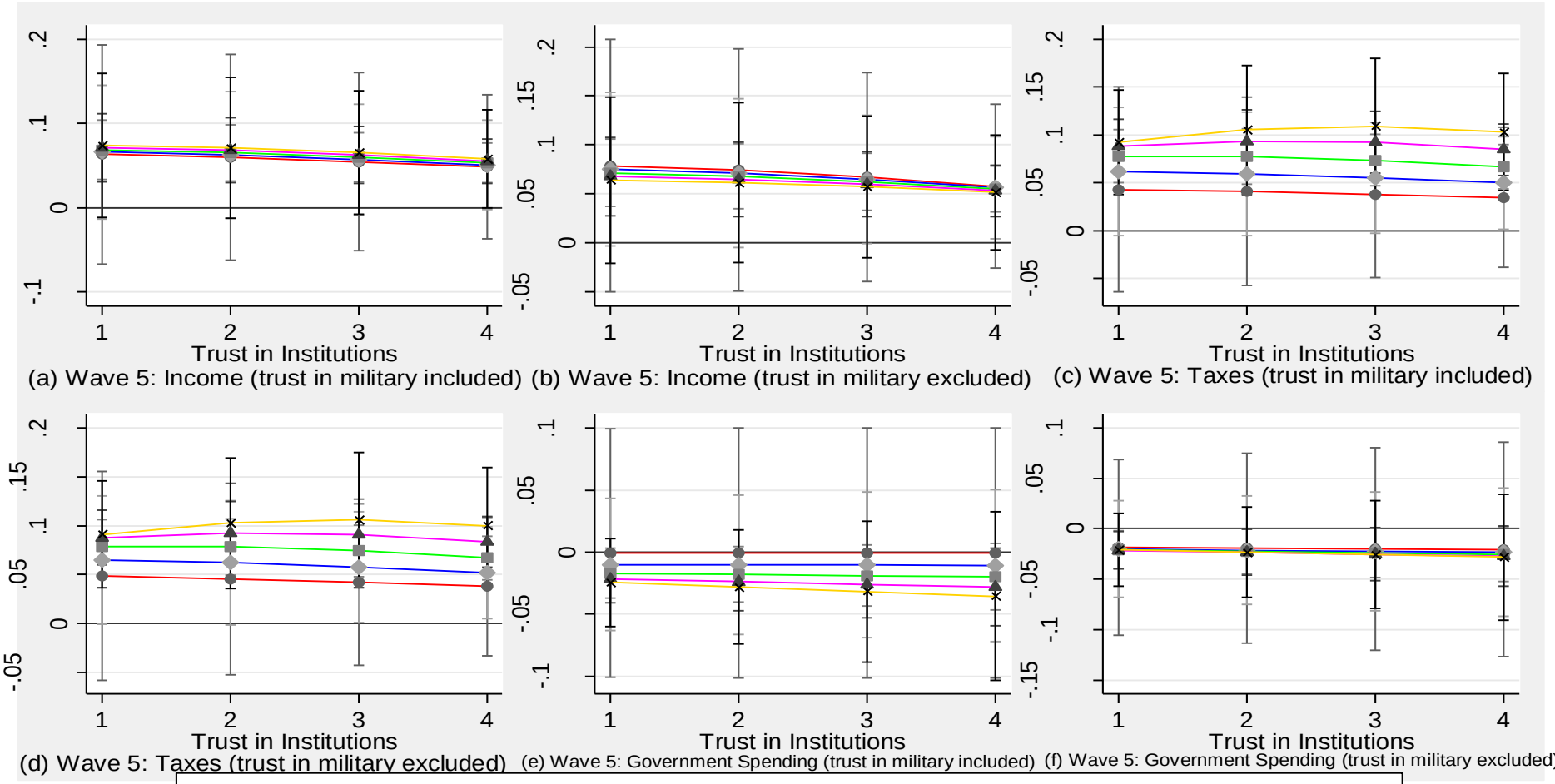
2	**-2**	0.060 (0.062)	0.074 (0.063)	0.041 (0.050)	0.046 (0.050)	-0.001 (0.051)	-0.019 (0.048)	0.041 (0.030)	0.045 (0.029)	0.034 (0.022)	0.035* (0.020)	0.023 (0.028)	0.014 (0.025)
2	**-1**	0.063 (0.038)	0.071* (0.039)	0.059* (0.033)	0.062* (0.032)	-0.010 (0.029)	-0.021 (0.027)	0.051** (0.020)	0.052*** (0.019)	0.061*** (0.016)	0.060*** (0.014)	0.003 (0.016)	-0.004 (0.016)
2	**0**	0.065*** (0.017)	0.068*** (0.017)	0.077*** (0.015)	0.078*** (0.014)	-0.018 (0.011)	-0.023** (0.011)	0.037*** (0.010)	0.036*** (0.009)	0.064*** (0.010)	0.061*** (0.009)	-0.020** (0.008)	-0.024*** (0.008)
2	**1**	0.068*** (0.020)	0.065*** (0.019)	0.093*** (0.017)	0.092*** (0.016)	-0.024** (0.012)	-0.023** (0.011)	0.019*** (0.006)	0.018*** (0.006)	0.046*** (0.010)	0.042*** (0.009)	-0.044*** (0.011)	-0.045*** (0.010)
2	**2**	0.071* (0.043)	0.061 (0.042)	0.105*** (0.035)	0.103*** (0.034)	-0.028 (0.023)	-0.023 (0.023)	0.008** (0.004)	0.007** (0.003)	0.025*** (0.009)	0.023*** (0.008)	-0.070*** (0.023)	-0.069*** (0.022)
3	**-2**	0.055 (0.054)	0.067 (0.054)	0.038 (0.044)	0.042 (0.043)	-0.001 (0.051)	-0.020 (0.051)	0.042 (0.032)	0.047 (0.031)	0.036 (0.024)	0.037 (0.022)	0.021 (0.023)	0.013 (0.023)
3	**-1**	0.057* (0.034)	0.065* (0.033)	0.055* (0.030)	0.058** (0.029)	-0.010 (0.030)	-0.022 (0.030)	0.048*** (0.018)	0.049*** (0.017)	0.060*** (0.015)	0.058*** (0.014)	0.003 (0.016)	-0.004 (0.016)
3	**0**	0.060*** (0.015)	0.062*** (0.015)	0.074*** (0.014)	0.074*** (0.013)	-0.019 (0.013)	-0.024* (0.013)	0.031*** (0.008)	0.030*** (0.008)	0.054*** (0.009)	0.051*** (0.009)	-0.021** (0.009)	-0.026*** (0.009)
3	**1**	0.063*** (0.017)	0.060*** (0.017)	0.092*** (0.016)	0.091*** (0.016)	-0.026* (0.014)	-0.025* (0.013)	0.015*** (0.005)	0.014*** (0.004)	0.033*** (0.007)	0.030*** (0.007)	-0.050*** (0.013)	-0.052*** (0.013)
3	**2**	0.065* (0.038)	0.057 (0.037)	0.109*** (0.036)	0.106*** (0.035)	-0.032 (0.029)	-0.026 (0.027)	0.006** (0.003)	0.005** (0.002)	0.016*** (0.005)	0.015*** (0.005)	-0.083*** (0.029)	-0.081*** (0.029)

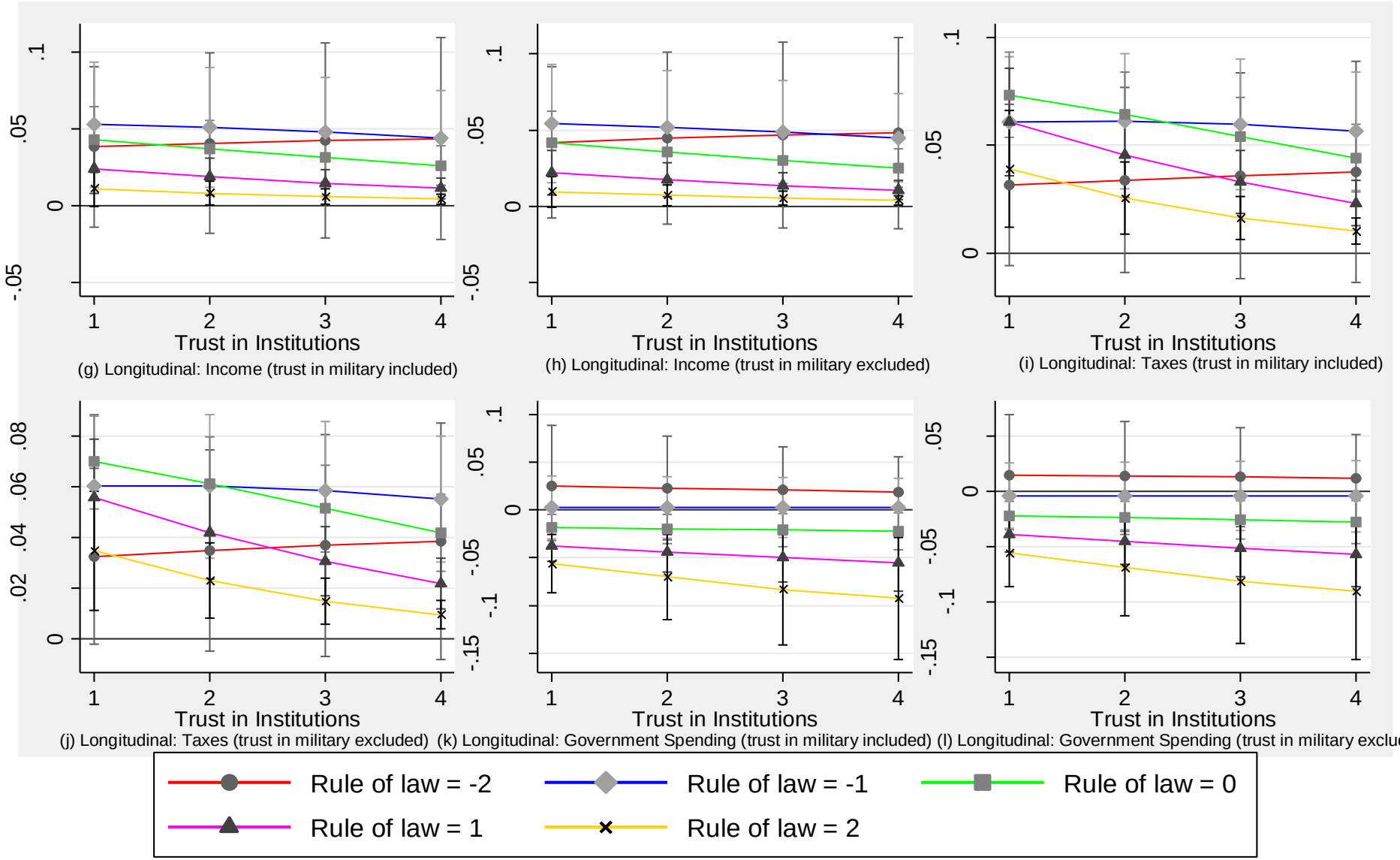
4	**-2**	0.049 (0.044)	0.058 (0.043)	0.035 (0.037)	0.038 (0.036)	-0.001 (0.051)	-0.021 (0.054)	0.044 (0.034)	0.048 (0.032)	0.038 (0.026)	0.038 (0.024)	0.019 (0.019)	0.012 (0.020)
4	**-1**	0.051* (0.027)	0.056** (0.027)	0.050** (0.025)	0.052** (0.024)	-0.011 (0.031)	-0.023 (0.032)	0.044*** (0.016)	0.045*** (0.015)	0.056*** (0.014)	0.055*** (0.013)	0.003 (0.016)	-0.004 (0.017)
4	**0**	0.053*** (0.012)	0.055*** (0.012)	0.067*** (0.012)	0.067*** (0.011)	-0.020 (0.014)	-0.025* (0.014)	0.026*** (0.007)	0.025*** (0.006)	0.044*** (0.008)	0.042*** (0.008)	-0.022** (0.010)	-0.028*** (0.010)
4	**1**	0.056*** (0.013)	0.053*** (0.013)	0.085*** (0.014)	0.083*** (0.013)	-0.028* (0.016)	-0.027* (0.015)	0.011*** (0.003)	0.011*** (0.003)	0.023*** (0.005)	0.022*** (0.005)	-0.055*** (0.015)	-0.057*** (0.015)
4	**2**	0.058* (0.030)	0.052* (0.030)	0.103*** (0.031)	0.100*** (0.031)	-0.035 (0.035)	-0.028 (0.032)	0.004*** (0.002)	0.004*** (0.002)	0.010*** (0.003)	0.009*** (0.003)	-0.093*** (0.033)	-0.090*** (0.032)

Notes:

1) Standard errors in parentheses. *p< 0.1, **p< 0.05, ***p< 0.01.
2) The dependent variable is an individual's willingness-to-pay through the respective payment vehicles specified for each column and is expressed as a dummy variable: coded 1 for "agree" and "strongly agree"; 0 for "disagree" and "strongly disagree".

Figure 4. Marginal effects of the interaction between an individual's trust in institutions and his/her country's rule of law for all three payment vehicles in wave 5 and longitudinal datasets.




-.05
0
.05
.1
1
2
3
4
Trust in Institutions
(g) Longitudinal: Income (trust in military included)
(h) Longitudinal: Income (trust in military excluded)
(i) Longitudinal: Taxes (trust in military included)
.02
.04
.06
.08
-.15
-.1
(j) Longitudinal: Taxes (trust in military excluded)
(k) Longitudinal: Government Spending (trust in military included)
(l) Longitudinal: Government Spending (trust in military excluded)
Rule of law = -2
Rule of law = -1
Rule of law = 0
Rule of law = 1
Rule of law = 2

7.5 Hypothesis 4: partial support

Results from both wave 5 and longitudinal analyses seem to suggest some support for Hypothesis 4, that individuals' environmental attitudes are influenced by the interaction effect between a country's rule of law quality and its cultural frame. Recall that Bachmann (2010: 89-90) assumes such interaction, as well as Ostrom and Ahn (2001: 27) who find that rules can interact with culture "given the physical and cultural setting" individuals are "enmeshed" in. Triandis (1989: 511-512) also argues that culture can interact with the working or *de facto* rules of a community in creating customs to economize on the need to come up with new rules every time the same situation occurs. Schwartz (2014a: 554) further observes that institutions as rules of the game can embody cultural values and thus reflect the cultural frame of the country, as Hickerson (1987: 1130, 1136) and Sunstein (1994: 822) also contend. However, the impact of the interaction between a country's quality of rule of law and its cultural frame on one's WTP is mixed. A cursory glance at the results of the marginal effect of the interaction between rule of law and cultural frame in Table 8 (below) seems to suggest no discernible, even contradictory, pattern of effects on one's WTP. For direct income payments, the changes in probability of WTP ranges from -0.042 to 0.093 when trust in military is included (see Table 8, column 1) and from -0.042 to 0.092 when trust in military is excluded (see Table 8, column 2) in the wave 5 analysis; for the longitudinal analysis, the change in probability of WTP ranges from -0.568 to 1.087 when trust in military is included (see Table 8, column 7), and from -0.580 to 1.087 when trust in military is excluded (see Table 8, column 8). For taxes, the change in probability of WTP ranges from -0.160 to -0.064 when trust in military is included (see Table 8, column 3), and from -0.161 to -0.063 when trust in military is excluded (see Table 8, column 4) in the wave 5 analysis; for longitudinal analysis, the change in probability of WTP is from -0.407 to 0.878 when trust in military is included (see Table 8, column 9), and from

-0.400 to 0.885 when trust in military is excluded (see Table 8, column 10). For government spending, changes in probability of free-riding range from -0.150 to 0.267 when trust in military is included (see Table 8, column 5), and from -0.150 to 0.268 when trust in military is excluded (see Table 8, column 6) in the wave 5 analysis; for longitudinal analysis, changes in probability of free-riding range from -0.086 to 0.037 when trust in military is included (see Table 8, column 11), and from -0.086 to 0.037 when trust in military is excluded (see Table 8, column 12) as well.

However, some patterns can be observed. Results from wave 5 suggests more support for Yamagishi than cross-cultural psychologists such as Triandis and Schwartz. For example, one's willingness to pay *decreases* for income payments when cultural frame ranges from 0 to 1 which is strongly collectivistic but *increases* when cultural frame ranges from 9 to 10 which is strongly individualistic (see Table 8, columns 1 and 2). Thus, individuals are *more likely* to pay as cultural frame of a country becomes *more individualistic* increasing from 0 to 10 holding rule of law constant but this is only noticeable when rule of law is weak at -2 for strongly collectivistic (cultural frame = 0 and 1) and strongly individualistic (cultural frame = 9 and 10) cultural frames. This trend seems to hold true for taxes as well (see Table 8, columns 3 and 4). Individuals are *less likely* to pay when cultural frame of a country is *strongly collectivistic* at values ranging from 0 to 3 for most values of rule of law. Government spending seems to further support this observation (see Table 8, columns 5 and 6). Individuals are *more likely* to free ride on government spending when cultural frame of a country is *strongly collectivistic* at values ranging from 0 to 3 for all values of rule of law, and are to a large extent *less likely* to free ride when cultural frame of a country becomes *more individualistic* at values ranging from 8 to 10 as rule of law improves to 2 onwards as changes in the probability of willingness to free-ride are negative (see Table 8, columns

5 and 6). These results are consistent with Yamagishi's (2011: 255-256) argument that individuals without the support of strong rule of law of the country would focus on benefitting their in-groups at the expense of the larger in-group which is the country as social uncertainty is high and thus would be less inclined to support country-level cooperative efforts such as environmental preservation. This is especially so when rule of law is weak, which encourages formation of collectivistic groups for their own survival without depending on the government as Yamagishi and Yamagishi (1994: 160) argue. The above results contradict the cross-cultural psychologists who would expect the opposite: that collectivistic countries would encourage individuals to pay more as they identify their needs with those of their compatriots more in their own country than with foreigners, while individuals in individualistic countries pay less as they identify less with the needs of their compatriots than with foreigners.

A different pattern is observed from the longitudinal analysis. Results from the longitudinal analysis *seem to* support the explanation put forth by cross-cultural psychologists above across all three payment vehicles, though such support is mixed. For example, individuals are to a large extent *more likely* to pay for all values of rule of law when countries are *strongly collectivistic* when cultural frame ranges from 0 to 5 for income payments (see Table 8 below, columns 7 and 8) and taxes (see Table 8 below, columns 9 and 10)—however, coefficients are mostly statistically insignificant for government spending when cultural frame ranges from 0 to 5 (see Table 8 below, columns 11 and 12). Conversely, individuals are to a large extent *less likely* to pay for all values of rule of law when countries are *individualistic* at cultural values ranging from 7 to 9 for income payments (see Table 8 below, columns 7 and 8) and taxes (see Table 8 below, columns 9 and 10). Government spending, however, appears to buck this trend. Individuals are *less likely* to free ride

on government spending when countries are *individualistic* for values of cultural frame ranging from 6 to 10 though this seems to be so when rule of law of a country is weak at values ranging from -2 to -1 (see Table 8 below, columns 11 and 12). Cross-cultural psychologists would expect otherwise, that individualistic individuals are more likely to free-ride on government spending as they focus only on themselves. Yamagishi's arguments may be more applicable. In Yamagishi's view, individualistic individuals are free to join outsiders as they are not bound to their own in-groups and thus could freely express their personal views and join outsider groups including groups supporting country level initiatives such as environmental protection. Examining again the results for government spending in the longitudinal analyses (see Table 8 below, columns 11 and 12) show that individuals are *less likely* to free ride on government spending as reductions in probability of free riding are *greater* as rule of law *improves* from -2 to -1 while holding cultural frame constant at values ranging from 6 to 10, i.e. individualistic. If so, this observation further supports Yamagishi's argument that stronger rule of law would encourage individuals in individualistic countries to freely support out-group initiatives such as environmental protection; this is so albeit statistically insignificant coefficients when rule of law improves beyond -1.

Figure 5 below illustrates the statistically significant results mentioned above for wave 5 and longitudinal datasets. Changes in the probability of WTP are statistically significant for income payments in the wave 5 dataset only when rule of law is -2 for values of cultural frame at 0 (red line), 1 (blue line), 9 (yellow line) and 10 (darker green line) (see Figure 5 (a) and (b)). The coefficients are consistent with Yamagishi's explanation above as change in probability that one is willing to pay increases more as cultural frame becomes more individualistic. The coefficients for taxes in the wave 5 dataset are also in line with Yamagishi's explanation above as change in

probability that one is willing to pay increases when cultural frame is 2 (lime green line) compared to lower values of cultural frame at 0 (red line) and 1 (blue line), but the increases are more as rule of law increases, especially from 1 to 2 (see Figure 5 (c) and (d)). Coefficients for government spending in the wave 5 dataset (see Figure 5 (e) and (f)) also seem consonant with Yamagishi's explanation above as probability in free-riding increases as rule of law is weak at -2 and -1 peaking when rule of law is at -1 and cultural frame is most collectivistic at 0 (red line) compared to 1 (blue line), 2 (lime green line) and 3 (magenta line). However, probability in free-riding falls as rule of law improves from 0 onwards which troughs at when rule of law is at 0 when the country is strongly individualistic at 10 (darker green line) compared to cultural frame at 9 (yellow line) and 8 (sky blue line). These results thus show that strong rule of law when interacted with individualistic cultural frame assures individuals that non-cooperation from strangers in the community in larger (e.g. national) enterprises such as pollution mitigation would face legal punishment and weak rule of law would encourage individuals in collectivistic countries to focus more on their in-groups at the expense of the larger national collective by free riding on government spending. A stronger rule of law is thus essential to curb the risk of free-ridership on public funds that has been mentioned earlier (Pearce and Moran, 1994: 50, 52-53; Kriström, 1999: 784-785; Gilpin, 2000: 195; Hufschmidt et al, 1983: 253; Madhoo, 2010: 41; Tietenberg and Lewis, 2012: 83; Perman et al, 2011: 425; Hanley et al, 2007: 341; Grafton et al, 2004: 259; Al-Kandari, 1994: 374), a risk that appears more prevalent in individualistic countries.

For the longitudinal dataset, coefficients for income and taxes in the longitudinal dataset are also moving in the expected direction; however, the results are more consistent with Yamagishi's explanations than with those of cross-cultural psychologists above as illustrated in Figure 5 (g)

and (h) for income payments and Figure 5 (i) and (j) for taxes. Increases in probability of WTP are at a higher rate when rule of law improves from -2 to -1 and are highest when cultural frame is 0 (red line) which is strongly collectivistic compared to cultural frame at 1 (blue line), 2 (lime green line), 3 (magenta line), 4 (gold line) and 5 (orange line). However, these increments seem to reach their highest at the peak when rule of law is at -1 for both income payments and taxes before reducing sharply as rule of law increases, i.e. improves. Yet, as rule of law *improves* beyond -1, increments in the probability that one is willing to pay *decreases* for societies which are *collectivistic*, i.e. cultural frame ranging from 0 to 5. Conversely, decreases in probability of WTP are steeper and are lowest when cultural frame is strongly individualistic at 9 (yellow line) compared to cultural frame at 8 (sky blue line) and 7 (pink line) when marginal effects are statistically coefficient. Moreover, these reductions in probability reach their lowest at the trough when rule of law is at 0 for both income payments and taxes in the longitudinal dataset before they increase as rule of law improves beyond 0. However, such reductions in the probability of WTP *decrease* as rule of law *increases* beyond 0 for *individualistic* societies, i.e. cultural frame ranging from 7 to 9. Contrary to the cross-cultural psychologists as well, coefficients for government spending are consistent with Yamagishi's explanation above that strong rule of law when coupled with individualistic cultural frame reduces chances of free-riding (see Figure 5 (k) and (l)). Restricting to values of rule of law at -2 and -1, one's willingness to free ride on the government decreases further as rule of law improves from -2 to -1 and is lowest when cultural frame is strongly individualistic at 10 (darker green line) compared to cultural frame at 9 (yellow line), 8 (sky blue line), 7 (pink line) and 6 (cyan line).

Several reasons are suggested for the contradictory results mentioned above. The first argument centers on the characteristic of cultural frame, which is that the effects of cultural frame require time to manifest. The wave 5 analysis arguably offers a single snapshot of a very short period by focusing just on wave 5 dataset which may be inadequate to capture the effects of cultural frame. The longitudinal dataset, in contrast, offers a longer duration for examination which can allow for the previously unobservable effects in the short term to surface in the longer term. This comports with the conceptualization of culture in terms of time as a store of memory over the ages, in Kluckhohn's (1954) words. It also fits the perspective to treat culture as a slow changing variable over time, enough so to be constant as Schwartz (2008: 45), and Hofstede and associates (Hofstede and McCrae, 2004: 65; Minkov et al, 2013: 1095) argue. The second argument attempts to explain this interaction effect in light of the results observed from income payments and taxes in the longitudinal analysis. Such results may very well reflect a country's rule of law that encourages or upholds an individualistic society and/or vice-versa such that it gives rise to the not-in-my-backyard (NIMBY) syndrome. This socio-political context incentivizes individuals to extract as much benefits from society for themselves and socialize as much of the costs of extraction to other actors in society. With respect to the environment, Portney (2013: 164-165) describes how NIMBY individuals desire the benefits of pollution mitigation facilities (e.g. toxic waste recycling) but demur on the costs to be paid for such benefits (e.g. siting of recycling facilities). Such a contextual effect may encourage like-minded individuals to band together to form interest groups to promote their own interests in order to compete with other groups which champion conflicting goals or cooperate with interest groups with complementary objectives; this interest group dynamic is common in advanced democracies such as western European countries which scholars of culture have tended to view as individualistic countries. In his study of European local grassroots

movements of the 1970s and 1980s, Donati (1997: 151-152) observes how NIMBY individuals are motivated not by postmaterialism values to protect the environment but rather by economic reasons (e.g. defending the values of their property) and personal security (e.g. health deterioration) to oppose governments who wish to implement pollution mitigation projects. Thus, countries with strong rule of law can yield opposing social forces where mitigation of environmental pollution is the focus of contention among social groups: strong national rule of law can interact with individualist national culture to disincline (disincentivize) individuals to pay as observed in NIMBY individuals in advanced democracies which also tend to be developed economies, but such places also reveal that individuals are more willing to pay when strong rule of law interacts with greater trust in strangers and institutions as explained above (see Hypothesis 2). That the former outcome may prevail over the latter is a worrying trend, especially if such contestation persists all the while as pollution worsens. Such contestation, however, is arguably a more realistic depiction of various actors with countervailing interests pitting themselves against one another in societies as competing pressures appear to drive the dynamics of environmental pollution mitigation.

Methodological arguments may also be a third reason to explain the differences in results between those in the wave 5 and those in the longitudinal analyses. The peculiarity of the government spending question may be a reason as explained in Hypotheses 1 (see section 7.2 above) and 2 (see section 7.3 above). Even so, a cursory explanation may attribute these contradictory results to distortion of measures in the longitudinal data (i.e. noise) in three ways when compared with that in the wave 5 analysis:

i) Cultural orientation is not reliably measured based on Yoon's child qualities as discussed earlier. Even if otherwise, child qualities may be a blunter measure with its binary scale (see Table 13, Appendix A) compared to Schwartz's universal value types which rely on a longer Likert scale (see Table 12, Appendix A). Only a lack of alternative measures justifies using child qualities as a proxy measure when analyzing across multiple survey waves;

ii) Generalized trust is measured using a binary scale for the longitudinal analysis (see Table 15, Appendix A) which may be a blunter measure of one's trust in unfamiliar individuals compared to a more sensitive measure such as that with a longer Likert scale as utilized in analyzing wave 5 (see Table 14, Appendix A). Moreover, generalized trust, as noted earlier, is distorted as the measure does not discriminate unfamiliar individuals from familiar ones (see Table 15 in Appendix A), of which the latter is an integral argument of Yamagishi's—again, use of generalized trust is compelled in the absence of better measures across survey waves; and

iii) One's trust/confidence in the institutions may be distorted by the inclusion of one's perspective on human rights as a proxy measure in the absence of a question to elicit one's trust in the courts in wave 4 of the WVS (see Table 17, Appendix A), as mentioned above.

Fourthly, even if one were to ignore the results for the government spending vehicle in both analyses and methodological problems listed above, results for income payments and taxes in the longitudinal analysis do not entirely contradict Yamagishi's arguments with respect to the three payment vehicles in *both* wave 5 and longitudinal analyses. One reason is that Yamagishi and

colleagues (see Kuwabara et al, 2007: 462-464, 474-476; Romano et al, 2017: 12705) do not dismiss the role of culture entirely. A second reason is that a closer examination of results for income payments (see Figure 5 (g), (h)) and taxes (see Figure 5 (i), (j)) in the longitudinal analysis reveals contradictions in that changes in probability of one's WTP *decreases* as rule of law *increases* for societies which remain *collectivistic* (i.e. cultural frame < 6); however, changes in probability of one's WTP *increases* as rule of law *increases* for societies which remain *individualistic* (i.e. cultural frame > 6). These results suggest some 'convergence' in changes in probability that one is willing to pay at around 0 between individualistic and collectivistic societies. However, cross-cultural psychologists would argue that there *should be no convergence* as individuals are more likely to pay in collectivistic societies and less likely to pay in individualistic societies; instead, the relation between probability of WTP and cultural frame should be *linear*, i.e. the more collectivistic a country is, the more one is willing to pay and conversely for individualistic countries. What explains this convergence upon a closer examination seems to be improvements in the rule of law that can be attributed to Yamagishi's argument. Yamagishi observes that individuals in supposedly more 'collectivistic' societies (i.e. cultural frame < 6) such as Japanese society contribute *more* to the public good when systems of punishment are in place, i.e. rule of law is high. He also notes that stronger rule of law enables individuals to break out of their 'collectivistic' in-groups to join out-groups as alternative sources of pooled resources important to one's survival as strong rule of law reduces chances of social uncertainty (see Yamagishi, 2011: 255-256). Strong rule of law coupled with individualistic cultural frame thus enables individuals to 'trust' out-group members out of one's beliefs in the goodness of others or what Ahn and Ostrom (2008: 76) describe as one's beliefs in others' "pure motivations" to cooperate, rather than 'calculated' intentions motivated by extrinsic incentives that seem to be

associated with collectivistic societies as Yamagishi observes. If so, the above results dovetail with Yamagishi's (1986: 271) other observation that strong rule of law can ironically reduce people's intrinsic or "pure" motivation to cooperate because they come to feel that they are forced by the threat of punishment to cooperate with others rather than out of one's beliefs in others' "pure motivations" to cooperate as Ahn and Ostrom (2008: 76) describe. Individuals can, thus, attribute others' cooperation to the presence of punishment for non-cooperation rather than the latter's desire to cooperate, which ironically fosters the former's dependency on punishment in order to effect cooperation and makes individuals feel less trusting of others and even exploit others (Yamagishi, 1988a: 534-535; Yamagishi and Yamagishi, 1994: 137; Yamagishi et al, 1998a: 190). Such phenomenon of 'crowding out', so to speak, has also been recognized by environmental economists such as Shogren (2012: 355-356) and their critics such as Gowdy (2008: 635) who raise strategic bidding as one obstacle to environmental valuation. These explanations may explain why individuals who are more trusting of others instead contribute *less* to the public good in more collectivistic countries with *high* rule of law. It also explains why Yamagishi (1988: 271) criticizes using the government as a "centralized authority" as a solution to solve CXN problems in providing public goods.

Thus, while results for collectivistic societies above may contradict expectations of many environmental economists mentioned above (i.e. Pearce and Moran, 1994: 50, 52-53; Kriström, 1999: 784-785; Gilpin, 2000: 195; Hufschmidt et al, 1983: 253; Madhoo, 2010: 41; Tietenberg and Lewis, 2012: 83; Perman et al, 2011: 425; Hanley et al, 2007: 341; Grafton et al, 2004: 259; Al-Kandari, 1994: 374) who expect that individuals are *more willing* to pay when a country is *more*—not *less*—individualistic when the country's rule of law *increases* by one unit, their

expectations are not necessarily inconsistent with Yamagishi's if strong rule of law is needed to encourage individuals in highly individualistic societies (i.e. cultural frame > 6) to contribute by deterring non-contributors. This thus explains the reductions in one's probability that one is willing to pay which *decreases* at a *lesser rate* as rule of law *improves* for *individualistic* societies beyond the initial trough when rule of law is zero for income payments (see Figure 5 (g), (h)) and taxes (see Figure 5 (i), (j)) in the longitudinal dataset. That increments in probability that one is willing to pay peaks when rule of law improves from -2 to -1 for collectivistic societies (i.e. cultural frame < 6) as seen for income payments (see Figure 5 (g), (h)) and taxes (see Figure 5 (i), (j)) in the longitudinal dataset can also be explained by a strong rule of law which appeals to *both* intrinsically and extrinsically motivated individuals. Individuals driven by extrinsic motivation need assurance from stronger rule of law to punish free-riders for non-cooperation or what is called 'crowding in' as Shogren (2012: 355-356) observes of such individuals (see Chapter 2). Intrinsically motivated individuals on the other hand would also be more willing to contribute to CPRs as initial improvements in rule of law enables them to trust out-groups such as interest groups or even the government who support such initiatives as environmental conservation as explained by Yamagishi's "institutional view" of culture. However, rate of increase in probability that one is willing to pay decreases as rule of law improves beyond the threshold of -1 for collectivistic societies as extrinsically motivated individuals ironically become less trusting of others or the government and even exploit them by free-riding on them if they feel that it is punishment than trust that explains cooperation. Intrinsically motivated individuals on the other hand are 'crowded out' or 'suffocated' by strong rule of law.

Likewise, two factors can explain the greater rate of reductions in probability that one is willing to pay which eventually troughs when rule of law increases from -2 to 0 for individualistic societies (cultural frame > 6) as seen for income payments (see Figure 5 (g), (h)) and taxes (see Figure 5 (i), (j)) in the longitudinal dataset. One is that initial improvements in rule of law of a country can suffocate or 'crowd out' individuals' intrinsic motivations to contribute which can be out of "pure motivations" or beliefs in other individuals' good intentions to cooperate. A second explanation may be that improvements to rule of law initially safeguards individuals' self-interests such that they can engage in NIMBY behavior. However, beyond that threshold of 0 for rule of law, stronger rule of law deters non-contribution in highly individualistic societies (i.e. cultural frame > 6) whether arising from 'crowding out' intrinsic motivations or due to NIMBY behavior by forcing individuals to pay which thus explains why changes in probability of one's WTP *decreases at a lower rate* in these highly individualistic societies as rule of law *increases beyond 0*—which is again invoking the extrinsic motivation explanation and 'crowding in' argument. It seems that different thresholds of rule of law apply to 'collectivistic' and 'individualistic' societies to 'optimally' increase individuals' contributions to CPRs: up to -1 for 'collectivistic' societies, and beyond 0 for 'individualistic' societies.

Table 8. Marginal effects of interaction between a country's rule of law and its cultural frame for both wave 5 and longitudinal datasets of the World Values Survey.

Dataset		**Wave 5**						**Longitudinal**					
Values of independent variables		**Direct income payments**		**Taxation**		**Government spending**		**Direct income payments**		**Taxation**		**Government spending**	
Rule of law	**Cultu -ral frame**	**Includes trust in military (1)**	**Excludes trust in military (2)**	**Includes trust in military (3)**	**Excludes trust in military (4)**	**Includes trust in military (5)**	**Excludes trust in military (6)**	**Includes trust in military (7)**	**Excludes trust in military (8)**	**Includes trust in military (9)**	**Excludes trust in military (10)**	**Includes trust in military (11)**	**Excludes trust in military (12)**
-2	**0**	-0.038** (0.018)	-0.037** (0.017)	-0.064** (0.025)	-0.063** (0.024)	0.261*** (0.066)	0.261*** (0.066)	0.009 (0.011)	0.009 (0.010)	0.032 (0.031)	0.028 (0.027)	0.091 (0.103)	0.092 (0.104)
-2	**1**	-0.042** (0.019)	-0.042** (0.019)	-0.069*** (0.022)	-0.068*** (0.022)	0.228*** (0.077)	0.228*** (0.077)	0.026 (0.024)	0.024 (0.023)	0.061 (0.045)	0.055 (0.041)	0.061 (0.078)	0.062 (0.079)
-2	**2**	-0.043* (0.025)	-0.042* (0.025)	-0.071*** (0.022)	-0.071*** (0.022)	0.181** (0.089)	0.181** (0.090)	0.067 (0.044)	0.065 (0.043)	0.110** (0.056)	0.103* (0.054)	0.033 (0.056)	0.035 (0.056)
-2	**3**	-0.037 (0.037)	-0.036 (0.037)	-0.069** (0.027)	-0.068** (0.027)	0.125 (0.096)	0.124 (0.097)	0.155** (0.065)	0.153** (0.065)	0.175*** (0.054)	0.172*** (0.055)	0.010 (0.038)	0.011 (0.039)
-2	**4**	-0.022 (0.056)	-0.020 (0.057)	-0.061 (0.038)	-0.060 (0.038)	0.068 (0.095)	0.067 (0.096)	0.267*** (0.058)	0.268*** (0.059)	0.228*** (0.039)	0.230*** (0.040)	-0.010 (0.026)	-0.009 (0.027)

-2	**5**	0.002	0.005	-0.047	-0.046	0.018	0.017	0.230***	0.230***	0.197***	0.199***	-0.024	-0.024
		(0.080)	(0.080)	(0.056)	(0.056)	(0.084)	(0.083)	(0.022)	(0.023)	(0.018)	(0.018)	(0.019)	(0.019)
-2	**6**	0.032	0.035	-0.026	-0.026	-0.022	-0.023	0.011	0.008	0.059	0.053	-0.035***	-0.035***
		(0.098)	(0.097)	(0.080)	(0.080)	(0.060)	(0.058)	(0.036)	(0.035)	(0.042)	(0.042)	(0.013)	(0.013)
-2	**7**	0.061	0.063	-0.002	-0.003	-0.049*	-0.050*	-0.083**	-0.082**	-0.078***	-0.082***	-0.042***	-0.042***
		(0.099)	(0.094)	(0.101)	(0.101)	(0.028)	(0.027)	(0.041)	(0.041)	(0.027)	(0.024)	(0.009)	(0.009)
-2	**8**	0.082	0.084	0.023	0.022	-0.065**	-0.065***	-0.061	-0.057	-0.121*	-0.114*	-0.046***	-0.046***
		(0.076)	(0.069)	(0.113)	(0.112)	(0.023)	(0.024)	(0.055)	(0.052)	(0.063)	(0.065)	(0.012)	(0.012)
-2	**9**	0.093**	0.092**	0.046	0.045	-0.072	-0.072	-0.029	-0.027	-0.100	-0.087	-0.048**	-0.048**
		(0.043)	(0.037)	(0.110)	(0.109)	(0.053)	(0.054)	(0.036)	(0.033)	(0.088)	(0.081)	(0.019)	(0.019)
-2	**10**	0.092**	0.090**	0.064	0.063	-0.072	-0.071	-0.012	-0.011	-0.064	-0.053	-0.047*	-0.048*
		(0.039)	(0.041)	(0.092)	(0.091)	(0.080)	(0.080)	(0.018)	(0.016)	(0.078)	(0.066)	(0.027)	(0.027)
-1	**0**	-0.061	-0.060	-0.108*	-0.106*	0.267**	0.268**	1.087**	1.087**	0.878***	0.885***	0.079	0.080
		(0.041)	(0.040)	(0.055)	(0.054)	(0.126)	(0.126)	(0.499)	(0.512)	(0.261)	(0.287)	(0.084)	(0.085)
-1	**1**	-0.060	-0.059	-0.104**	-0.103**	0.212**	0.213**	1.021***	1.027***	0.789***	0.803***	0.054	0.055
		(0.042)	(0.041)	(0.051)	(0.051)	(0.107)	(0.108)	(0.263)	(0.272)	(0.149)	(0.163)	(0.064)	(0.065)
-1	**2**	-0.054	-0.053	-0.097**	-0.095**	0.159*	0.159*	0.882***	0.890***	0.672***	0.688***	0.031	0.032
		(0.044)	(0.044)	(0.049)	(0.048)	(0.095)	(0.095)	(0.105)	(0.107)	(0.081)	(0.085)	(0.048)	(0.049)
-1	**3**	-0.042	-0.040	-0.085*	-0.084*	0.109	0.108	0.683***	0.689***	0.532***	0.545***	0.009	0.010
		(0.050)	(0.050)	(0.050)	(0.049)	(0.088)	(0.088)	(0.051)	(0.051)	(0.050)	(0.050)	(0.036)	(0.036)

-1	**4**	-0.023	-0.021	-0.069	-0.068	0.061	0.061	0.450***	0.452***	0.377***	0.384***	-0.010	-0.009
		(0.062)	(0.063)	(0.056)	(0.056)	(0.083)	(0.083)	(0.047)	(0.047)	(0.036)	(0.036)	(0.028)	(0.029)
-1	**5**	0.002	0.005	-0.050	-0.049	0.017	0.016	0.216***	0.214***	0.216***	0.215***	-0.027	-0.026
		(0.079)	(0.080)	(0.068)	(0.068)	(0.078)	(0.078)	(0.046)	(0.046)	(0.035)	(0.036)	(0.024)	(0.025)
-1	**6**	0.031	0.034	-0.027	-0.027	-0.023	-0.025	0.011	0.008	0.057	0.050	-0.043*	-0.042*
		(0.097)	(0.097)	(0.084)	(0.084)	(0.070)	(0.069)	(0.035)	(0.034)	(0.042)	(0.041)	(0.023)	(0.024)
-1	**7**	0.061	0.065	-0.002	-0.003	-0.060	-0.061	-0.147***	-0.148***	-0.091**	-0.099**	-0.056**	-0.056**
		(0.110)	(0.107)	(0.101)	(0.101)	(0.057)	(0.056)	(0.046)	(0.048)	(0.042)	(0.040)	(0.023)	(0.024)
-1	**8**	0.089	0.092	0.023	0.022	-0.093**	-0.094**	-0.251*	-0.249*	-0.220***	-0.226***	-0.068***	-0.068***
		(0.111)	(0.106)	(0.115)	(0.114)	(0.045)	(0.044)	(0.130)	(0.132)	(0.057)	(0.062)	(0.025)	(0.025)
-1	**9**	0.112	0.113	0.047	0.047	-0.123***	-0.123***	-0.307	-0.300	-0.326***	-0.326**	-0.078***	-0.078***
		(0.099)	(0.093)	(0.123)	(0.122)	(0.045)	(0.045)	(0.233)	(0.233)	(0.118)	(0.133)	(0.029)	(0.029)
-1	**10**	0.126	0.126*	0.070	0.068	-0.148**	-0.148**	-0.324	-0.313	-0.407**	-0.397*	-0.086**	-0.086**
		(0.081)	(0.074)	(0.124)	(0.122)	(0.069)	(0.070)	(0.330)	(0.325)	(0.215)	(0.234)	(0.035)	(0.035)
0	**0**	-0.092	-0.090	-0.155	-0.152	0.152**	0.153**	0.061	0.060	0.141	0.136	0.064	0.065
		(0.081)	(0.079)	(0.097)	(0.096)	(0.068)	(0.068)	(0.063)	(0.061)	(0.107)	(0.106)	(0.057)	(0.057)
0	**1**	-0.081	-0.079	-0.138	-0.135	0.134**	0.135**	0.090	0.088	0.177*	0.172*	0.046	0.047
		(0.072)	(0.071)	(0.084)	(0.083)	(0.056)	(0.056)	(0.072)	(0.071)	(0.103)	(0.103)	(0.048)	(0.048)
0	**2**	-0.066	-0.064	-0.118	-0.117	0.112**	0.112**	0.125*	0.123*	0.210**	0.206**	0.028	0.029
		(0.066)	(0.065)	(0.074)	(0.073)	(0.053)	(0.054)	(0.073)	(0.073)	(0.087)	(0.088)	(0.040)	(0.040)

0	**3**	-0.047 (0.064)	-0.045 (0.063)	-0.097 (0.069)	-0.096 (0.068)	0.085 (0.058)	0.085 (0.058)	0.159** (0.062)	0.157** (0.062)	0.230*** (0.061)	0.226*** (0.062)	0.009 (0.034)	0.010 (0.034)
0	**4**	-0.024 (0.068)	-0.022 (0.068)	-0.075 (0.070)	-0.074 (0.069)	0.053 (0.065)	0.052 (0.065)	0.174*** (0.044)	0.172*** (0.044)	0.220*** (0.039)	0.217*** (0.040)	-0.010 (0.030)	-0.009 (0.031)
0	**5**	0.002 (0.079)	0.004 (0.079)	-0.052 (0.076)	-0.051 (0.076)	0.017 (0.072)	0.016 (0.072)	0.136*** (0.036)	0.134*** (0.036)	0.164*** (0.035)	0.161*** (0.035)	-0.030 (0.031)	-0.029 (0.031)
0	**6**	0.030 (0.094)	0.034 (0.094)	-0.027 (0.088)	-0.027 (0.087)	-0.025 (0.079)	-0.026 (0.079)	0.011 (0.033)	0.008 (0.033)	0.053 (0.039)	0.047 (0.038)	-0.050 (0.035)	-0.049 (0.035)
0	**7**	0.060 (0.111)	0.064 (0.110)	-0.002 (0.101)	-0.003 (0.101)	-0.071 (0.088)	-0.072 (0.088)	-0.202*** (0.053)	-0.208*** (0.053)	-0.098* (0.054)	-0.110** (0.053)	-0.071 (0.043)	-0.070 (0.044)
0	**8**	0.091 (0.126)	0.095 (0.124)	0.023 (0.116)	0.022 (0.115)	-0.120 (0.100)	-0.122 (0.100)	-0.429*** (0.088)	-0.439*** (0.087)	-0.256*** (0.081)	-0.274*** (0.080)	-0.093* (0.055)	-0.092* (0.055)
0	**9**	0.121 (0.139)	0.124 (0.136)	0.048 (0.131)	0.047 (0.130)	-0.173 (0.116)	-0.176 (0.116)	-0.568** (0.236)	-0.580** (0.239)	-0.376*** (0.139)	-0.400*** (0.143)	-0.114* (0.068)	-0.114 (0.069)
0	**10**	0.148 (0.147)	0.151 (0.143)	0.073 (0.144)	0.072 (0.143)	-0.229* (0.136)	-0.231* (0.136)	-0.575 (0.425)	-0.586 (0.433)	-0.434* (0.236)	-0.460* (0.249)	-0.137 (0.084)	-0.136 (0.085)
1	**0**	-0.124 (0.119)	-0.121 (0.118)	-0.179* (0.098)	-0.177* (0.099)	0.061* (0.032)	0.061* (0.032)	0.000 (0.000)	0.000 (0.000)	0.003 (0.003)	0.002 (0.002)	0.050 (0.032)	0.050 (0.031)
1	**1**	-0.101 (0.099)	-0.098 (0.097)	-0.154* (0.087)	-0.152* (0.087)	0.066*** (0.024)	0.066*** (0.024)	0.001 (0.001)	0.001 (0.001)	0.006 (0.005)	0.006 (0.005)	0.039 (0.032)	0.039 (0.032)

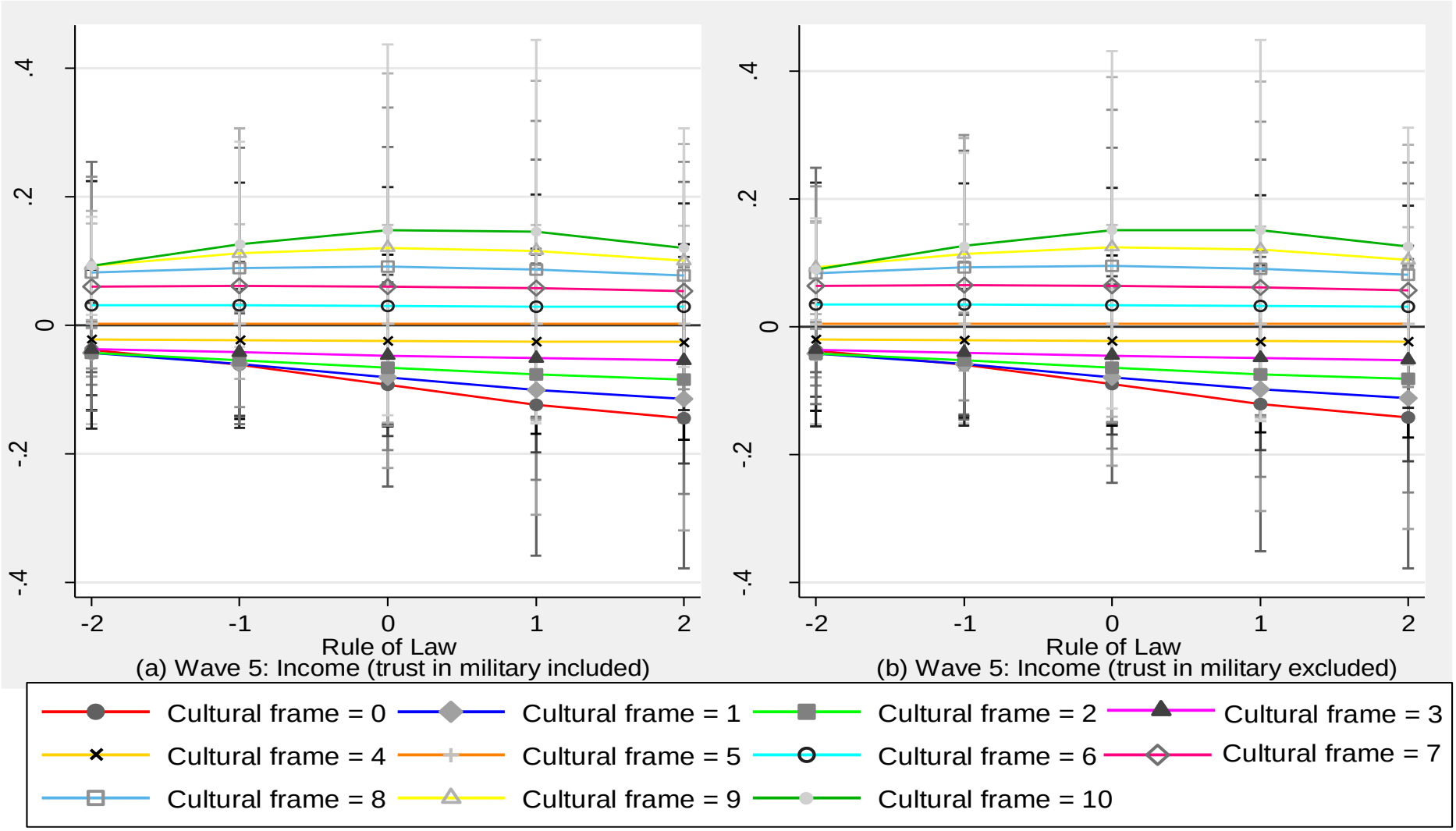
1	**2**	-0.076	-0.074	-0.128	-0.127	0.067***	0.067***	0.004	0.003	0.015*	0.014	0.025	0.026
		(0.084)	(0.082)	(0.078)	(0.078)	(0.020)	(0.020)	(0.003)	(0.002)	(0.009)	(0.008)	(0.032)	(0.032)
1	**3**	-0.051	-0.049	-0.103	-0.102	0.061**	0.061**	0.012*	0.011*	0.034**	0.031**	0.009	0.010
		(0.075)	(0.074)	(0.074)	(0.074)	(0.028)	(0.028)	(0.006)	(0.006)	(0.014)	(0.013)	(0.032)	(0.032)
1	**4**	-0.025	-0.023	-0.078	-0.077	0.045	0.044	0.033***	0.032***	0.065***	0.062***	-0.011	-0.009
		(0.073)	(0.072)	(0.074)	(0.074)	(0.046)	(0.046)	(0.011)	(0.011)	(0.017)	(0.017)	(0.032)	(0.032)
1	**5**	0.002	0.004	-0.053	-0.052	0.016	0.015	0.066***	0.065***	0.094***	0.091***	-0.033	-0.032
		(0.079)	(0.078)	(0.080)	(0.080)	(0.066)	(0.067)	(0.018)	(0.017)	(0.020)	(0.019)	(0.037)	(0.037)
1	**6**	0.029	0.032	-0.028	-0.027	-0.026	-0.028	0.010	0.008	0.049	0.044	-0.058	-0.057
		(0.089)	(0.088)	(0.089)	(0.089)	(0.088)	(0.089)	(0.032)	(0.031)	(0.033)	(0.033)	(0.047)	(0.047)
1	**7**	0.058	0.061	-0.002	-0.003	-0.079	-0.081	-0.200***	-0.205***	-0.099*	-0.111**	-0.086	-0.084
		(0.102)	(0.102)	(0.102)	(0.101)	(0.112)	(0.113)	(0.057)	(0.057)	(0.055)	(0.055)	(0.063)	(0.064)
1	**8**	0.087	0.091	0.023	0.022	-0.136	-0.138	-0.193*	-0.193*	-0.179**	-0.186**	-0.115	-0.114
		(0.118)	(0.117)	(0.116)	(0.115)	(0.135)	(0.135)	(0.112)	(0.113)	(0.071)	(0.075)	(0.084)	(0.084)
1	**9**	0.116	0.121	0.048	0.047	-0.189	-0.192	-0.082	-0.081	-0.136	-0.134	-0.146	-0.145
		(0.135)	(0.134)	(0.131)	(0.130)	(0.151)	(0.151)	(0.076)	(0.075)	(0.086)	(0.089)	(0.106)	(0.107)
1	**10**	0.146	0.151	0.073	0.072	-0.229	-0.232	-0.027	-0.026	-0.072	-0.069	-0.178	-0.177
		(0.152)	(0.152)	(0.147)	(0.146)	(0.161)	(0.161)	(0.032)	(0.031)	(0.064)	(0.063)	(0.129)	(0.130)
2	**0**	-0.145	-0.142	-0.160***	-0.161***	0.021	0.021	0.000	0.000	0.000	0.000	0.037**	0.037**
		(0.119)	(0.121)	(0.044)	(0.046)	(0.018)	(0.018)	(0.000)	(0.000)	(0.000)	(0.000)	(0.015)	(0.015)

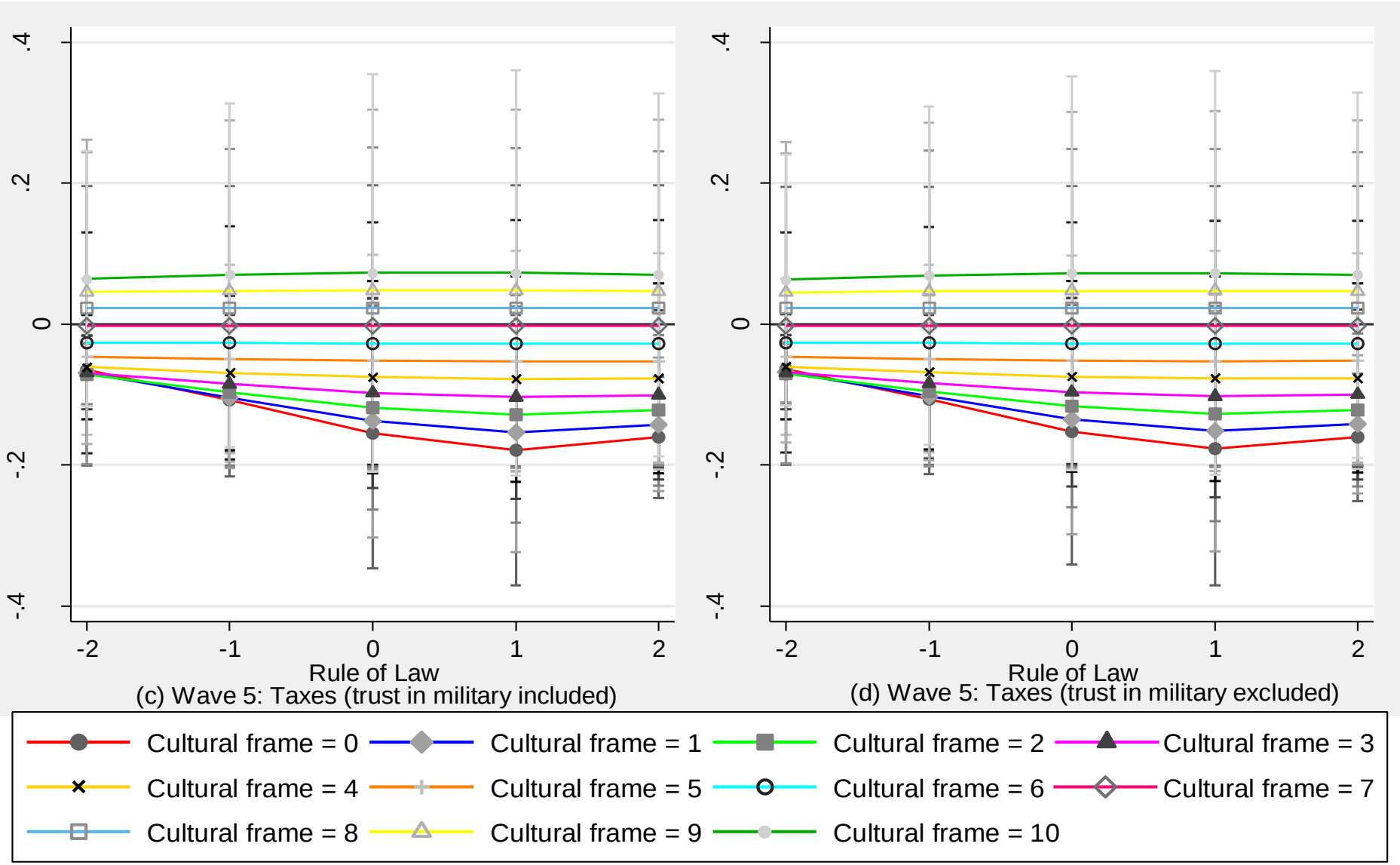
2	**1**	-0.114 (0.105)	-0.112 (0.104)	-0.142*** (0.048)	-0.142*** (0.050)	0.028 (0.018)	0.028 (0.018)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.032* (0.019)	0.032* (0.018)
2	**2**	-0.084 (0.091)	-0.082 (0.091)	-0.122** (0.054)	-0.122** (0.055)	0.036*** (0.014)	0.036*** (0.014)	0.000 (0.000)	0.000 (0.000)	0.001 (0.001)	0.001 (0.001)	0.023 (0.025)	0.023 (0.024)
2	**3**	-0.055 (0.082)	-0.052 (0.081)	-0.100 (0.061)	-0.100 (0.062)	0.041*** (0.010)	0.041*** (0.010)	0.001 (0.000)	0.001 (0.000)	0.004* (0.002)	0.004* (0.002)	0.009 (0.030)	0.009 (0.029)
2	**4**	-0.026 (0.078)	-0.023 (0.076)	-0.077 (0.069)	-0.076 (0.069)	0.036 (0.028)	0.036 (0.028)	0.005** (0.002)	0.005** (0.002)	0.016*** (0.006)	0.014*** (0.005)	-0.011 (0.034)	-0.010 (0.034)
2	**5**	0.002 (0.078)	0.004 (0.077)	-0.053 (0.078)	-0.052 (0.078)	0.015 (0.060)	0.014 (0.061)	0.028*** (0.008)	0.028*** (0.008)	0.045*** (0.010)	0.044*** (0.010)	-0.036 (0.042)	-0.034 (0.042)
2	**6**	0.028 (0.082)	0.031 (0.081)	-0.028 (0.089)	-0.027 (0.089)	-0.027 (0.096)	-0.029 (0.097)	0.010 (0.030)	0.008 (0.030)	0.044* (0.026)	0.040 (0.027)	-0.065 (0.056)	-0.063 (0.056)
2	**7**	0.054 (0.087)	0.057 (0.085)	-0.002 (0.102)	-0.003 (0.101)	-0.083 (0.121)	-0.086 (0.122)	-0.142*** (0.048)	-0.143*** (0.049)	-0.092** (0.046)	-0.101** (0.044)	-0.096 (0.075)	-0.095 (0.075)
2	**8**	0.078 (0.090)	0.081 (0.089)	0.022 (0.114)	0.022 (0.113)	-0.132 (0.117)	-0.134 (0.116)	-0.043 (0.033)	-0.041 (0.032)	-0.087** (0.043)	-0.084* (0.044)	-0.128 (0.091)	-0.126 (0.091)
2	**9**	0.100 (0.093)	0.104 (0.092)	0.047 (0.124)	0.046 (0.124)	-0.156* (0.088)	-0.157* (0.087)	-0.006 (0.007)	-0.006 (0.006)	-0.030 (0.025)	-0.026 (0.022)	-0.156 (0.099)	-0.155 (0.100)
2	**10**	0.121 (0.095)	0.125 (0.095)	0.070 (0.131)	0.070 (0.132)	-0.150** (0.075)	-0.150** (0.075)	-0.001 (0.001)	-0.001 (0.001)	-0.008 (0.008)	-0.006 (0.007)	-0.179* (0.096)	-0.178* (0.097)

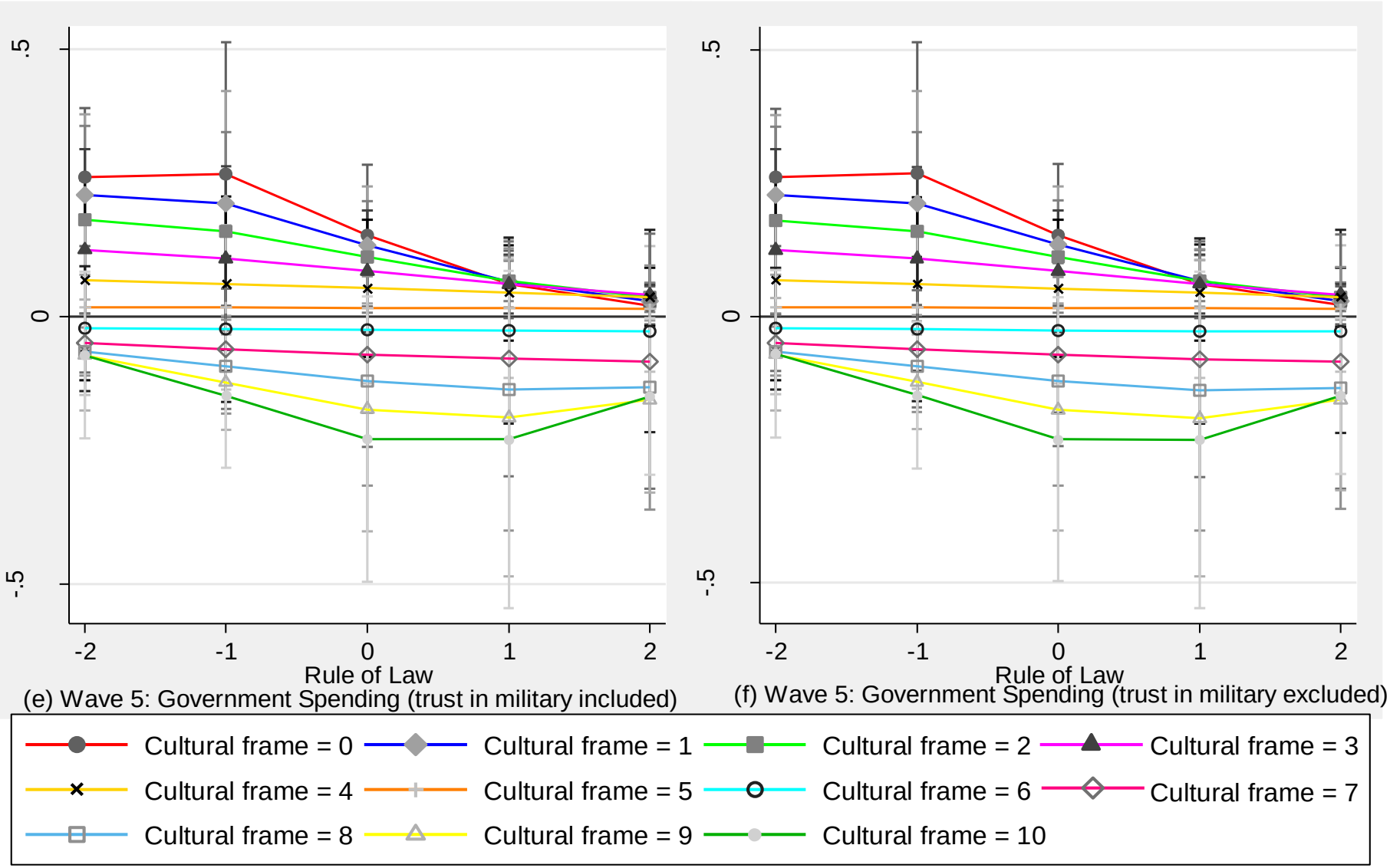
Notes:

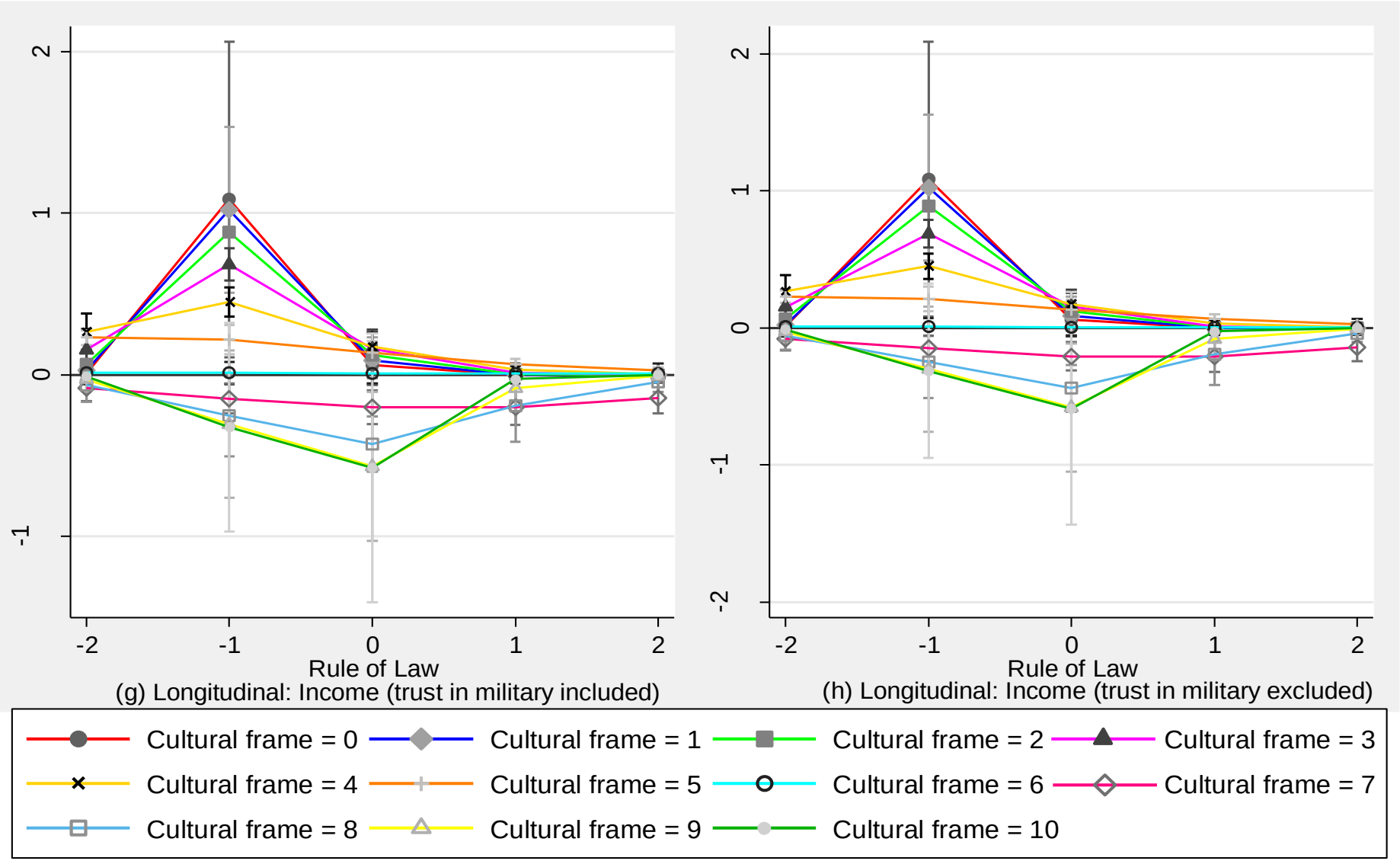
1) Standard errors in parentheses. *p< 0.1, **p< 0.05, ***p< 0.01.
2) The dependent variable is an individual's willingness-to-pay through the respective payment vehicles specified for each column and is expressed as a dummy variable: coded 1 for "agree" and "strongly agree"; 0 for "disagree" and "strongly disagree".

Figure 5. Marginal effects of the interaction between a country's rule of law and its cultural frame for all three payment vehicles in wave 5 and longitudinal datasets.



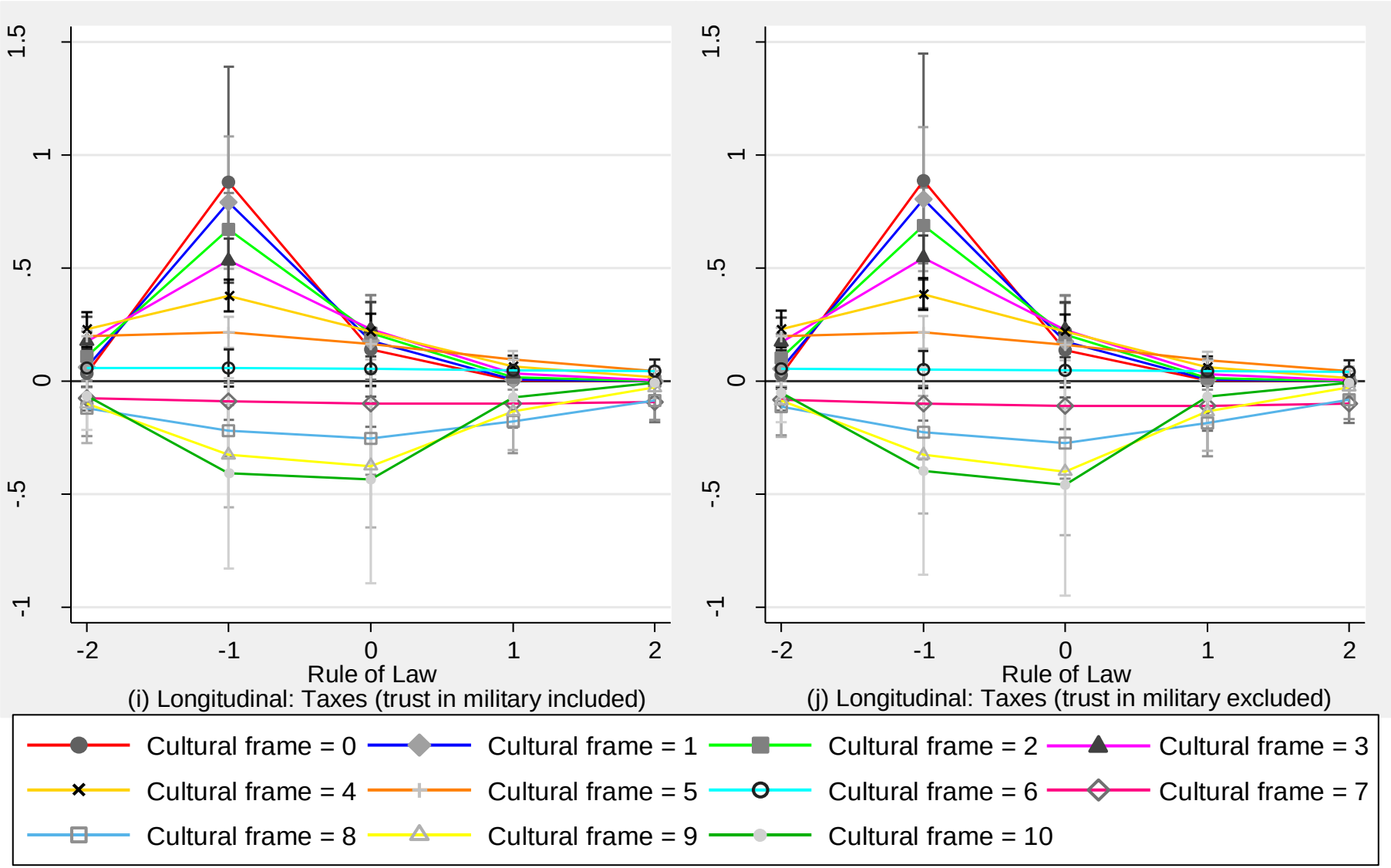

.4
.2
0
-.2
-.4
-2
-1
0
1
2
Rule of Law
(c) Wave 5: Taxes (trust in military included)
(d) Wave 5: Taxes (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10

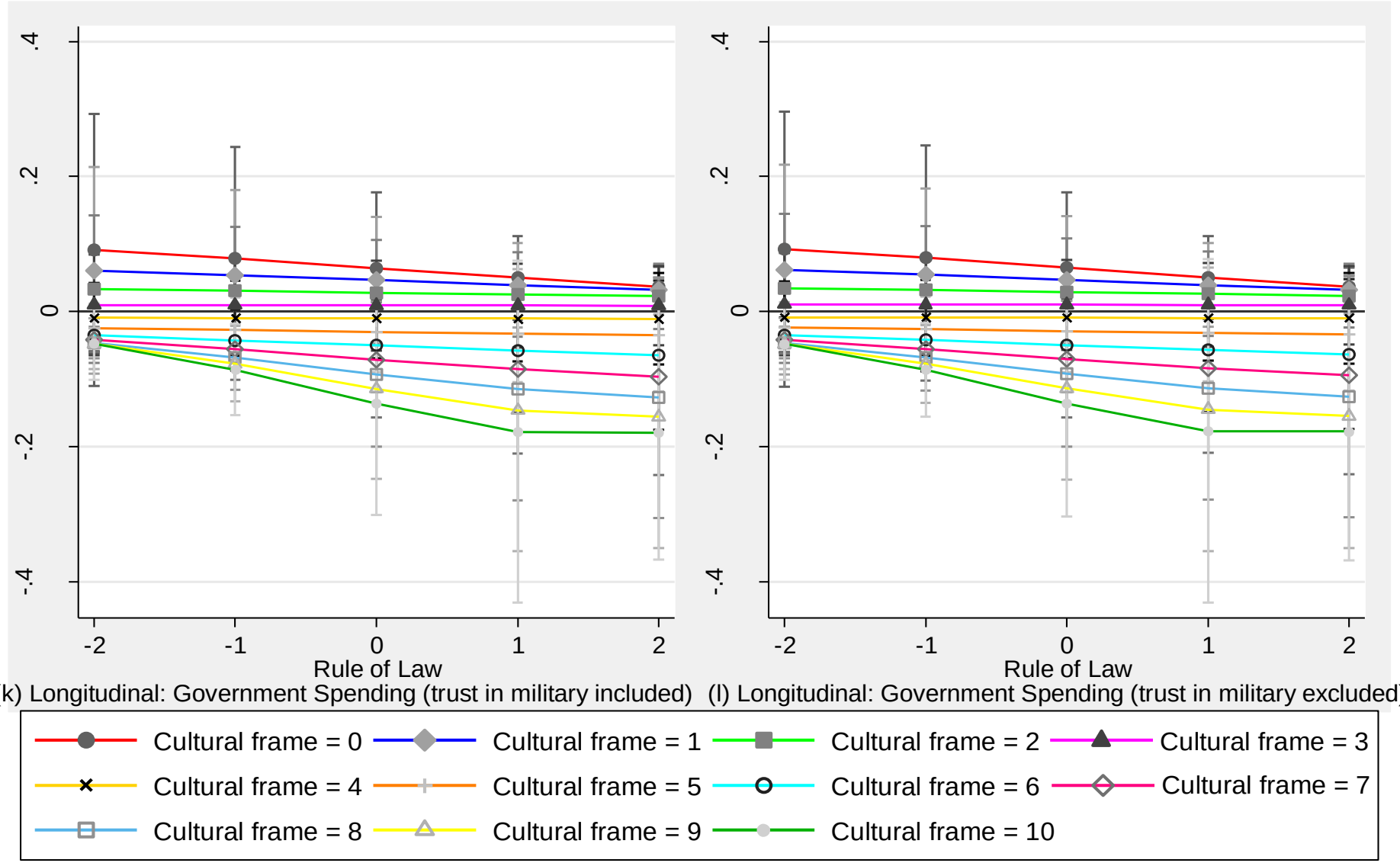

.5
0
-.5
-2
-1
0
1
2
Rule of Law
(e) Wave 5: Government Spending (trust in military included)
(f) Wave 5: Government Spending (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10



(g) Longitudinal: Income (trust in military included)

(h) Longitudinal: Income (trust in military excluded)


1.5
1
.5
0
-.5
-1
-2
-1
0
1
2
Rule of Law
(i) Longitudinal: Taxes (trust in military included)
(j) Longitudinal: Taxes (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10



(k) Longitudinal: Government Spending (trust in military included) (l) Longitudinal: Government Spending (trust in military excluded)

7.6 Description of results by levels of analysis

This section summarizes the results by the individual level followed by the country level, then to cross-level interaction effects. This allows for clearer illustration of how the results support or not Ostrom's two-level context, Yamagishi's arguments for assurance and cross-cultural psychologists recognition of culture's two-levels of analysis by utilizing both micro contextual or individual level variables and macro contextual or country level variables, and their interactions between these two groups of variables.

7.6.1 Individual level, i.e. micro contextual, variables

At the individual level or micro context, among the most noteworthy observations is that cultural orientation (see odds ratios for *Cultural orientation* in Table 3) appears not to exhibit an impact on one's environmental WTP. This weakens the arguments of cross-cultural psychologists such as Hofstede, Triandis and Schwartz who advance arguments for the role of culture in social phenomena conceived in terms of individualistic (or idiocentric) and collectivistic (or allocentric) cultural orientations that informs Hypothesis 1. Other arguments doubted include those which employ individualism-collectivism to explain individuals' pro-environmental behaviors such as Turkyilmaz, Uslu and Durmus, and Cho et al, as well as Yoon who study political attitudes and behavior. The exception is government spending which does not require individuals' monetary contributions in the longitudinal analysis. Thus, I speculate that problems with the question that measures individuals' attitudes to free-ride on government spending may explain this anomaly. That such anomalies appear only for government spending in the longitudinal analysis and *not* in the wave 5 analysis shows that time duration of the analysis may be another factor explaining this anomaly.

Individuals' trust in strangers and institutions are two other individual level variables that demonstrate statistical significance that is consistent with expectations of theory. One's trust in strangers in the wave 5 analysis, or others in general in the longitudinal analysis (see odds ratios for *Trust in strangers* in Table 3) exhibits the expected direction of impact on one's WTP for all three payment vehicles. The higher one's trust in unfamiliar others, the greater the willingness to pay for environmental conservation and the lower the willingness to free-ride on government spending without personal contribution; this observation is consistent for both wave 5 and longitudinal analyses regardless whether one's trust in the military as an institution is included or not. This seems to be consistent with Ostrom's and Yamagishi's arguments for the role of trust in collective action, as well as Yamagishi's contention that one's perception of other members of his/her in-group on whether they share the same beliefs towards how they should treat others in the in-group matters, such as through reciprocity. However, not all is apparent as the effect of one's trust in (general) others is mediated by the impact of rule of law at the country level as demonstrated by the marginal effects of the interaction between these two variables (see section 7.4 on Hypothesis 3 above). This evidence shows the impact of a cross-level interaction effect between trust in others at the individual level and rule of law at the country level. Such a result supports Ostrom's and Yamagishi's arguments for the distinction between *trust* and *assurance* (elaborated below). Cultural frame also needs to be accounted for in its interaction with one's trust in others (elaborated below). The bottomline is that effects of one's trust in strangers cannot be interpreted on its own when it interacts with other independent variables.

Results are similar between one's trust in institutions (see odds ratios for *Trust in governing institutions* in Table 3) and one's trust in others (see above). Odds ratios for one's trust in institutions move in the expected direction consistent with theoretical predictions. The greater one's trust in governing institutions, the more likely one is willing to pay via voluntary income payments and mandatory taxes and the less likely one will free-ride on government spending without contributing his or her own money; this observation holds for both wave 5 and longitudinal analyses irrespective whether one's trust in the military is included or not. Such a result seems to lend support to environmental economists such as Blamey and colleagues who argue that individuals' perception of the trustworthiness of the governing institutions matter when individuals assess how competent these institutions are in managing monies collected from voluntary income donation and compulsory taxation payment vehicles. This supports Ostrom and Yamagishi who argue for the importance of the legitimacy of working and/or formal rules to individuals in a group such as the country. Nevertheless, observations drawn from interaction effects between one's trust in institutions and a country's rule of law show that the effects of one's trust in institutions cannot be interpreted alone; interaction effects must be accounted for. Similar arguments can be made to support the study of interaction effects between one's trust in institutions and cultural frame (see below) as Schwartz and colleagues (see Devos et al, 2002: 488, 492) have made. Likewise, as with trust in strangers aforementioned, it remains premature to interpret the effects of trust in institutions on its own when it interacts with other factors.

7.6.2 Country level, i.e. macro contextual, variables

At the country level or macro context, the most notable observation is the impact of the rule of law. However, rule of law *per* se seems to exhibit contradictory impacts when comparing the odds

ratios between wave 5 and longitudinal analyses (see odds ratios for *Rule of law* in Table 3 above). The impact of the rule of law is statistically *insignificant* for all three payment vehicles in the wave 5 analysis (see Table 3, columns 1 to 6). However, rule of law exerts statistically *significant* impacts for voluntary income payments and compulsory taxes (see Table 3, see columns 7 to 10) though statistically *insignificant* for government spending (see Table 3, columns 11 and 12). Moreover, rule of law seems to exhibit contradictory impacts when comparing the odds ratios between the two analyses. The odds ratios are *less than one* for income payments and taxes (see Table 3, columns 1 to 4) suggesting one's *lower* willingness to pay as rule of law *increases* in wave 5 analysis, but are more than one for the longitudinal analysis suggesting a *higher* willingness to pay as rule of law *increases*. Odds ratios of *more than one* for government spending in the wave 5 analysis means that individuals are *more* likely to free-ride on government spending (see Table 3, columns 5 and 6) as a country's rule of law *improves* but odds ratios of *less than one* in the longitudinal analysis means that one is *less* likely to free-ride on government spending as rule of law quality *improves* (see Table 3, columns 11 and 12). These observations may seem minor, however, as the impact of rule of law is statistically insignificant in the wave 5 analysis. Thus, by focusing just on the statistically significant results for rule of law *per se* in the longitudinal analysis as with Hypothesis 3, the observation is that as the quality of a country's rule of law improves, the more likely an individual is willing to pay via income payments and/or taxes. These results support Ostrom's macro-institutional structure and Yamagishi's formal and informal rules of monitoring and sanctioning individuals who violate in-group rules. Yet, support for rule of law is qualified because impact of a country's rule of law interacts with one's trust in strangers and institutions (see section 7.4 above). This interaction effect is an example of a cross-level interaction effect, its importance which will be elaborated below. Suffice to say at this moment that results for rule of

law serves ultimately to show support for Ostrom's two-level context as well as Yamagishi's argument that CXN problems such as environmental resource management resemble more assurance of others' contributions rather than simply trust in others' contributions as punishment obviates the need for trust.

The impact of the rule of law per se, moreover, should *not* be interpreted independent of other variables when it interacts with cultural frame (see below). The impacts of cultural frame *per se* (see odds ratios for *Cultural frame* in Table 3) on one's WTP are in the expected direction for income payments (see columns 1 and 2, 7 and 8) and taxation (see columns 3 and 4, 9 and 10) for both wave 5 and longitudinal analyses, as odds ratios of less than one imply that one is less willing to pay as countries are more individualistic—and are statistically significant in the longitudinal analysis (columns 7 to 10) unlike those in the wave 5 analysis (columns 1 to 4). However, the efficacy of cultural frame to explain one's WTP is undercut by its interaction with rule of law, the results of this interaction effect which have been addressed above (see section 7.5 above). Results of this interaction effect suggest support for Yamagishi's arguments against the cross-cultural psychologists such as Triandis and Schwartz when comparing results between the wave 5 and longitudinal analyses. These results support Ostrom and Ahn's argument for legitimacy of rules rooted in the culture of the land and Bachmann's assumption that rule of law and cultural frame interact with one another as well as Sunstein's and Hickerson's arguments for expressiveness of WTP bids which reflect a country's 'culture' expressed through its institutions or systems of monitoring and punishment.

7.6.3 Cross-level interaction effects

One of the most important cross-level interaction effects examined here is that between an individual's trust in strangers and his/her country's rule of law. This interaction effect has been sounded out several times above and has been systematically examined in section 7.4 (see above). As noted in that section, the change in probability that one is willing to pay via income payments and taxes increases and change in probability that one will free ride on the government decreases as trust in strangers increases and rule of law increases. However, the marginal effects of this interaction are statistically significant only when rule of law is at 0, 1 and 2 across all payment vehicles for both wave 5 and longitudinal analyses. This interaction effect is important because its results support Yamagishi's argument for assurance over trust as punishment implemented at the group level such as at the national level through a country's rule of law interacts with one's trust in strangers on his/her WTP which demonstrates assurance, i.e. trust combined with punishment. Ostrom's two-level context is supported as well since the interaction effect involves a macro context or a country level variable which is a country's quality of rule of law, and a micro context or individual level variable which is one's trust in strangers. This result also suggests support for Ostrom's observation of the Southern California water basin project that legal courts can be used as a national forum for individuals to negotiate, craft and enforce rules at the national level in managing the environmental commons. As a micro context variable, one's trust in strangers captures not just the presence but also the strength of interpersonal relationships as well as the assumption that communication among actors occurs, especially among actors who demonstrate high trust in other unfamiliar actors and thus would presumably communicate more with these actors at the country level rather than those inside their immediate social circle.

Another cross-level interaction effect to note is that between an individual's trust in institutions and a country's rule of law. This interaction effect, too, has been systematically examined in section 7.4 (see above). As trust in institutions rises and rule of law improves, one's willingness to pay via income payments and taxes increases and willlingness to free-ride on the government decreases. While the rate of decrease in the probability that one is willing to pay is different when one's trust in military is included or not for both income payments and taxes, the broader conclusion suggests that some form of payment vehicle bias exists, especially for taxes which has revealed more statistically significant coefficients over a broader range of values of trust in institutions and rule of law in combination in contrast with income payments and government spending. Results from this interaction effect is consistent with Ostrom's (2000a; see also Powe, 2007: 28-30), and Blamey and colleagues' (see Blamey, 1998: 63-64; Morrison et al, 2000: 412, 421) arguments for the importance of payment vehicle bias. Such a result can be explained by one's *perception* of trust in governing institutions as the WVS measures using one's *confidence* in these institutions. Scholz and Lubell (1998: 411, 412; see also Farley et al, 2015: 249) maintain that whether citizens will meet their obligations to the country such as tax compliance is contingent not just on their trust in other citizens which has been addressed earlier (see above), but also whether political leaders honor their obligations to the citizenry—this citizen-leader dynamic which the interaction effect between one's trust in governing institutions and his/her country's rule of law seeks to capture. The interaction involving the rule of law is also explained in the context of an assurance game through the implementation and enforcement of working rules and/or formal laws to ensure that other parties and organisations fulfill their part of the 'policy bargain' in a 'fair' way, as Blamey (1998: 53) argues. Assurance manifests through individuals' need to trust in the government so that they do not feel that other individuals cheat them of their contributions by free-

riding (Blamey, 1998: 53-54). Results thus support Yamagishi's argument that the role of individuals' perceptions of the rule of law are important as their perceived trust, i.e. confidence, in these governing institutions is dependent on perceived rule of law of the country they reside in—a country's quality of rule of law measured based on perceptions as Kaufmann, Kraay and Mastruzzi (2010) operationalize. If these results hold, the worry is that perceptions of trust in governing institutions are held hostage to perceived improvements to or deterioration of rule of law that renders environmental WTP vulnerable to manipulation in the absence of any verifiable means to validate those perceived changes in the quality of a country's rule of law.

Another observation concerns the cross-level interaction effect between one's cultural orientation and his/her country's cultural frame on one' WTP. Hypothesis 2 suggests that amplification effects of culture can be observed on one's WTP if both cultural orientation and cultural frame are aligned—that is, an individual's idiocentric cultural orientation is aligned with his/her country's individualistic cultural frame, or one's allocentric cultural orientation is aligned with his/her country's collectivistic cultural frame. This prognosis has been advanced most notably by Yoon, but also by Triandis and colleagues as well as Schwartz. An analysis of the marginal effects of this interaction term suggests that Hypothesis 2 is largely unsupported (see section 7.3 above). The notable conclusion drawn from an analysis of this interaction effect seems to suggest that arguments for postmaterialist values as Inglehart and colleagues argue are doubtful. This is supported by an examination of the changes in probability of free-riding on government spending which seems to be statistically significant only for the longitudinal analysis; marginal effects remain statistically insignificant for all other payment vehicles in both wave 5 and longitudinal analyses including government spending in the wave 5 analysis. Even if the results on free-riding

on government spending are worthy of note, that the marginal effects are significant only for collectivist cultural frames and not individualist cultural frames limits the significance of Hypothesis 2; an individual is *more likely* to free-ride on the government as the country becomes *less collectivistic* but only up to the point when the country is borderline collectivistic (cultural frame = 5). Nevertheless, this constrained conclusion is consistent with environmental economists with respect to the possibility of free-riding (e.g. Hanley, Shogren and White) and cross-cultural psychologists such as Triandis (see Triandis and Suh, 2002: 146) who argue that idiocentric actors are more likely to free-ride on others' contributions to public goods, which is exacerbated all the more so by a country's individualistic cultural frame. Still, similarity in the results between Hypotheses 1 and 2 which show that marginal effects of their respective interaction terms are statistically significant only for government spending in the longitudinal analysis suggest that these results can be dismissed due to problems with the government spending question as mentioned earlier.

Two final observations must be made before this section on cross-level interaction effects can conclude. The interaction effects between an individual's trust in strangers and institutions on the one hand, and cultural frame of a country on the other hand, ought to be analyzed. While these two interaction effects have not been represented by any hypothesis above, they are important not only because these are also cross-level interaction effects that ought to be analyzed. More than that, counterintuitive findings have been observed from the results of these interaction effects, i.e. that their marginal effects move in the direction that is contrary to the expectations of cross-cultural psychologists such as Hofstede, Triandis and Schwartz. These two interaction effects shall be analyzed separately below.

Results from the interaction effect between one's trust in strangers and cultural frame of a country show that its marginal effects are contrary to what cross-cultural psychologists anticipate (see Table 9 below). For example, the marginal effects of this interaction effect on the change in probability that an individual is willing to pay is *positive* for income payments (see Table 9, columns 1, 2, 7, and 8) and taxes (Table 9, columns 3, 4, 9 and 10) for both wave 5 and longitudinal analyses as his/her trust in strangers increases and his/her country's cultural frame becomes more individualistic. Cross-cultural psychologists would predict the opposite; that is, they argue that change in probability should be *negative* as trust in strangers increases and cultural frame becomes more collectivistic which promotes in-group cooperation. For government spending, the marginal effects are *negative*, i.e. change in the probability of free-riding on government spending *reduces* as individuals trust out-group members (i.e. strangers) *more* and is *more negative* as a country becomes *more individualistic* (see Table 9, columns 5, 6, 11 and 12). Cross-cultural psychologists such as Hofstede (2001b: 239) would argue otherwise that it is a *more collectivistic* country that should see individuals in that country *more willing* to pay and *less willing* to free ride on government spending if individuals trust other strangers in a country more since a collectivistic society should 'naturally' encourage trusting one another to cooperate on a group enterprise such as environmental conservation. By examining the coefficients which are statistically significant, results suggest that effects are statistically significant mostly for cultural frames ranging from 1 to 9 for all three payment vehicles in the wave 5 dataset (Table 9, columns 1 to 6), and for cultural frames ranging from 4 to 7 for all three payment vehicles in the longitudinal dataset (Table 9, columns 7 to 12). For income payments, the increase in probability of WTP ranges from 0.049 to 0.093 when trust in military is included (see Table 9, column 1) and from 0.049 to 0.095 when

trust in military is excluded (see Table 9, column 2) in the wave 5 analysis; for the longitudinal analysis, the increase in probability of WTP ranges from 0.006 to 0.040 when trust in military is included (see Table 9, column 7), and from 0.006 to 0.040 when trust in military is excluded (see Table 9, column 8). For taxes, the increase in probability of WTP ranges from 0.061 to 0.075 when trust in military is included (see Table 9, column 3), and from 0.061 to 0.077 when trust in military is excluded (see Table 9, column 4) in the wave 5 analysis; for longitudinal analysis, the increase in probability of WTP is from 0.008 to 0.035 when trust in military is included (see Table 9, column 9), and from 0.008 to 0.033 when trust in military is excluded (see Table 9, column 10). Decreases in probability of free-riding range from 0.020 to 0.098 when trust in military is included (see Table 9, column 5), and from 0.020 to 0.098 when trust in military is excluded (see Table 9, column 6) in the wave 5 analysis; for longitudinal analysis, decreases in free-riding range from 0.027 to 0.066 when trust in military is included (see Table 9, column 11), and from 0.031 to 0.064 when trust in military is excluded (see Table 9, column 12).

Figure 6 below illustrates the above results for the statistically significant marginal effects mentioned above. Focusing on income payments (Figure 6 (a) and (b)) and taxes (Figure 6 (c) and (d)) in the wave 5 analysis, there are two commonalities. Firstly, marginal effects are positive for values of cultural frame ranging from 1 to 9 as their curves lie above the value of zero. Secondly, all these curves have an 'inflection' point. That is, this is the point at which increments in the probability of WTP is higher for higher values of cultural frame after this particular value of one's trust in strangers. The 'inflection' point seems to be when one's trust in strangers is at 3 for income payments (Figure 6 (a) and (b)), while the 'inflection' point for taxes seems to be when one's trust in strangers is at 2 (Figure 6 (c) and (d)); the greatest increase in probability of WTP tends to be

for the higher values of cultural frame for both income and tax payment vehicles in the wave 5 analysis. This 'inflection' point is not observed for government spending in the wave 5 analysis though which seems to show a proportionate decrease in one's willingness to free ride on government spending as one's trust in strangers increases, the greatest decrease being when a country is most individualistic at cultural frame of 10 (see Figure 6 (e) and (f)). On the other hand, a proportionate increase in probability of WTP and decrease in free-riding is observed for all three payment vehicles in the longitudinal analyses. Increase in probability of one's WTP seems to be greater as one' trust in strangers increases, the highest values when cultural frame is at 7 (pink line) which is individualistic for both income payments (see Figure 6 (g) and (h)) and taxes (see Figure 6 (i) and (j)). This trend of proportionate changes in probability is also seen for government spending in the longitudinal analysis (see Figure 6 (k) and (l)), where the rate of reduction in probability of free-riding on government spending decreases constantly (i.e. negative values but on a straight downward sloping curve) as one's trust in strangers increases with the greatest reductions occurring when cultural frame is at 8 (sky blue line) which is indivdualistic.

The statistical significance of the above results suggests a need for an alternative explanation to those of the cross-cultural psychologists. Yamagishi may be better able to explain these results. Yamagishi (2011a: 255) points out how individualistic people are actually more trusting of strangers when he observes that Americans tend to elicit higher measures of general trust compared to Japanese respondents in their responses to the WVS questions (see also Chapter 6). Yamagishi (1988a: 539-540; 1998: 167; 2003: 356-357) also observes through his earlier experiments that American participants are less likely to exit from groups of their compatriots with free-riders than Japanese participants when exit costs are raised. This has led Ahn and Ostrom (2008: 76) to

describe Yamagishi's conception of trust as based on one's beliefs in others' "pure motivations" or good intentions rather than on any calculated incentive where cooperation is concerned as mentioned above when explaining the results for the interaction effect between rule of law of a country and its cultural frame (see section 7.5 above). An individualistic environment, Yamagishi observes, is thus ironically more conducive to trusting out-group members as individuals gain the skills to trust others and discern those who are trustworthy from those who are less trustworthy and are more likely to cooperate with strangers in that regard. In fact, what makes a country 'individualistic' in Yamagishi's view is the absence of system of monitoring and punishment that is present in 'collectivistic' groups such as 'collectivistic' countries. If so, the lack of any punitive mechanism frees or 'emancipates' individuals to enable them to exercise their trust in out-group members based on "pure motivations" or their genuine intentions—in fact, these individuals are 'forced' to trust outsiders if they wish to cooperate with others when punitive mechanisms are absent to assure them of others' cooperation. Moreover, their 'emancipation' enables them to contribute to group efforts out of their own "pure motivations" reciprocating others' "pure motivations" in terms of the former's willingness to do a 'good deed' such as contributing to environmental conservation as such willingness has not been 'crowded out' or suffocated by punitive mechanisms that compel such contributions as Yamagishi (1988a: 534-535; Yamagishi and Yamagishi, 1994: 137; Yamagishi et al, 1998a: 190), environmental economists such as Shogren (2012: 355-356) and their critics (e.g. Gowdy, 2008: 635) note. Yamagishi (2011b) has crystallized this phenomenon of emancipation into his theory known as "The Emancipation Theory of Trust" whereby a collectivistic society produces assurance or secure exchanges among individuals but ironically undermines interprersonal trust; this theory has been further supported by other scholars who test his propoposition across 31 countries (e.g. Gheorghiu et al, 2009).

Table 9. Marginal effects of interaction between an individual's trust in strangers and his/her country's cultural frame for both wave 5 and longitudinal datasets of the World Values Survey.

Dataset		**Wave 5**						**Longitudinal**					
Values of independent variables		**Direct income payments**		**Taxation**		**Government spending**		**Direct income payments**		**Taxation**		**Government spending**	
Trust in others	**Cultu -ral Frame**	**Includes trust in military (1)**	**Excludes trust in military (2)**	**Includes trust in military (3)**	**Excludes trust in military (4)**	**Includes trust in military (5)**	**Excludes trust in military (6)**	**Includes trust in military (7)**	**Excludes trust in military (8)**	**Includes trust in military (9)**	**Excludes trust in military (10)**	**Includes trust in military (11)**	**Excludes trust in military (12)**
0	**0**							0.000 (0.000)	0.000 (0.000)	0.002 (0.002)	0.001 (0.002)	-0.012 (0.027)	-0.011 (0.027)
0	**1**							0.000 (0.001)	0.000 (0.001)	0.003 (0.003)	0.003 (0.002)	-0.016 (0.023)	-0.016 (0.023)
0	**2**							0.001 (0.001)	0.001 (0.001)	0.005 (0.004)	0.005 (0.003)	-0.021 (0.018)	-0.021 (0.018)
0	**3**							0.003 (0.002)	0.003 (0.002)	0.009** (0.005)	0.009** (0.004)	-0.027** (0.014)	-0.026* (0.014)
0	**4**							0.007** (0.003)	0.007** (0.003)	0.015*** (0.005)	0.015*** (0.005)	-0.032*** (0.010)	-0.031*** (0.010)

0	**5**							0.016***	0.016***	0.024***	0.023***	-0.038***	-0.037***
								(0.005)	(0.005)	(0.006)	(0.006)	(0.009)	(0.009)
0	**6**							0.030***	0.029***	0.031***	0.030***	-0.045***	-0.043***
								(0.010)	(0.010)	(0.010)	(0.010)	(0.013)	(0.013)
0	**7**							0.040***	0.040***	0.035**	0.033**	-0.051***	-0.050***
								(0.015)	(0.015)	(0.015)	(0.015)	(0.019)	(0.019)
0	**8**							0.037*	0.036*	0.031*	0.029	-0.058**	-0.056**
								(0.020)	(0.020)	(0.019)	(0.019)	(0.026)	(0.026)
0	**9**							0.024	0.023	0.023	0.021	-0.065*	-0.063*
								(0.021)	(0.021)	(0.019)	(0.019)	(0.034)	(0.034)
0	**10**							0.013	0.012	0.014	0.013	-0.072*	-0.070
								(0.015)	(0.015)	(0.017)	(0.016)	(0.043)	(0.043)
1	**0**	0.095*	0.096*	0.075**	0.077**	-0.005	-0.005	0.000	0.000	0.001	0.001	-0.012	-0.012
		(0.050)	(0.051)	(0.038)	(0.038)	(0.014)	(0.014)	(0.000)	(0.000)	(0.001)	(0.001)	(0.030)	(0.030)
1	**1**	0.093**	0.095**	0.075**	0.077**	-0.009	-0.009	0.000	0.000	0.002	0.002	-0.017	-0.017
		(0.040)	(0.040)	(0.030)	(0.030)	(0.012)	(0.012)	(0.000)	(0.000)	(0.002)	(0.002)	(0.026)	(0.026)
1	**2**	0.091***	0.092***	0.075***	0.076***	-0.014	-0.014	0.001	0.001	0.005	0.004	-0.023	-0.022
		(0.029)	(0.029)	(0.022)	(0.023)	(0.011)	(0.011)	(0.001)	(0.001)	(0.003)	(0.003)	(0.021)	(0.021)
1	**3**	0.089***	0.090***	0.075***	0.076***	-0.020**	-0.020**	0.002	0.002	0.008**	0.008**	-0.029*	-0.028*
		(0.020)	(0.020)	(0.016)	(0.016)	(0.008)	(0.008)	(0.002)	(0.002)	(0.004)	(0.004)	(0.016)	(0.016)

1	**4**	0.086*** (0.014)	0.086*** (0.013)	0.074*** (0.011)	0.075*** (0.011)	-0.027*** (0.006)	-0.027*** (0.006)	0.006** (0.003)	0.006** (0.003)	0.014*** (0.004)	0.013*** (0.004)	-0.036*** (0.011)	-0.035*** (0.011)
1	**5**	0.082*** (0.013)	0.082*** (0.012)	0.074*** (0.010)	0.074*** (0.010)	-0.035*** (0.007)	-0.035*** (0.007)	0.014*** (0.005)	0.014*** (0.004)	0.022*** (0.005)	0.021*** (0.005)	-0.043*** (0.011)	-0.042*** (0.011)
1	**6**	0.079*** (0.018)	0.078*** (0.017)	0.073*** (0.014)	0.073*** (0.014)	-0.045*** (0.011)	-0.044*** (0.011)	0.028*** (0.009)	0.027*** (0.009)	0.030*** (0.009)	0.029*** (0.009)	-0.050*** (0.015)	-0.049*** (0.015)
1	**7**	0.074*** (0.025)	0.073*** (0.025)	0.073*** (0.020)	0.072*** (0.020)	-0.055*** (0.017)	-0.055*** (0.018)	0.040*** (0.015)	0.039*** (0.015)	0.034** (0.014)	0.033** (0.015)	-0.058** (0.023)	-0.056** (0.023)
1	**8**	0.070** (0.033)	0.068** (0.032)	0.072*** (0.026)	0.070*** (0.027)	-0.066*** (0.025)	-0.066*** (0.025)	0.039* (0.021)	0.038* (0.021)	0.032 (0.020)	0.030 (0.020)	-0.066** (0.032)	-0.064** (0.032)
1	**9**	0.065 (0.040)	0.063 (0.040)	0.071** (0.033)	0.069** (0.033)	-0.078** (0.034)	-0.077** (0.034)	0.028 (0.024)	0.027 (0.023)	0.024 (0.022)	0.022 (0.022)	-0.074* (0.042)	-0.072* (0.042)
1	**10**	0.060 (0.048)	0.057 (0.047)	0.070* (0.039)	0.068* (0.040)	-0.090** (0.043)	-0.089** (0.043)	0.015 (0.019)	0.015 (0.018)	0.016 (0.019)	0.014 (0.019)	-0.083 (0.053)	-0.080 (0.053)
2	**0**	0.081** (0.044)	0.082* (0.044)	0.073* (0.038)	0.075** (0.038)	-0.005 (0.015)	-0.005 (0.015)						
2	**1**	0.082** (0.036)	0.083** (0.035)	0.073** (0.030)	0.075** (0.030)	-0.010 (0.014)	-0.010 (0.014)						
2	**2**	0.082*** (0.027)	0.083*** (0.027)	0.074*** (0.023)	0.075*** (0.023)	-0.016 (0.013)	-0.015 (0.013)						

2	**3**	0.081*** (0.019)	0.082*** (0.019)	0.074*** (0.016)	0.075*** (0.016)	-0.022** (0.010)	-0.022** (0.010)						
2	**4**	0.080*** (0.013)	0.081*** (0.013)	0.074*** (0.011)	0.075*** (0.011)	-0.031*** (0.008)	-0.031*** (0.008)						
2	**5**	0.079*** (0.012)	0.079*** (0.012)	0.074*** (0.010)	0.074*** (0.011)	-0.040*** (0.009)	-0.040*** (0.009)						
2	**6**	0.076*** (0.018)	0.076*** (0.017)	0.074*** (0.015)	0.074*** (0.015)	-0.051*** (0.014)	-0.051*** (0.014)						
2	**7**	0.073*** (0.025)	0.073*** (0.025)	0.074*** (0.022)	0.073*** (0.022)	-0.063*** (0.021)	-0.062*** (0.021)						
2	**8**	0.070** (0.034)	0.069** (0.034)	0.074** (0.029)	0.073** (0.029)	-0.075** (0.030)	-0.074** (0.030)						
2	**9**	0.066 (0.043)	0.064 (0.042)	0.074** (0.036)	0.072** (0.036)	-0.086** (0.039)	-0.086** (0.039)						
2	**10**	0.062 (0.051)	0.059 (0.051)	0.074* (0.043)	0.071 (0.044)	-0.098** (0.048)	-0.097** (0.048)						
3	**0**	0.065* (0.034)	0.065* (0.034)	0.068** (0.034)	0.069** (0.034)	-0.006 (0.017)	-0.006 (0.017)						
3	**1**	0.067** (0.028)	0.067** (0.028)	0.069** (0.028)	0.070** (0.028)	-0.011 (0.016)	-0.011 (0.016)						

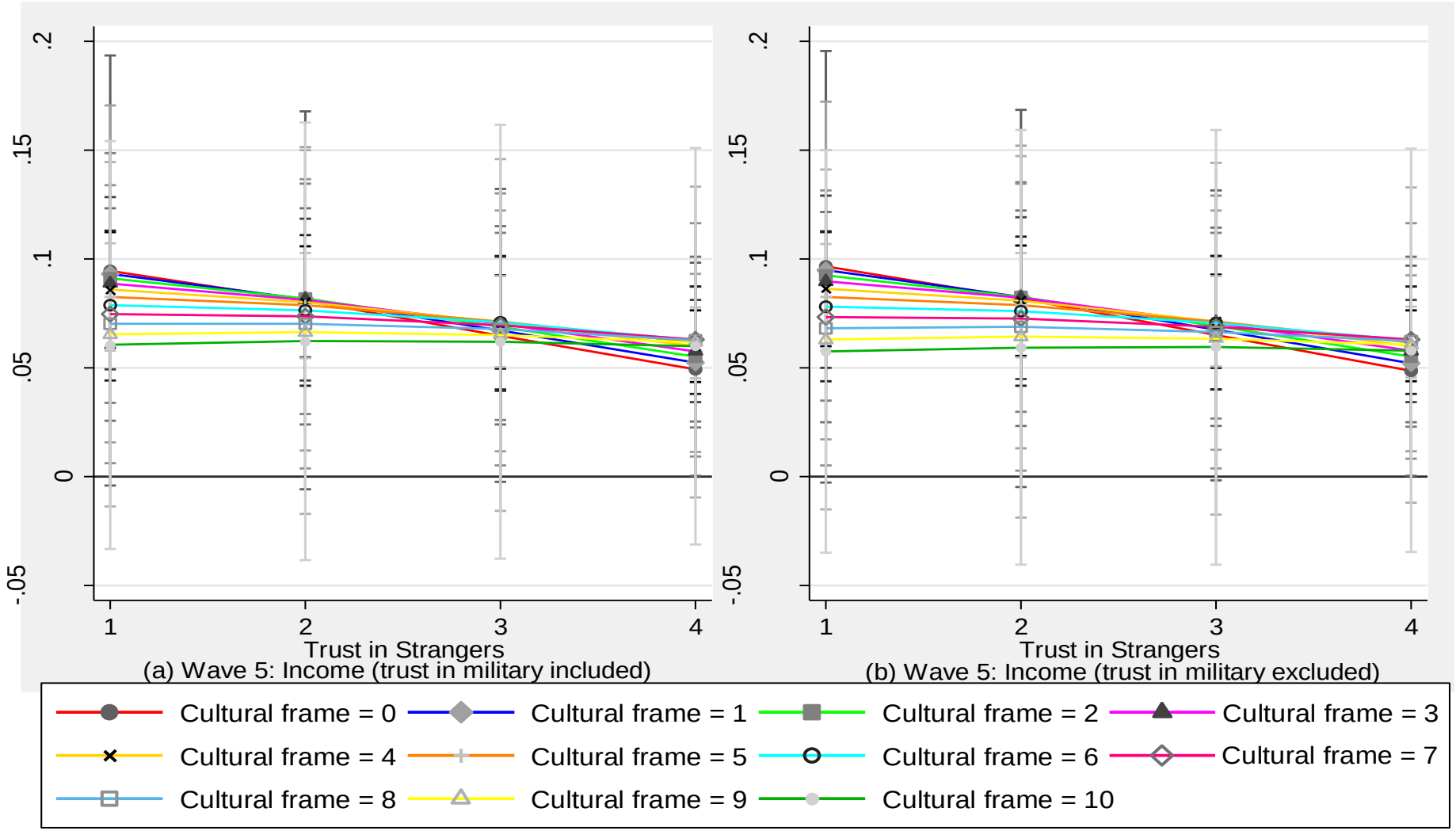
3	**2**	0.069*** (0.022)	0.069*** (0.022)	0.070*** (0.021)	0.071*** (0.021)	-0.017 (0.015)	-0.017 (0.015)						
3	**3**	0.070*** (0.016)	0.071*** (0.016)	0.070*** (0.015)	0.071*** (0.015)	-0.025** (0.012)	-0.025** (0.012)						
3	**4**	0.071*** (0.011)	0.071*** (0.011)	0.071*** (0.010)	0.071*** (0.010)	-0.034*** (0.010)	-0.034*** (0.010)						
3	**5**	0.071*** (0.011)	0.071*** (0.011)	0.072*** (0.010)	0.072*** (0.010)	-0.045*** (0.010)	-0.045*** (0.010)						
3	**6**	0.071*** (0.016)	0.071*** (0.016)	0.072*** (0.014)	0.072*** (0.014)	-0.057*** (0.016)	-0.057*** (0.016)						
3	**7**	0.069*** (0.023)	0.069*** (0.023)	0.073*** (0.021)	0.072*** (0.021)	-0.069*** (0.024)	-0.069*** (0.024)						
3	**8**	0.068** (0.032)	0.066** (0.032)	0.073*** (0.028)	0.072** (0.028)	-0.080** (0.033)	-0.080** (0.033)						
3	**9**	0.065 (0.041)	0.063 (0.041)	0.073** (0.036)	0.072** (0.036)	-0.091** (0.041)	-0.090** (0.041)						
3	**10**	0.062 (0.051)	0.059 (0.051)	0.074* (0.043)	0.071 (0.044)	-0.098** (0.048)	-0.098** (0.048)						
4	**0**	0.049** (0.025)	0.049** (0.025)	0.061** (0.028)	0.061** (0.028)	-0.006 (0.018)	-0.006 (0.018)						

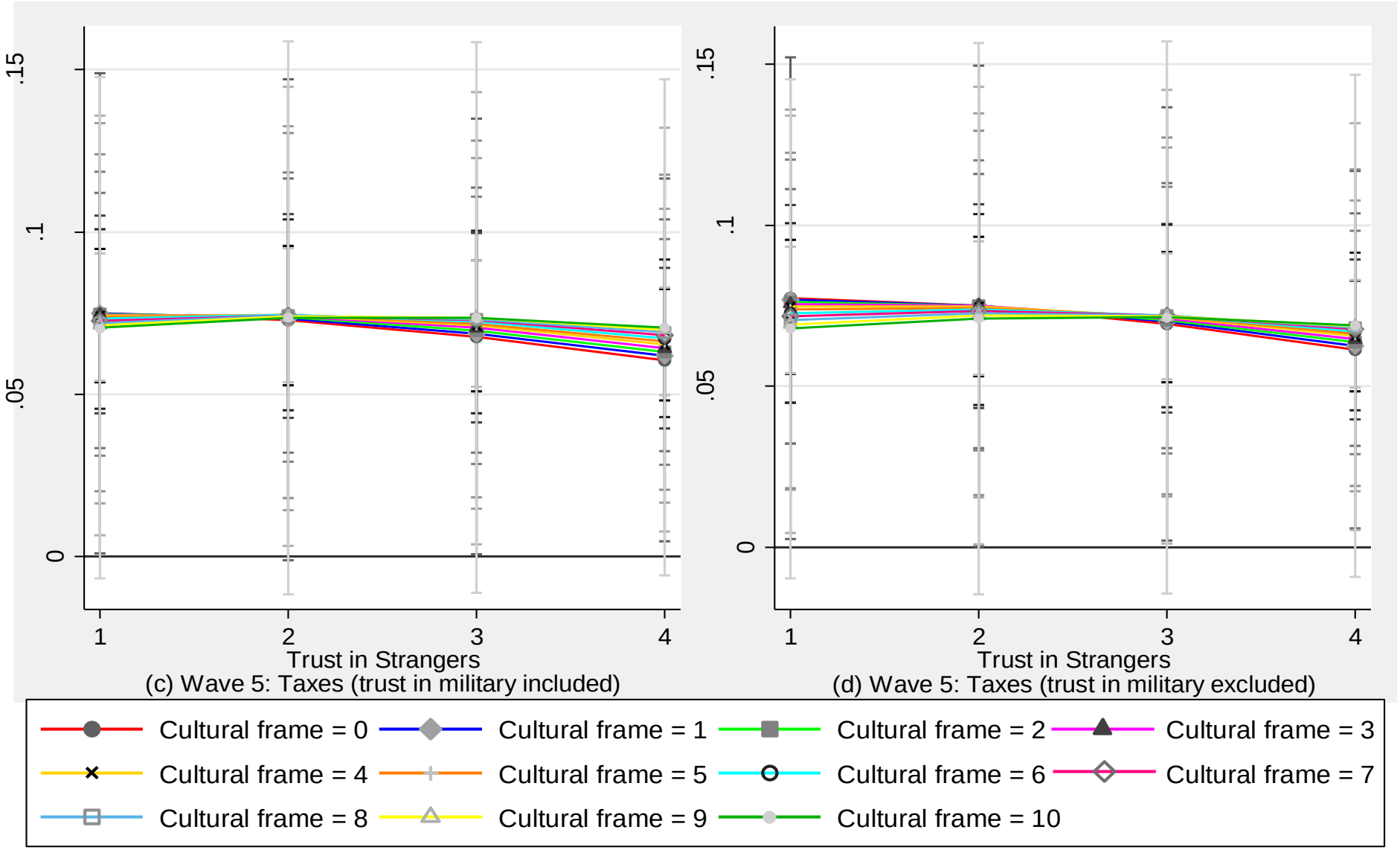
4	**1**	0.052**	0.052**	0.062***	0.063***	-0.011	-0.011						
		(0.021)	(0.021)	(0.023)	(0.023)	(0.018)	(0.018)						
4	**2**	0.055***	0.055***	0.063***	0.064***	-0.019	-0.018						
		(0.017)	(0.016)	(0.018)	(0.018)	(0.017)	(0.017)						
4	**3**	0.058***	0.058***	0.064***	0.065***	-0.027*	-0.027*						
		(0.012)	(0.012)	(0.013)	(0.013)	(0.014)	(0.014)						
4	**4**	0.060***	0.060***	0.065***	0.065***	-0.038***	-0.038***						
		(0.008)	(0.008)	(0.009)	(0.009)	(0.011)	(0.011)						
4	**5**	0.061***	0.062***	0.066***	0.066***	-0.050***	-0.049***						
		(0.008)	(0.008)	(0.008)	(0.009)	(0.012)	(0.012)						
4	**6**	0.063***	0.063***	0.067***	0.067***	-0.062***	-0.061***						
		(0.013)	(0.013)	(0.012)	(0.013)	(0.018)	(0.018)						
4	**7**	0.063***	0.063***	0.068***	0.068***	-0.073***	-0.072***						
		(0.019)	(0.019)	(0.018)	(0.018)	(0.025)	(0.025)						
4	**8**	0.063**	0.062**	0.069***	0.068***	-0.082**	-0.082**						
		(0.027)	(0.028)	(0.025)	(0.025)	(0.032)	(0.032)						
4	**9**	0.062*	0.060	0.070**	0.069**	-0.089**	-0.088**						
		(0.036)	(0.037)	(0.032)	(0.032)	(0.037)	(0.037)						
4	**10**	0.060	0.058	0.071*	0.069*	-0.092**	-0.092**						
		(0.046)	(0.047)	(0.039)	(0.040)	(0.042)	(0.043)						

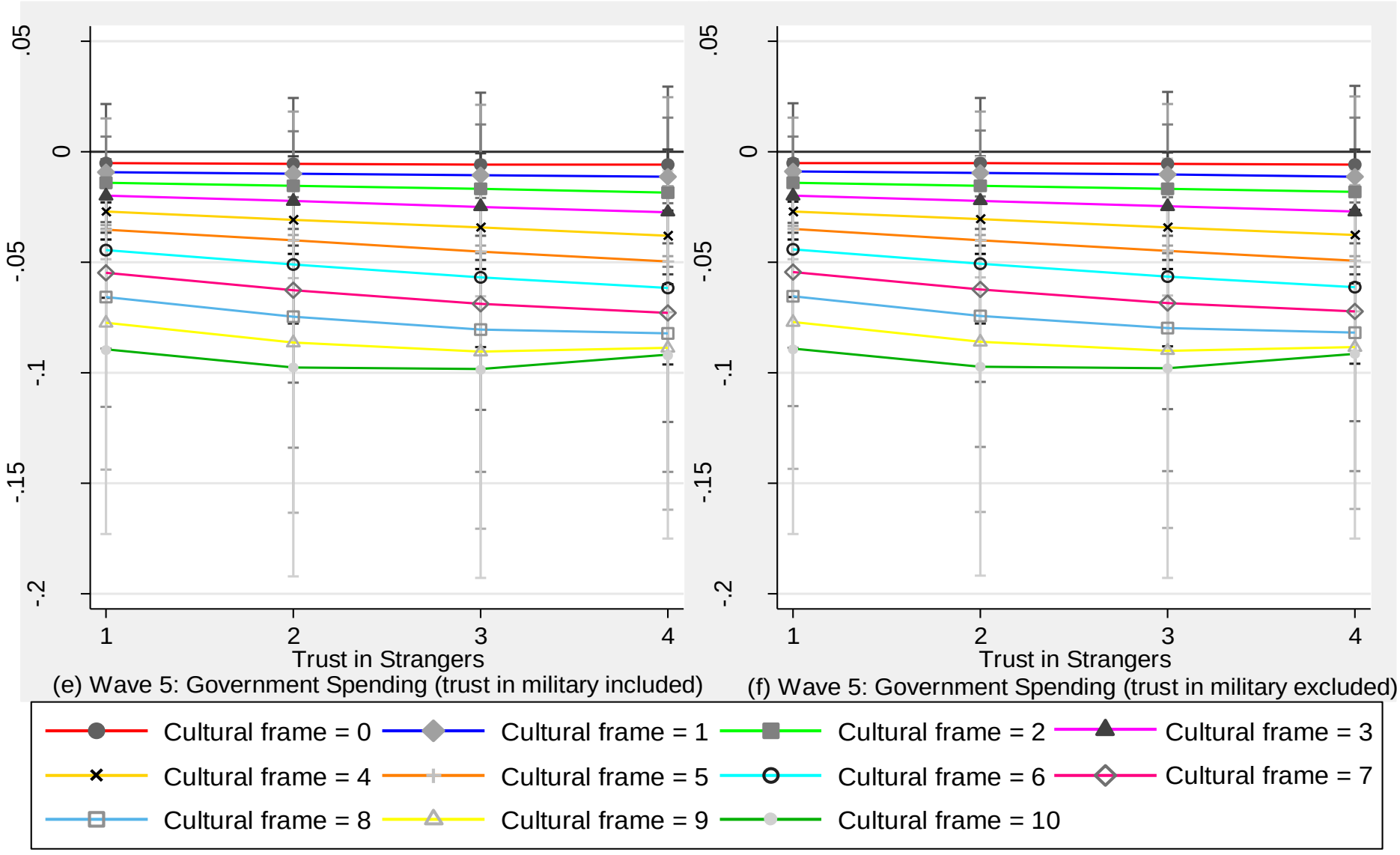
Notes:

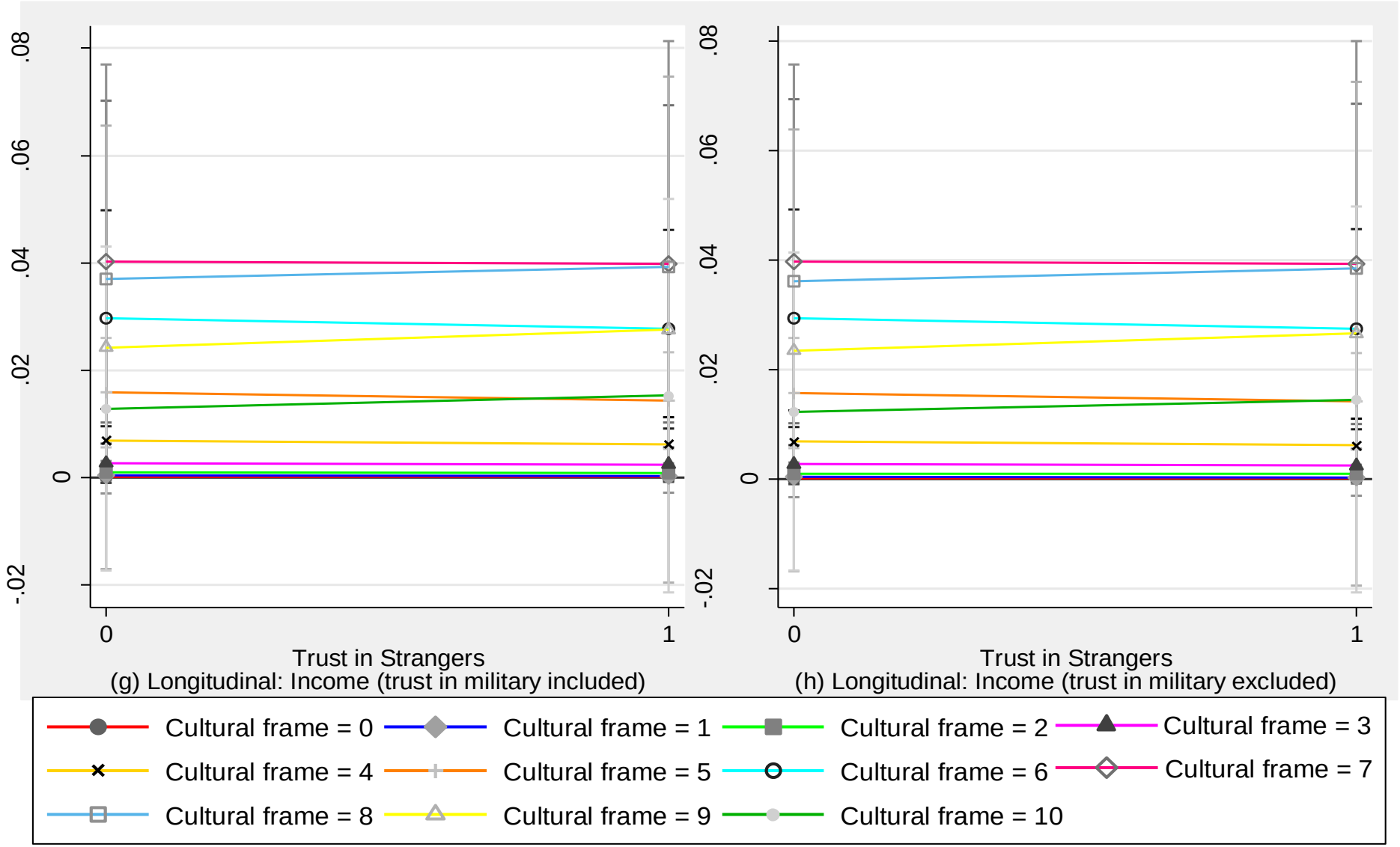
1) Standard errors in parentheses. *p< 0.1, **p< 0.05, ***p< 0.01.
2) The dependent variable is an individual's willingness-to-pay through the respective payment vehicles specified for each column and is expressed as a dummy variable: coded 1 for "agree" and "strongly agree"; 0 for "disagree" and "strongly disagree".

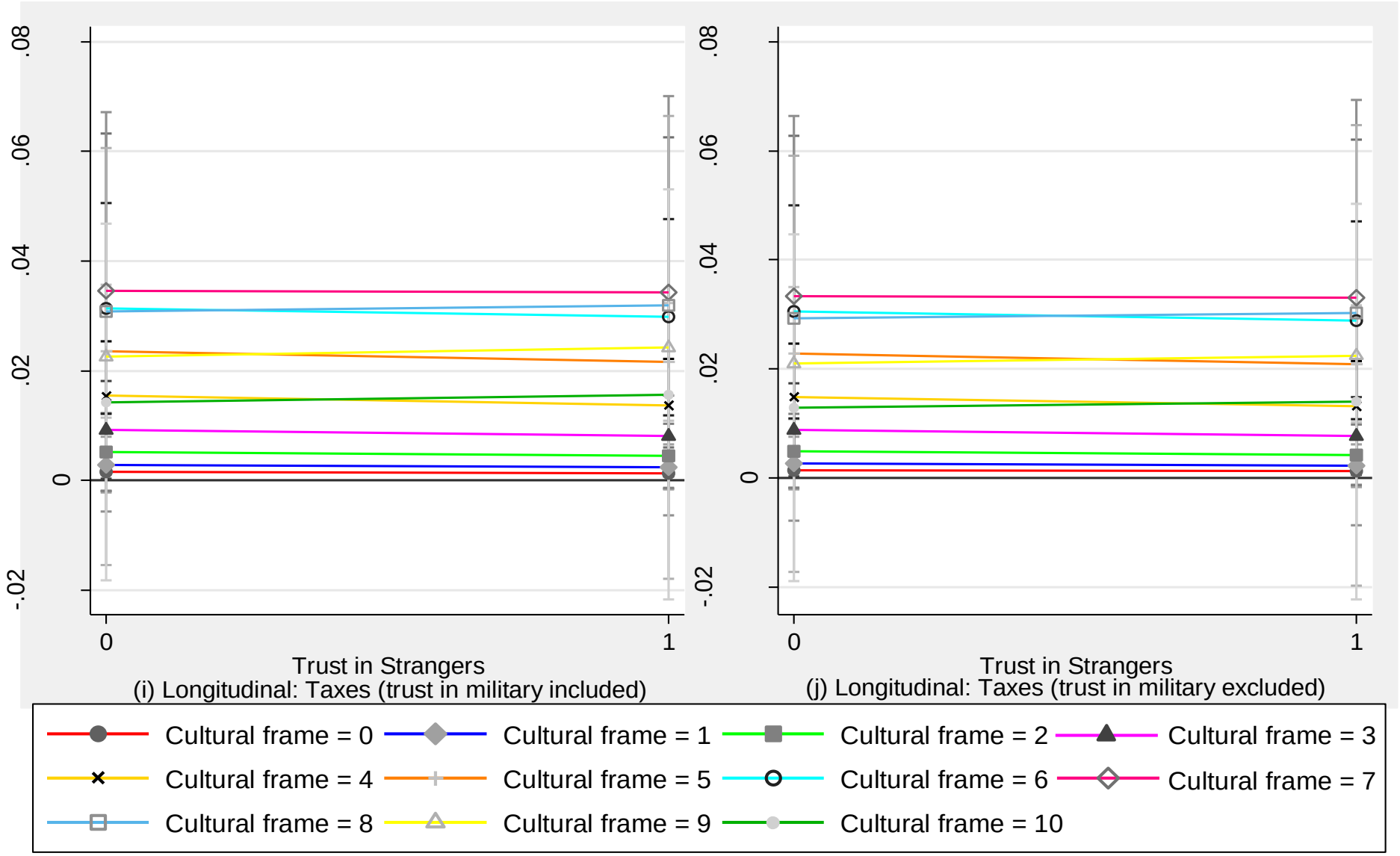
Figure 6. Marginal effects of the interaction between an individual's trust in strangers and his/her country's cultural frame for all three payment vehicles in wave 5 and longitudinal datasets.

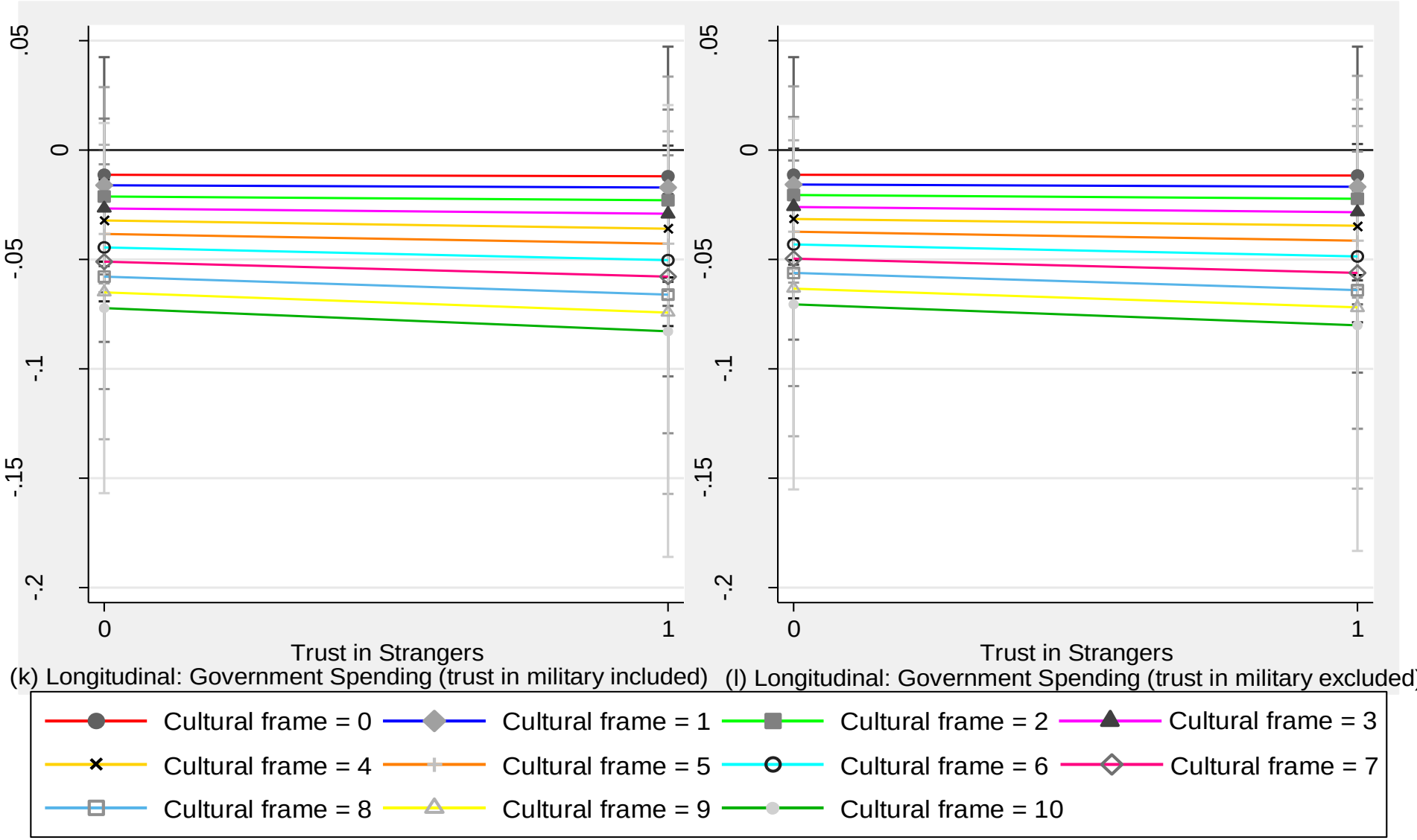



.15
.1
.05
0
1
2
3
4
Trust in Strangers
(c) Wave 5: Taxes (trust in military included)
.15
.1
.05
0
1
2
3
4
Trust in Strangers
(d) Wave 5: Taxes (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10


.05
0
-.05
-.1
-.15
-.2
1
2
3
4
Trust in Strangers
(e) Wave 5: Government Spending (trust in military included)
(f) Wave 5: Government Spending (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10


.08
.06
.04
.02
0
-.02
0
1
Trust in Strangers
(g) Longitudinal: Income (trust in military included)
(h) Longitudinal: Income (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10


.08
.06
.04
.02
0
-.02
0
1
Trust in Strangers
(i) Longitudinal: Taxes (trust in military included)
.08
.06
.04
.02
0
-.02
0
1
Trust in Strangers
(j) Longitudinal: Taxes (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10



(k) Longitudinal: Government Spending (trust in military included) (l) Longitudinal: Government Spending (trust in military excluded)

Results for the interaction between an individual's trust in institutions and cultural frame are similarly as counterintuitive as those for interaction between an individual's trust in strangers and cultural frame above. The former contradict what cross-cultural psychologists would expect as its marginal effects are in the opposing polarity (see Table 10 below). The marginal effects of this interaction effect is *positive* for income payments (Table 10, columns 1, 2, 7 and 8) and taxes (Table 10, columns 3, 4, 9 and 10) in both wave 5 and longitudinal analyses. These results mean that an individual is *more likely* to pay via direct income payments or taxes as his/her trust in institutions *increases* and cultural frame of a country is *increasingly individualistic*. This observation holds for statistically significant marginal effects for all values of one's trust in institutions which tend to occur when cultural frame ranges from 0 to 6 for income payments (Table 10, columns 1 and 2) and from 0 to 7 for taxes (Table 10, columns 3 and 4) in the wave 5 analysis; the observation holds in the longitudinal analysis when cultural frame ranges from 3 to 8 for income payments (Table 10, columns 7 and 8) and from 3 to 9 for taxes (Table 10, columns 9 and 10). Cross-cultural psycholologists would expect all of these marginal effects to be *negative* instead as individuals should be more likely to pay when a country is *increasingly collectivistic* as his/her trust in institutions increases. Environmental conservation is seen as a group project that should expect more support from a society that encourages collectivism. These results are further supported by results for government spending in both wave 5 and longitudinal analyses: an individual is *less likely* to free ride on government spending as his/her trust in institutions *increases* and a country is *increasingly individualistic*. This is observed for all values of one's trust in institutions when cultural frame ranges from 4 to 6 in the wave 5 analysis (Table 10, columns 5 and 6); for longitudinal analysis, this is observed when cultural frame ranges from 2 to 6 (Table 10, columns 11 and 12). Cross-cultural psychologists such as Hofstede and Schwartz would expect

otherwise, arguing that an individual is *less likely* to free-ride on government spending when a country is *increasingly collectivistic*, not individualistic, as his/her trust in institutions *increases*. The marginal effects are detailed as follow. For income payments, the increase in probability of WTP ranges from 0.045 to 0.130 when trust in military is included (see Table 10, column 1) and from 0.049 to 0.103 when trust in military is excluded (see Table 10, column 2) in the wave 5 analysis; for the longitudinal analysis, the increase in probability of WTP ranges from 0.005 to 0.063 when trust in military is included (see Table 10, column 7), and from 0.004 to 0.065 when trust in military is excluded (see Table 10, column 8). For taxes, the increase in probability of WTP ranges from 0.057 to 0.130 when trust in military is included (see Table 10, column 3), and from 0.063 to 0.118 when trust in military is excluded (see Table 10, column 4) in the wave 5 analysis; for longitudinal analysis, the increase in probability of WTP is from 0.013 to 0.094 when trust in military is included (see Table 10, column 9), and from 0.011 to 0.096 when trust in military is excluded (see Table 10, column 10). Decreases in probability of free-riding range from 0.017 to 0.025 when trust in military is included (see Table 10, column 5), and from 0.018 to 0.037 when trust in military is excluded (see Table 10, column 6) in the wave 5 analysis; for longitudinal analysis, decreases in probability of free-riding range from 0.023 to 0.044 when trust in military is included (see Table 10, column 11), and from 0.026 to 0.042 when trust in military is excluded (see Table 10, column 12).

Figure 7 below illustrates the abovementioned results drawn from Table 10. Marginal effects are positive as trust in institutions increases throughout but gradually decrease when examining the values of cultural frame ranging from 0 (red line) to 6 (cyan line) for income payments (Figure 7 (a) and (b)) and from 0 (red line) to 7 (pink line) for taxes (Figure 7 (c) and (d)) in the wave 5

analysis; a smiilar trend is largely observed in the longitudinal analysis for income payments for values of cultural frame ranging from 3 (magenta line) to 8 (sky blue line) (Figure 7 (g) and (h)), and for taxes for cultural frame ranging from 3 (magenta line) to 9 (yellow line) (Figure 7 (i) and (j)). However, the difference in the results for income payments and taxes between wave 5 and longitudinal analyses lies in the quantum of increment in the probability of WTP. Increments in the probability of WTP are *highest* when *cultural frame is 0* (red line; collectivistic) and gradually decrease to the lowest when cultural frame is 6 (cyan line; individualistic) for income payments (Figure 7 (a) and (b)) and when cultural frame is 7 (pink line; individualistic) for taxes (Figure 7 (c) and (d)) in the *wave 5 analysis*; for *longitudinal analysis*, the increments in the probability of WTP are *highest* for both income payments (Figure 7 (g) and (h)) and taxes (Figure 7 (i) and (j)) when *cultural frame is mostly at 7* (pink line; individualistic) and gradually decrease in general to the lowest when cultural frame is 3 (magenta line; collectivistic). This trend is similarly observed for government spending in both wave 5 and longitudinal analyses. The similarity between both analyses is that reductions in the probability of free-riding on government spending are negative in both wave 5 (Figure 7 (e) and (f)) and longitudinal (Figure 7 (k) and (l)) analyses as one's trust in institutions increases. However, the smallest reductions in the probability of free-riding occur when cultural frame is at 4 (gold line; individualistic) which gradually increase to its highest when cultural frame is at 5 when one's trust in the military is included (orange line; collectivistic) (see Figure 7 (e)) or at 6 (cyan line; individualistic) when one's trust in the military is excluded (see Figure 7 (f)) in the wave 5 analysis; for longitudinal analysis, the smallest reductions in the probability of free-riding occur when cultural frame is 2 (lime green line; collectivistic) which gradually increase to its highest when cultural frame is 6 (cyan line; individualistic) (see Figure 7 (k) and (l)).

While results in wave 5 analysis may conform closer to cross-cultural psychologists' expectations since increases are at the highest for income payment and taxation vehicles when cultural frame is collectivistic, that the increments are still positive for income payments and taxes and negative for government spending when cultural frame is individualistic in both wave 5 and longitudinal analyses undermine their arguments. Such a result is quite difficult to square with cross-cultural psychologists' expectations that individuals should be *more*, not less, likely to contribute as their trust in governing institutions increases and as their countries become *more collectivistic*. The results in wave 5 analysis may also be a snapshot of a particular time period compared to the longitudinal analysis which accounts for a longer time frame. If so, these reasons weaken the strength of Schwartz and associates' (see Devos et al, 2002: 488, 492) arguments for the role of culture impacting on one's trust in institutions; this is even though Schwartz and colleagues examine this from the role of cultural orientation rather than cultural frame if one considers Schwartz's (2014a: 551-552) argument that his ten universal types of values used to operationalize an individual's cultural orientation in this dissertation correspond with particular cultural frames. Rather, Yamagishi may provide a more plausible explanation than that of the cross-cultural psychologists. As Yamagishi notes in his "institutional view" of culture as noted above, an 'individualistic' society enables—in fact, even compels—individuals to trust outsiders more because monitoring and punishment mechanisms are absent to ensure that others cooperate if individuals wish to engage in interpersonal cooperation; these outsiders, however, also include the governing institutions as collectivists consider rules of the in-group as legitimate which need not necessarily be rules of their governments. Hence, individuals are more likely to pay via direct income payments and taxes and less likely to free ride on government spending as cultural frame

of a country becomes more individualistic as such a society encourages individuals to venture beyond their in-groups to trust the government instead. The upshot is that Yamagishi seems to provide a more convincing explanation of individuals' behaviors even when cultural frame is examined as a mediating factor on individuals' trust in strangers and institutions, in contrast with those of the cross-cultural psychologists.

Table 10. Marginal effects of interaction between an individual's trust in institutions and his/her country's cultural frame for both wave 5 and longitudinal datasets of the World Values Survey.

Dataset		**Wave 5**						**Longitudinal**					
Values of independent variables		**Direct income payments**		**Taxation**		**Government spending**		**Direct income payments**		**Taxation**		**Government spending**	
Trust in others	**Cultu-ral Frame**	**Includes trust in military (1)**	**Excludes trust in military (2)**	**Includes trust in military (3)**	**Excludes trust in military (4)**	**Includes trust in military (5)**	**Excludes trust in military (6)**	**Includes trust in military (7)**	**Excludes trust in military (8)**	**Includes trust in military (9)**	**Excludes trust in military (10)**	**Includes trust in military (11)**	**Excludes trust in military (12)**
1	**0**	0.130** (0.058)	0.111* (0.058)	0.128*** (0.038)	0.118*** (0.039)	-0.008 (0.014)	-0.003 (0.016)	0.001 (0.001)	0.001 (0.001)	0.005 (0.005)	0.004 (0.003)	-0.031* (0.017)	-0.028* (0.017)
1	**1**	0.117*** (0.045)	0.103** (0.045)	0.118*** (0.031)	0.111*** (0.031)	-0.010 (0.013)	-0.005 (0.014)	0.002 (0.002)	0.002 (0.002)	0.009 (0.007)	0.007 (0.006)	-0.030** (0.014)	-0.029** (0.014)
1	**2**	0.104*** (0.033)	0.094*** (0.033)	0.108*** (0.023)	0.103*** (0.023)	-0.012 (0.012)	-0.009 (0.012)	0.004 (0.003)	0.004 (0.003)	0.017* (0.010)	0.014* (0.008)	-0.029** (0.012)	-0.029** (0.011)
1	**3**	0.091*** (0.023)	0.085*** (0.023)	0.099*** (0.017)	0.095*** (0.017)	-0.014 (0.010)	-0.013 (0.009)	0.010* (0.005)	0.009* (0.005)	0.031*** (0.012)	0.027*** (0.010)	-0.028*** (0.009)	-0.029*** (0.009)
1	**4**	0.078*** (0.015)	0.076*** (0.015)	0.089*** (0.011)	0.088*** (0.011)	-0.017** (0.007)	-0.018** (0.007)	0.021*** (0.007)	0.019*** (0.007)	0.051*** (0.011)	0.046*** (0.010)	-0.027*** (0.006)	-0.028*** (0.006)

1	**5**	0.065*** (0.014)	0.066*** (0.014)	0.079*** (0.011)	0.080*** (0.011)	-0.020** (0.008)	-0.023*** (0.008)	0.040*** (0.010)	0.038*** (0.009)	0.075*** (0.010)	0.070*** (0.010)	-0.025*** (0.006)	-0.028*** (0.006)
1	**6**	0.051** (0.020)	0.056*** (0.020)	0.069*** (0.016)	0.073*** (0.016)	-0.024* (0.013)	-0.030** (0.012)	0.059*** (0.014)	0.058*** (0.013)	0.090*** (0.010)	0.088*** (0.010)	-0.023** (0.009)	-0.027*** (0.008)
1	**7**	0.038 (0.029)	0.046 (0.029)	0.060** (0.023)	0.065*** (0.022)	-0.028 (0.021)	-0.037* (0.019)	0.062*** (0.016)	0.064*** (0.016)	0.088*** (0.014)	0.088*** (0.013)	-0.020 (0.013)	-0.026** (0.012)
1	**8**	0.024 (0.039)	0.036 (0.038)	0.050 (0.031)	0.058* (0.030)	-0.031 (0.030)	-0.045 (0.027)	0.045** (0.022)	0.047** (0.023)	0.070*** (0.024)	0.071*** (0.024)	-0.017 (0.019)	-0.025 (0.018)
1	**9**	0.010 (0.049)	0.026 (0.048)	0.040 (0.040)	0.050 (0.038)	-0.034 (0.041)	-0.052 (0.037)	0.025 (0.021)	0.026 (0.021)	0.047* (0.027)	0.048* (0.028)	-0.013 (0.026)	-0.024 (0.023)
1	**10**	-0.003 (0.059)	0.016 (0.058)	0.030 (0.049)	0.043 (0.046)	-0.037 (0.052)	-0.060 (0.047)	0.012 (0.013)	0.012 (0.014)	0.028 (0.023)	0.029 (0.024)	-0.009 (0.034)	-0.023 (0.030)
2	**0**	0.111** (0.055)	0.094* (0.052)	0.130*** (0.044)	0.118*** (0.044)	-0.008 (0.017)	-0.003 (0.016)	0.001 (0.001)	0.000 (0.001)	0.003 (0.003)	0.003 (0.003)	-0.037 (0.023)	-0.034 (0.022)
2	**1**	0.103** (0.043)	0.090** (0.041)	0.120*** (0.035)	0.111*** (0.034)	-0.010 (0.016)	-0.006 (0.015)	0.001 (0.001)	0.001 (0.001)	0.007 (0.005)	0.005 (0.004)	-0.036* (0.019)	-0.033* (0.018)
2	**2**	0.094*** (0.032)	0.085*** (0.031)	0.111*** (0.026)	0.104*** (0.026)	-0.013 (0.014)	-0.009 (0.013)	0.003 (0.002)	0.003 (0.002)	0.013* (0.007)	0.011* (0.006)	-0.034** (0.015)	-0.033** (0.015)
2	**3**	0.084*** (0.022)	0.079*** (0.021)	0.101*** (0.018)	0.097*** (0.018)	-0.015 (0.011)	-0.014 (0.011)	0.008* (0.004)	0.007* (0.003)	0.023*** (0.009)	0.020** (0.008)	-0.032*** (0.011)	-0.033*** (0.011)

2	**4**	0.074***	0.071***	0.091***	0.089***	-0.019**	-0.019**	0.017***	0.015***	0.040***	0.036***	-0.030***	-0.032***
		(0.015)	(0.014)	(0.013)	(0.012)	(0.009)	(0.008)	(0.006)	(0.005)	(0.009)	(0.009)	(0.008)	(0.008)
2	**5**	0.062***	0.064***	0.081***	0.082***	-0.022**	-0.025***	0.033***	0.032***	0.063***	0.059***	-0.027***	-0.031***
		(0.014)	(0.014)	(0.012)	(0.012)	(0.009)	(0.009)	(0.009)	(0.008)	(0.010)	(0.010)	(0.007)	(0.007)
2	**6**	0.050**	0.055***	0.071***	0.074***	-0.025*	-0.032**	0.054***	0.053***	0.084***	0.082***	-0.024**	-0.030***
		(0.020)	(0.020)	(0.017)	(0.017)	(0.015)	(0.014)	(0.014)	(0.013)	(0.012)	(0.011)	(0.010)	(0.010)
2	**7**	0.037	0.046	0.061***	0.067***	-0.029	-0.040*	0.063***	0.065***	0.092***	0.093***	-0.021	-0.029*
		(0.029)	(0.028)	(0.025)	(0.024)	(0.023)	(0.022)	(0.017)	(0.016)	(0.013)	(0.012)	(0.015)	(0.015)
2	**8**	0.024	0.036	0.050	0.059*	-0.032	-0.048	0.051**	0.053**	0.082***	0.084***	-0.017	-0.027
		(0.038)	(0.038)	(0.033)	(0.032)	(0.033)	(0.031)	(0.024)	(0.024)	(0.023)	(0.023)	(0.021)	(0.020)
2	**9**	0.010	0.026	0.040	0.051	-0.035	-0.056	0.030	0.032	0.060*	0.062*	-0.014	-0.026
		(0.049)	(0.048)	(0.041)	(0.040)	(0.044)	(0.042)	(0.024)	(0.026)	(0.031)	(0.032)	(0.028)	(0.027)
2	**10**	-0.003	0.016	0.030	0.044	-0.038	-0.063	0.014	0.016	0.039	0.040	-0.009	-0.024
		(0.059)	(0.058)	(0.050)	(0.049)	(0.054)	(0.052)	(0.017)	(0.018)	(0.030)	(0.031)	(0.035)	(0.033)
3	**0**	0.084**	0.073*	0.116***	0.105***	-0.009	-0.003	0.000	0.000	0.003	0.002	-0.044	-0.039
		(0.042)	(0.039)	(0.042)	(0.040)	(0.019)	(0.017)	(0.001)	(0.000)	(0.002)	(0.002)	(0.030)	(0.028)
3	**1**	0.082**	0.073**	0.110***	0.101***	-0.011	-0.006	0.001	0.001	0.005	0.004	-0.042*	-0.039*
		(0.034)	(0.032)	(0.033)	(0.032)	(0.018)	(0.016)	(0.001)	(0.001)	(0.004)	(0.003)	(0.024)	(0.023)
3	**2**	0.078***	0.071***	0.102***	0.096***	-0.014	-0.010	0.003	0.002	0.009*	0.008*	-0.039**	-0.038**
		(0.026)	(0.024)	(0.025)	(0.024)	(0.016)	(0.015)	(0.002)	(0.002)	(0.005)	(0.004)	(0.018)	(0.018)

3	**3**	0.073*** (0.018)	0.068*** (0.018)	0.095*** (0.017)	0.091*** (0.017)	-0.017 (0.013)	-0.015 (0.012)	0.006** (0.003)	0.005** (0.003)	0.017*** (0.007)	0.015* (0.006)	-0.036*** (0.013)	-0.037*** (0.013)
3	**4**	0.066*** (0.012)	0.064*** (0.012)	0.087*** (0.012)	0.085*** (0.012)	-0.020** (0.010)	-0.020** (0.009)	0.013*** (0.004)	0.012*** (0.004)	0.031*** (0.008)	0.028*** (0.007)	-0.033*** (0.009)	-0.035*** (0.009)
3	**5**	0.058*** (0.012)	0.059*** (0.012)	0.078*** (0.011)	0.079*** (0.011)	-0.023** (0.010)	-0.027*** (0.010)	0.027*** (0.007)	0.026*** (0.007)	0.051*** (0.009)	0.048*** (0.009)	-0.030*** (0.008)	-0.034*** (0.008)
3	**6**	0.048*** (0.018)	0.052*** (0.018)	0.069*** (0.017)	0.072*** (0.016)	-0.027* (0.016)	-0.035** (0.016)	0.048*** (0.013)	0.047*** (0.012)	0.074*** (0.012)	0.072*** (0.012)	-0.026** (0.012)	-0.032*** (0.012)
3	**7**	0.036 (0.027)	0.044 (0.027)	0.060** (0.024)	0.066*** (0.023)	-0.030 (0.025)	-0.043* (0.025)	0.062*** (0.017)	0.064*** (0.016)	0.091*** (0.014)	0.091*** (0.013)	-0.022 (0.017)	-0.031* (0.017)
3	**8**	0.024 (0.038)	0.035 (0.037)	0.050 (0.032)	0.059* (0.032)	-0.034 (0.035)	-0.050 (0.034)	0.055** (0.025)	0.059** (0.025)	0.091*** (0.020)	0.093*** (0.019)	-0.018 (0.023)	-0.029 (0.023)
3	**9**	0.010 (0.048)	0.026 (0.048)	0.040 (0.041)	0.051 (0.040)	-0.036 (0.045)	-0.058 (0.044)	0.035 (0.028)	0.038 (0.030)	0.074** (0.033)	0.077** (0.033)	-0.014 (0.029)	-0.027 (0.030)
3	**10**	-0.003 (0.059)	0.016 (0.058)	0.030 (0.050)	0.044 (0.049)	-0.038 (0.055)	-0.064 (0.053)	0.017 (0.021)	0.019 (0.022)	0.052 (0.037)	0.053 (0.038)	-0.009 (0.036)	-0.025 (0.036)
4	**0**	0.058** (0.029)	0.053* (0.027)	0.092*** (0.035)	0.085*** (0.033)	-0.009 (0.022)	-0.003 (0.018)	0.000 (0.000)	0.000 (0.000)	0.002 (0.002)	0.002 (0.001)	-0.051 (0.037)	-0.045 (0.034)
4	**1**	0.060** (0.024)	0.055** (0.023)	0.090*** (0.027)	0.084*** (0.026)	-0.012 (0.020)	-0.006 (0.018)	0.001 (0.001)	0.001 (0.001)	0.004 (0.003)	0.003 (0.002)	-0.048 (0.029)	-0.044 (0.028)

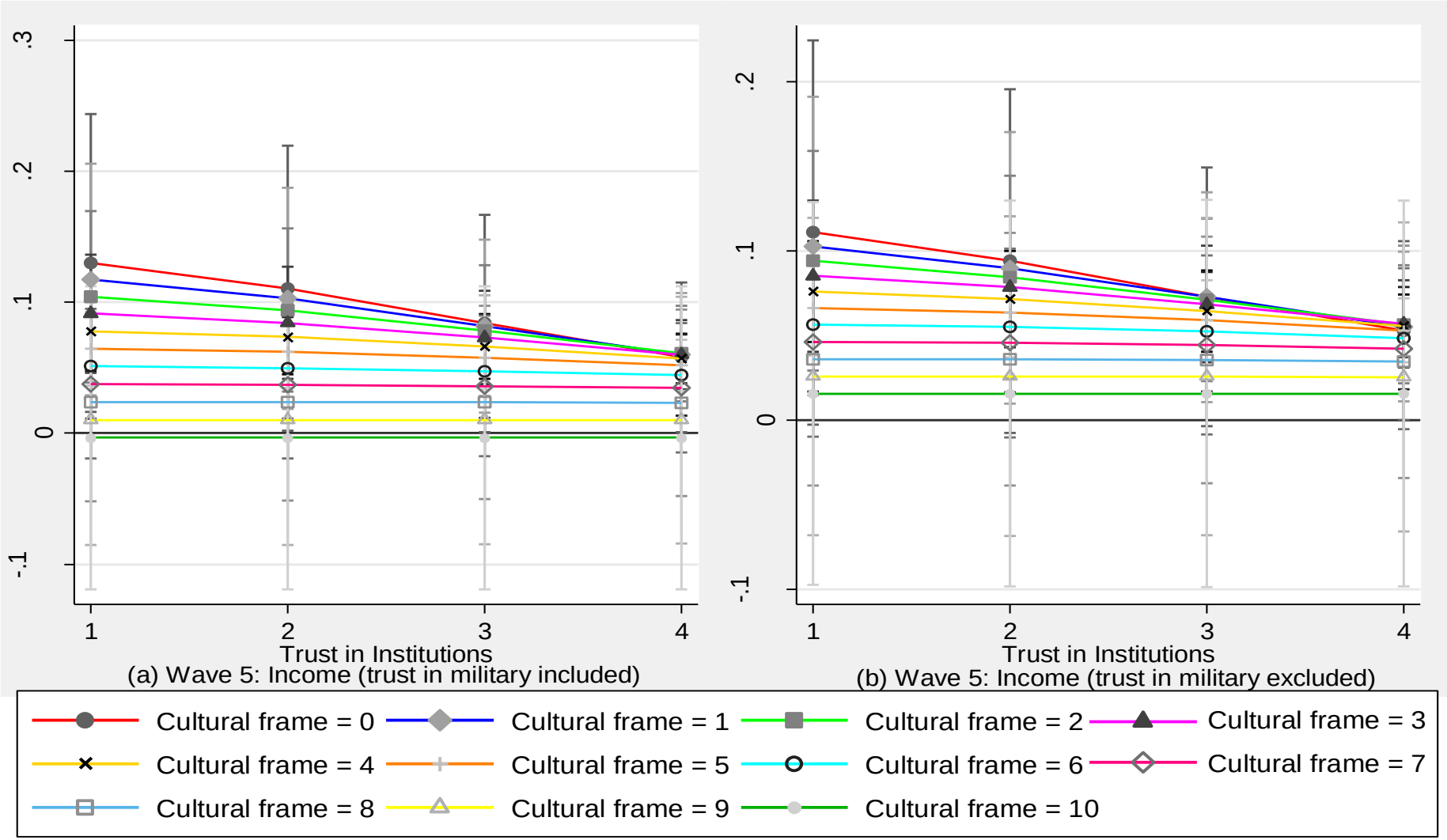
4	**2**	0.061***	0.057***	0.087***	0.082***	-0.015	-0.010	0.002	0.002	0.007*	0.006*	-0.044**	-0.042**
		(0.019)	(0.018)	(0.020)	(0.020)	(0.018)	(0.016)	(0.001)	(0.001)	(0.004)	(0.003)	(0.022)	(0.021)
4	**3**	0.060***	0.057***	0.083***	0.079***	-0.018	-0.015	0.005**	0.004**	0.013***	0.011**	-0.040***	-0.041***
		(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.013)	(0.002)	(0.002)	(0.005)	(0.004)	(0.015)	(0.015)
4	**4**	0.057***	0.056***	0.078***	0.076***	-0.021*	-0.022**	0.010***	0.010***	0.023***	0.021***	-0.036***	-0.039***
		(0.010)	(0.009)	(0.010)	(0.010)	(0.011)	(0.011)	(0.003)	(0.003)	(0.006)	(0.005)	(0.010)	(0.010)
4	**5**	0.052***	0.053***	0.072***	0.072***	-0.025**	-0.029**	0.022***	0.021***	0.039***	0.037***	-0.032***	-0.037***
		(0.010)	(0.010)	(0.010)	(0.009)	(0.011)	(0.011)	(0.006)	(0.006)	(0.008)	(0.007)	(0.009)	(0.009)
4	**6**	0.045***	0.049***	0.065***	0.068***	-0.028	-0.037**	0.041***	0.041***	0.061***	0.059***	-0.028**	-0.035***
		(0.016)	(0.015)	(0.014)	(0.014)	(0.018)	(0.018)	(0.011)	(0.011)	(0.012)	(0.012)	(0.013)	(0.013)
4	**7**	0.035	0.042*	0.057**	0.063***	-0.032	-0.045*	0.059***	0.061***	0.083***	0.083***	-0.023	-0.033*
		(0.025)	(0.024)	(0.022)	(0.021)	(0.027)	(0.026)	(0.016)	(0.016)	(0.015)	(0.015)	(0.018)	(0.019)
4	**8**	0.023	0.035	0.049	0.057*	-0.034	-0.052	0.059**	0.063***	0.094***	0.096***	-0.019	-0.031
		(0.036)	(0.035)	(0.030)	(0.029)	(0.036)	(0.035)	(0.025)	(0.024)	(0.018)	(0.016)	(0.025)	(0.025)
4	**9**	0.010	0.026	0.040	0.050	-0.037	-0.058	0.040	0.044	0.086***	0.089***	-0.014	-0.028
		(0.048)	(0.047)	(0.040)	(0.038)	(0.046)	(0.043)	(0.032)	(0.034)	(0.032)	(0.031)	(0.031)	(0.032)
4	**10**	-0.003	0.016	0.030	0.043	-0.038	-0.062	0.021	0.024	0.066	0.069	-0.010	-0.026
		(0.059)	(0.058)	(0.049)	(0.047)	(0.054)	(0.049)	(0.026)	(0.028)	(0.043)	(0.044)	(0.038)	(0.039)

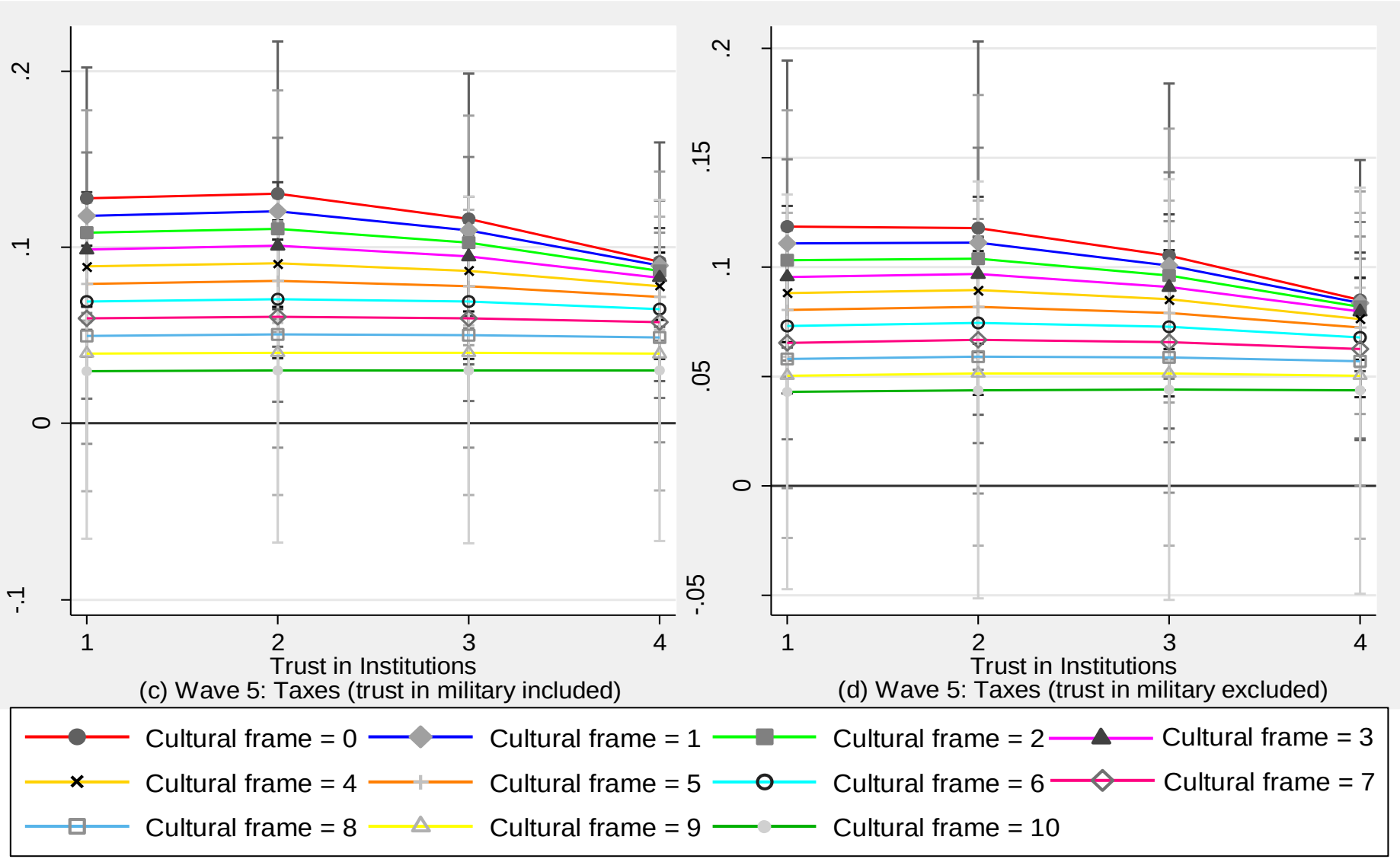
Notes:

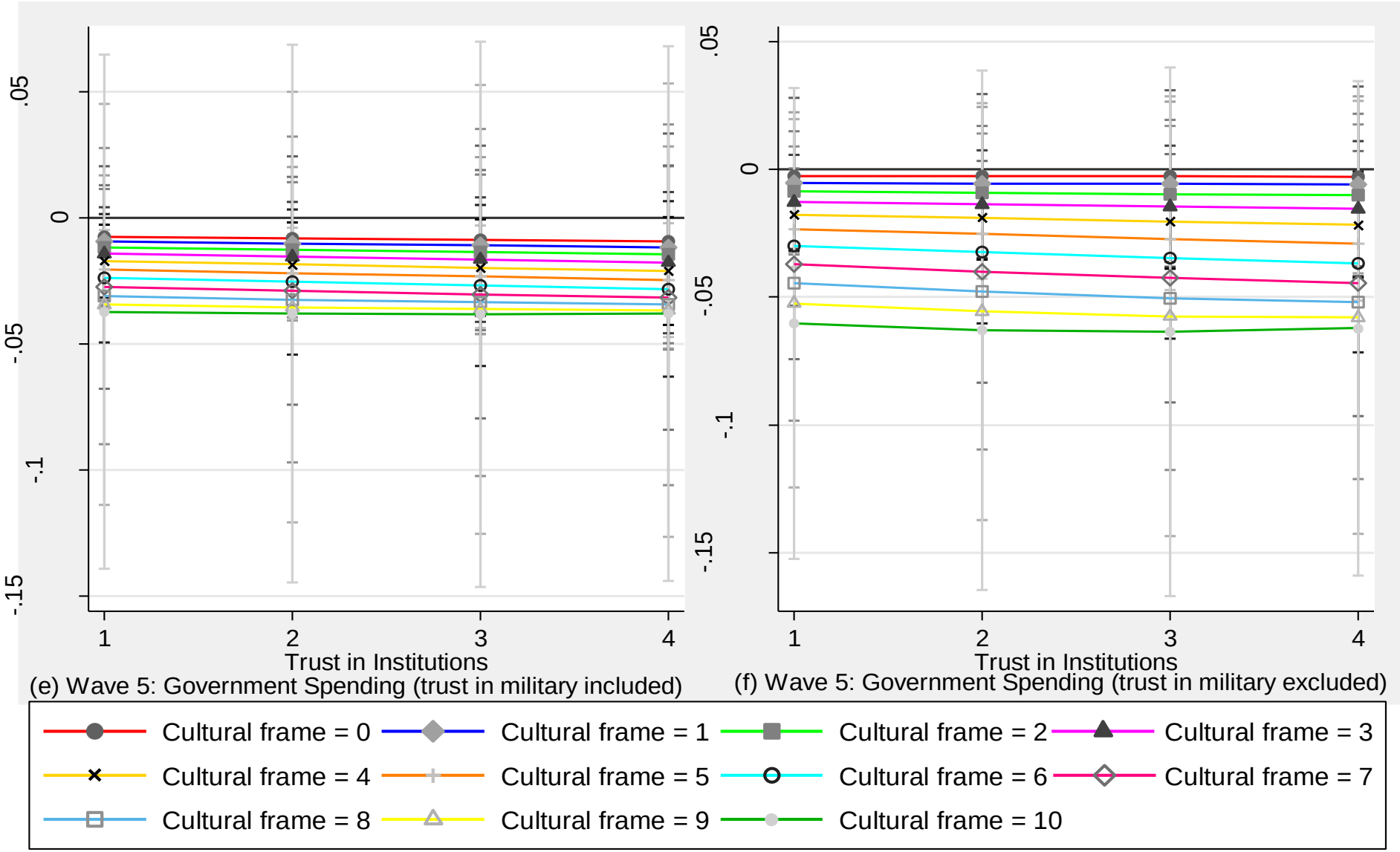
1) Standard errors in parentheses. *p< 0.1, **p< 0.05, ***p< 0.01.

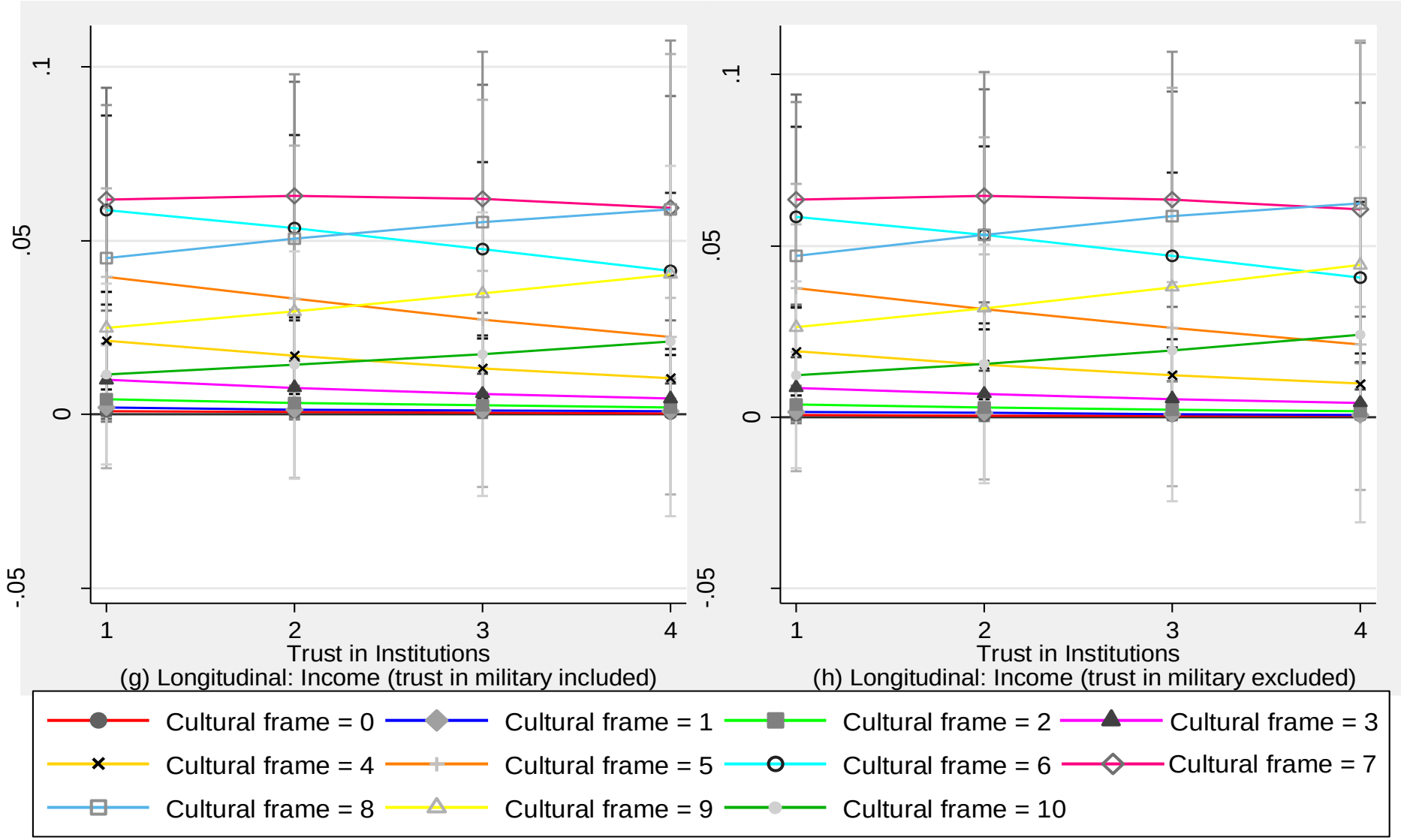
2) The dependent variable is an individual's willingness-to-pay through the respective payment vehicles specified for each column and is expressed as a dummy variable: coded 1 for "agree" and "strongly agree"; 0 for "disagree" and "strongly disagree".

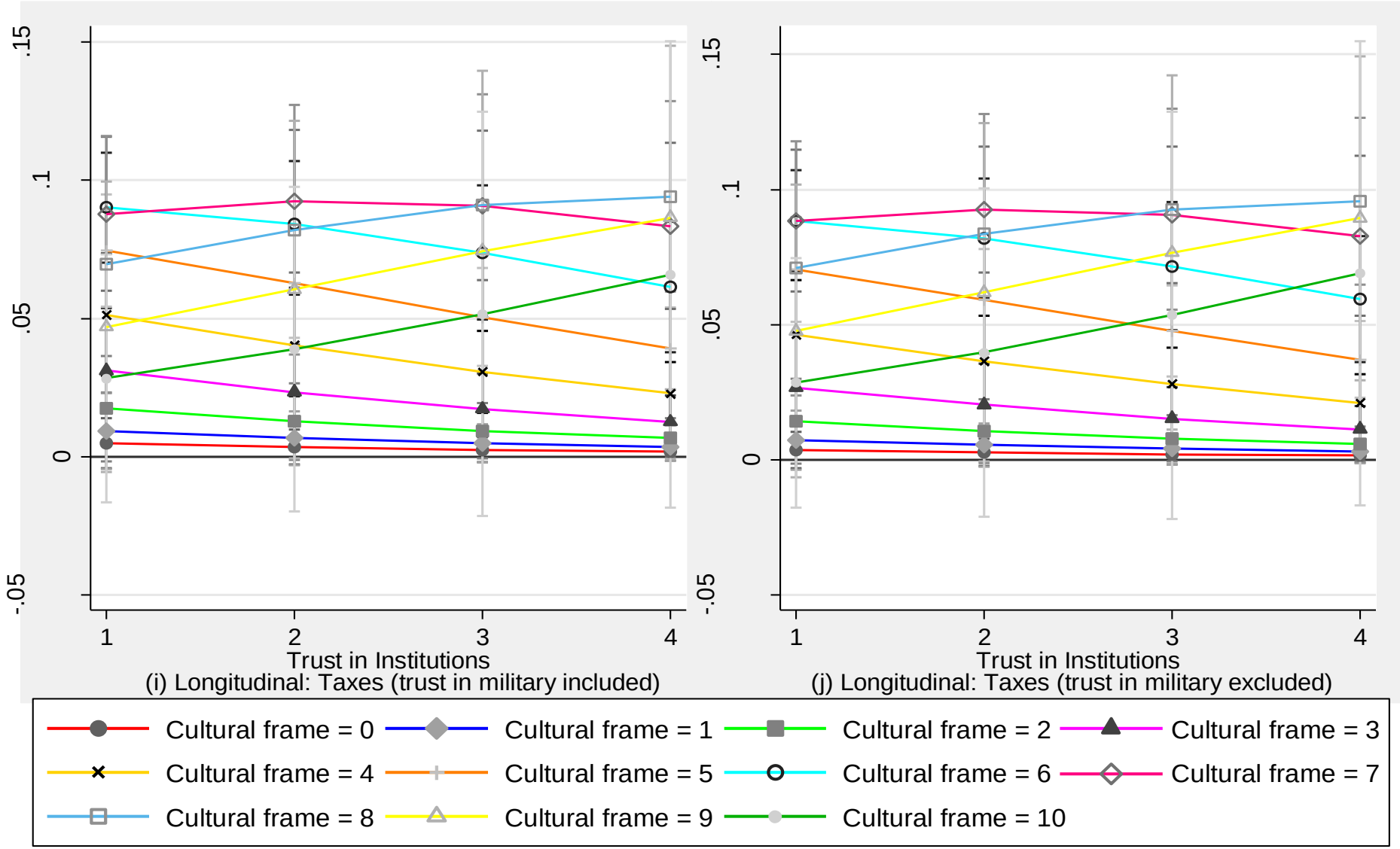
Figure 7. Marginal effects of the interaction between an individual's trust in institutions and his/her country's cultural frame for all three payment vehicles in wave 5 and longitudinal datasets.

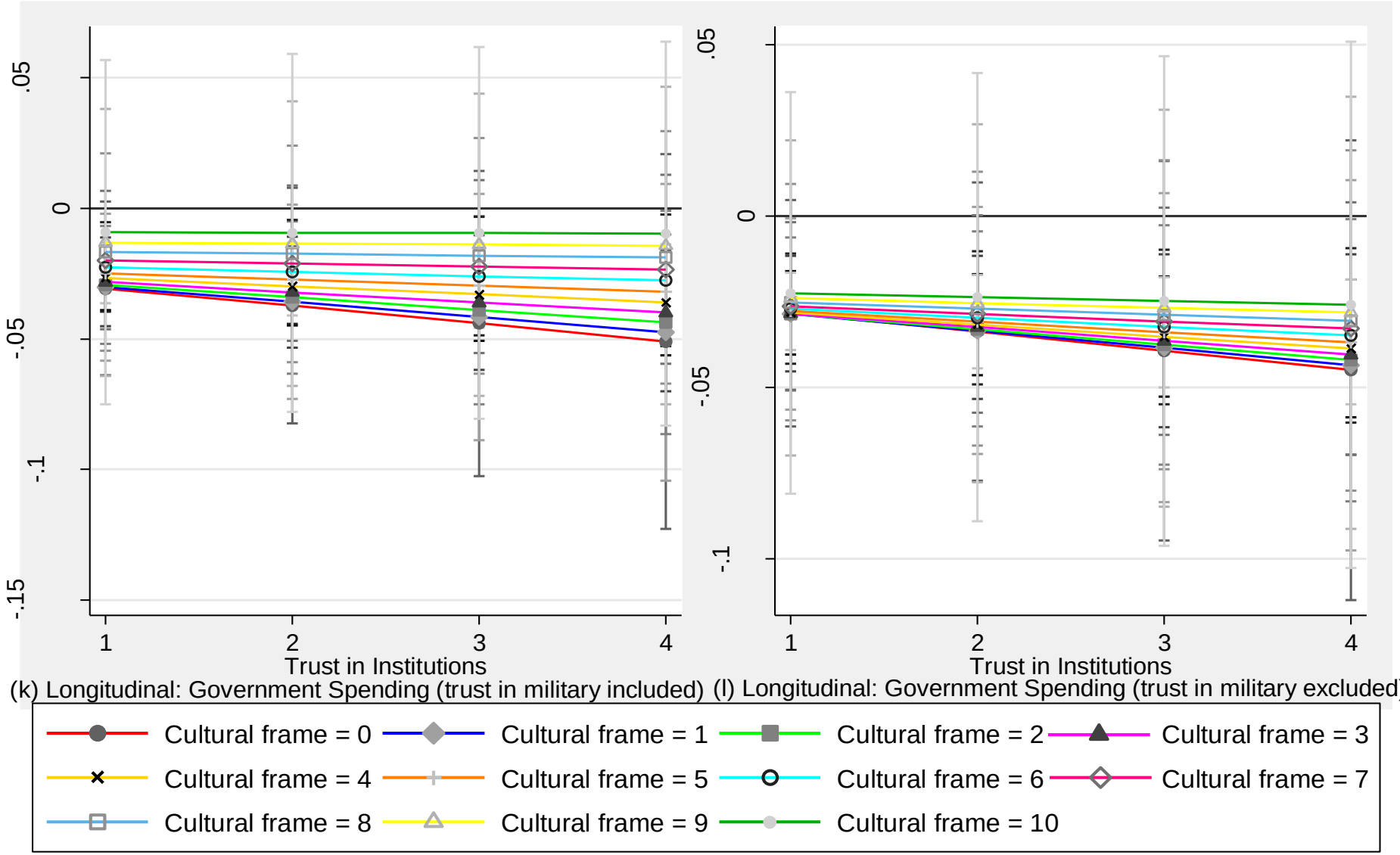



.2
.1
0
-.1
1
2
3
4
Trust in Institutions
(c) Wave 5: Taxes (trust in military included)
.2
.15
.1
.05
0
-.05
1
2
3
4
Trust in Institutions
(d) Wave 5: Taxes (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10


.05
0
-.05
-.1
-.15
1
2
3
4
Trust in Institutions
(e) Wave 5: Government Spending (trust in military included)
.05
0
-.05
-.1
-.15
1
2
3
4
Trust in Institutions
(f) Wave 5: Government Spending (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10


.1
.05
0
-.05
1
2
3
4
Trust in Institutions
(g) Longitudinal: Income (trust in military included)
.1
.05
0
-.05
1
2
3
4
Trust in Institutions
(h) Longitudinal: Income (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10


.15
.1
.05
0
-.05
1
2
3
4
Trust in Institutions
(i) Longitudinal: Taxes (trust in military included)
(j) Longitudinal: Taxes (trust in military excluded)
Cultural frame = 0
Cultural frame = 1
Cultural frame = 2
Cultural frame = 3
Cultural frame = 4
Cultural frame = 5
Cultural frame = 6
Cultural frame = 7
Cultural frame = 8
Cultural frame = 9
Cultural frame = 10



(k) Longitudinal: Government Spending (trust in military included) (l) Longitudinal: Government Spending (trust in military excluded)

7.7 Conclusion

The above results reveal some interesting patterns concerning the variables of interest. There seems to be little support for Hypothesis 1 on the impacts of one's cultural orientation on one's WTP and Hypothesis 2 on cross-level interaction effect between one's cultural orientation and his/her country's cultural frame on one's WTP. There seems to be some support for Hypothesis 4 on the within country-level interaction between a country's quality of rule of law and its cultural frame on one's WTP. Support for Hypothesis 3 on the impact of a country's rule of law on one's WTP is qualified to the extent that it is *not* rule of law *per se*, but its interaction with one's trust in strangers and governing institutions that exhibits an impact on one's WTP. The counterintuitive finding is that the interaction between one's trust in strangers and governing institutions on the one hand and cultural frame of a country on the other hand goes against what cross-cultural psychologists such as Hofstede and Schwartz would expect; instead, Yamagishi seems to provide a better explanation of the results for both wave 5 and longitudinal analyses. Two patterns can be discerned following from these observations. Firstly, individual level and country level variables are *not* sufficient *on their own* to explain one's WTP. This is because their cross-level interactions must be factored in, most notably the interaction effect between one's trust in strangers and institutions on the one hand and rule of law on the other hand as shown in the results above. The interaction effect between one's trust in strangers and his/her country's rule of law suggests support for Ostrom's two-level context as well as Yamagishi's arguments for assurance-based trust since punishment in the form of rule of law is enforced at the national level in tandem with one's trust in strangers. The interaction effect between one's trust in governing institutions and his/her country's rule of law suggests support for Yamagishi and colleagues' arguments for the role of individuals' perceived quality of his/her country's rule of law as rule of law is measured based on

people's perceived confidence in the governing institutions of their respective countries as Kaufmann, Kraay and Mastruzzi (2010) operationalize for the WGI. Secondly, the results described by levels of analysis have also shown that variables that involve culture—whether cultural orientation or cultural frame—seem to exert little or counterintuitive impact at best on one's WTP contrary to what cross-cultural psychologists propose. This is in contrast with the rule of law whose impact is more evident in the expected direction across all three payment vehicles in both wave 5 and longitudinal analyses when interacted with one's trust in strangers and institutions, regardless whether one's trust in the military is included or not. If so, these observations shall form the basis for discussion in the next chapter which identifies the patterns and implications of the context for individuals' environmental WTP.

CHAPTER 8 DISCUSSION

8.1 Introduction

Two patterns can be discerned from the results shown in Chapter 7 after analyzing both wave 5 and longitudinal datasets across all three payment vehicles regardless whether one's trust in the military is included or not. The first pattern seems to indicate that neither individual level independent variables nor country level independent variables alone can sufficiently explain why one is willing to pay for environmental pollution mitigation. Rather, it is the interaction between variables across these levels that is better able to account for one's environmental WTP. This suggests support for Ostrom's argument of two-level context comprising of micro contextual or individual level variables at one level interacting with macro contextual or country level variables at the other level. The second pattern is that independent variables related to culture appear to exhibit mixed impacts at best on one's WTP—which holds for both cultural orientation at the individual level or micro context and cultural frame at the country level or macro context, and their interactions with other independent variables at both levels. In contrast, a country's quality of rule of law exhibits impacts on WTP consistent with theoretical predictions. It is with these views that three puzzles can be answered. These three puzzles are discussed below which serve as analytical implications. The first puzzle concerns whether contextual factors indeed affect individuals' valuations of the environment. The second puzzle questions the extent to which institutions operationalized as a country's rule of law exert more impact than culture defined in terms of the individualism-collectivism dimension. The third puzzle is the counterintuitive finding identified in the results chapter: that an individual's trust in strangers and institutions interact with a country's cultural frame contrary to what cross-cultural psychologists expect as it seems more in line with

Yamagishi's expectations. This chapter will then conclude with a summary of arguments, policy implications and directions for future research.

8.2 Three puzzles

The results from the longitudinal dataset serve as a robustness check on the wave 5 results. Analysis of wave 5 uses more reliable measures of the variables of interest compared to the former. However, the longitudinal dataset benefits from the inclusion of greater number of observations from more countries and longer time periods compared to the latter. Nevertheless, despite the differences between both analyses in terms of operationalization of variables and results, similarities in results add confidence to answering the three puzzles that underlie this study on the effects of contextual factors on individuals' valuations of the environment.

8.2.1 Puzzle one: do contextual factors affect an individual's environmental WTP?

The first puzzle is the research question posed in this dissertation, which is whether contextual factors affect individuals' valuation of the natural environment. The answer is yes. Results for Hypothesis 4 (see section 7.5 above) which explores the effect of the interaction between the country level independent variables which are a country's quality of rule of law and its cultural frame for which there is partial evidence, support this conclusion albeit observed only for lower values of (i.e. weaker) rule of law in wave 5 in contrast for most values of rule of law in the longitudinal analysis. Stronger support comes from results for Hypothesis 3 (see section 7.4 above) on the rule of law through its interaction with an individual's trust in strangers and institutions for which it is evident across all three payment vehicles—voluntary income payments, compulsory taxes and government spending—in both wave 5 and longitudinal analyses regardless whether

one's trust in the military as one of the governing institutions is included or not; this is observed for most values of trust in strangers and institutions in both wave 5 and longitudinal analyses. Notwithstanding the differences in how the impact is mediated, a country's quality of rule of law influences individuals' WTP in both analyses across most payment vehicles, whether in isolation (see Table 3, columns 7 to 10) or in its interaction with another independent variable such as trust in strangers and institutions (see section 7.4 above), cultural frame (see section 7.5 above) and cultural orientation for most values of cultural orientation in both wave 5 and longitudinal analyses (see section 7.2 above). Cultural frame, in contrast, exhibits an impact that is more in line with Yamagishi's expectations than those of the cross-cultural psychologists as shown in cultural frame's interaction with rule of law (see section 7.5 above) and one's trust in strangers and institutions for most values of trust in strangers and institutions (see section 7.6.3 above) in both wave 5 and longitudinal analyses.

If so, these results support arguments for the impact of contextual factors that various scholars have made, whether in the short run (e.g. wave 5) or long run (i.e. longitudinal). The impacts of both rule of law and cultural frame in both analyses lend weight to Hickerson's (1987: 1131-1132) argument that individuals are not the ultimate point of reference in valuation studies. Rather, individuals express their valuations through institutions that "organize and regulate individual behavior". Such valuations emerge from culture that Hickerson (1987: 1132) views is "purposeful conduct" that is an "intellectual adaptation" of human beings to create "an orderly, secure, and meaningful way of life" in face of problems presented by a hostile, larger environment. However, as observed from the results on the interaction between a country's rule of law and its cultural frame (see section 7.5 above) and between one's trust in strangers and institutions and his/her

country's rule of law (see section 7.6.3 above), what is taken to be 'cultural frame' as conceived and operationalized by cross-cultural psychologists actually measures Yamagishi's "institutional view" of culture, or the strength of social monitoring and punishment mechanisms (elaborated below in section 8.2.3). Bachmann's (2010: 89-90) claim that both rule of law and cultural frame interact with each other is likewise supported by results for Hypothesis 4 and explanations of actors' NIMBY behaviors (to be elaborated below). They are reflective of cultural economics as an emerging field of study that seeks to understand how culture affects economic outcomes (for example, see Guiso, Sapienza and Zingales, 2006; Alesina and Giulano, 2015) which has its precedents in Max Weber's (1958) seminal work, *The Protestant Ethic and the Spirit of Capitalism*.

Results from Hypotheses 3 and 4 support Ostrom's (2010a: 70) argument for treating the context at two levels: at the level of micro context or individual level which involves interpersonal interactions among individuals in a community managing a CPR, and at the macro context or country level where external forces such as norms and rules of the country impact on the individuals in the group which is nested within the country. At the same time, however, the measurement of an individual's trust in strangers rather than in familiar persons following Inglehart and colleagues' (see Welzel et al, 2005: 122-123) arguments challenges Ostrom and Ahn's (2001: 10) view of social capital which include Putnam and the so-called "network school" of social capital. Two implications from these results can be made. Firstly, on the one hand, statistical evidence exists to support the strategic interdependent behavior that rational choice theorists such as Shepsle and Bonchek (1997: 202) have observed. Such interdependency can have institutional and 'cultural' roots, which is evident not just through the rule of law that punishes

free-riders, but also through ‘culture’ as ‘individualistic’ cultural frames (i.e. countries) which encourage self-interested behavior (elaborated below in section 8.2.3). Secondly, these results also support scholars such as Sen (1982: 66) who argues that people are “social animals” who are not “rigidly bound” to their preferences but interact in a context. The context here may not necessarily refer solely to Ostrom’s macro-institutional structure but may encompass the larger cultural milieu which Ostrom (2005b: 252) suggests can enculturate individuals from foreign cultures to adopt.

The two implications above raise the question to what extent that environmental valuation is a purely economic exercise by expressing one’s preference through choices denominated in dollars and cents. The evidence of contextual factors in this analysis has lent some weight to the charge led by Kahneman et al (1999: 203, 229) that environmental valuations are actually reflections of one’s environmental attitudes susceptible to external (i.e. contextual) influences, which major proponents of stated preference approaches such as Ryan and Spash (2011: 684) concede. Such a dispute goes back to Spash et al (2009: 962) who challenge Kahneman’s earlier article (i.e. Kahneman and Ritov, 1994: 29) that argues that WTP reflects primarily individuals’ attitudes. Spash et al charge Kahneman et al for neglecting to account for social norms and individuals’ perceived control over their own behaviors. This is on top of Spash et al’s criticisms that Kahneman et al did not investigate using standard CV procedures—which Kahneman and Ritov (1994: 30) acknowledge. Nevertheless, both Spash and Kahneman agree that contextual influences on individuals’ WTP matter. This point is a criticism that Spash et al (2009: 955-956) level at environmental economists (e.g. Carson, Flores and Meade: 2001; Carson and Hanemann, 2005) for treating the influence of social and institutional contexts on one’s WTP as exogenous and thus unquestioned, a criticism that Liebe et al (2011: 108) supports. In short, basing the value of an

environmental good or service purely on individuals' stated monetary values risks distorting the total economic value (TEV) of the environmental good or service in question if the contextual influences cannot be easily isolated from calculations of TEV.[25]

That results above show that contextual factors impact on one's environmental WTP present some conclusions to the debates in the environmental valuation literature identified in Chapter 2. Firstly, contextual factors add more evidence to the phenomenon of strategic bidding observed in the stated preference literature using CV surveys. Strategic bidding plays out in bids by depending not just on one's preferences, but also on one's trust in or expectations about other unfamiliar individuals and the government. That is, 'fair' bids or 'fair share' are contingent on the efficacy of the laws of the country or group to punish free-riders. The effects of laws are most palpable when laws mandate certain actions that individuals are required to carry out, such as compulsory taxation. For example, Vriend (1996: 275) earlier identifies framing effects which can influence how "opportunities may be perceived differently when the choice is framed differently" even for the same individual who possesses identical preferences but for different policy instruments or payment vehicles. Other scholars (e.g. Alevy et al, 2011: 375) also show that framing effects can affect how one expresses one's preferences. Framing effects can in turn lead to violations of axioms of invariance, dominance, independence and transitivity as Vriend (1996: 275) observes. One of the solutions to strategic bidding is to inculcate trust among valuers. Most notably, Scholz

[25] Total economic value (TEV) is calculated as follow according to Plottu and Plottu (2007):

TEV = use value + non-use value

Use value = direct use + indirect use

Non-use value = existence value + bequest value + option value

and Lubell (1998: 411, 412; see also Farley et al, 2015: 249) show that citizens will fulfill their obligations such as tax compliance to the country as long as they trust other citizens and political leaders to fulfill their 'end of the bargain'. Another solution is to provide assurance to individuals that other individuals will pay. Blamey (1998: 53), for example, argues that assurance requires institutions to coerce individuals through the implementation of rules or laws as individuals "may need to be assured that other parties or organisations involved in the 'policy bargain' are doing their bit, and/or that this is done in accordance with certain standards of fairness" as incentives to cooperate and assurances from others of their cooperation are not "sufficient" conditions for contributing towards provision of the public good.

If so, results suggests that human beings are largely not individual gains maximizers or *homo economicus* but are willing cooperators with a propensity to reward cooperators and punish violators (Gintis, 2000: 316). Thus, individuals behave in reaction to other individuals' (expected) behaviors which leads Soma (2006: 39) to argue that, "In reality, preferences depart from pure self-interest: people often sacrifice money in retaliation against unfair treatment (i.e. social goal effects); or if somebody is being nice (or mean) to you or others, you are inclined to be nice (or mean) to him (i.e. reciprocity effect)". Thus, trust in this respect is a "social construction" (Soma, 2006: 39). It is thus the presence of punishment through legal sanctions that members in a community grant rules their legitimacy. As Ostrom (2007: 249) argues, in addition to being generally known and understood, rules must be seen as legitimate, followed and enforced in order to be considered effective. Yamagishi (see Shinada and Yamagishi, 2007: 338) agrees with Ostrom (1998a: 16; 2005a: 833-834; 2007: 249; 2008c: 18; 2009d: 752; 2010d: 328; Poteete and Ostrom, 2004: 454) that such rules need to be accepted at least tacitly (Ostrom, 1986: 7; Yamagishi, 1988a:

533; Yamagishi et al, 1998a: 167-168; Yamagishi et al, 2008: 201; Yamagishi and Suzuki, 2010: 198; Hashimoto and Yamagishi, 2015: 116; Shinada et al, 2004: 382; Yamagishi et al, 2005b: 186; Hashimoto and Yamagishi, 2013: 144; Hashimoto and Yamagishi, 2016: 286-287; Hayashi et al, 1999: 41). Such tacit rules invoke Ostrom's (2016: 94) use of working rules or *de facto* rules of a CPR community to differentiate from formal laws or *de jure* rules which need not be the former. This has led Ostrom (1986: 7) to caution against assuming individuals to be rule followers which has been taken for granted in standard game theory as individuals may flout laws—a view which Gary Becker (1976) supports.

If the above view holds, this leads to the second conclusion, which is that the arena to engage in environmental valuation is not necessarily the free market but the courts. This is consistent with Soma (2006: 39) who contends that differences in contexts such as different "institutional arrangements" (e.g. the market, firm, family, political arena) can determine the roles that individuals adopt to suit the institution's demands. Soma's argument supports Vatn (2005a: 211) who advocates for treating institutions as "constructed set[s] of rules or typifications [i.e. common understandings]" which can influence people to adjust their behaviors according to the character of the VAI, for example, as citizens in a deliberative setting, or as consumers in an economic setting. Typifications or shared views can include notions that each individual ought to pay his/her 'fair share' (Vatn, 2004: 9), as well as individuals' common understandings of exchange based on the market (Vatn, 2005a: 208). This is especially evident in O'Neill's (2001: 1867, 1870, 1873; see also Ludwig, 2000: 34) argument against incommensurability. He argues that rational choice theory misconstrues the natural environment because it is "a site of conflict between competing values and interests, and institutions and communities that articulate those values and interests"

that defy reduction to a single monetary value. He proposes that there need not be exclusive reliance on the money metric to measure costs and benefits as alternative metrics can rely on number of people who suffered and benefited as a result of a policy intervention, use of judgment, procedural rationality, and expressive rationality.

In further support of the courts as the appropriate arena for environmental valuation, Hickerson and Sunstein suggest that law interacts with culture. Hickerson (1987: 1131-1132) argues that individuals are not the ultimate point of reference in valuation studies when critiquing the value neutrality stance adopted by orthodox economists and instead posits that valuations are more than just "value-neutral" or instrumental evaluations as they are "expressive" (Brennan and Lomasky, 1993: 33 in Hindmoor, 2006: 165). Expressiveness seems to be present in observations of social responsibility and moral worth influencing individuals' WTP as noted by proponents of CV approach (e.g. Ryan and Spash, 2011: 684). Sunstein (1994: 780, 789) reaches a similar conclusion arguing for "the expressive function of law", i.e. "the law's role in reflecting and communicating particular ways of valuing human goods" which concerns the appropriateness of different kinds of valuation such as through commodification rather than just mere "level" of valuation. This is observed in Cohen's (2003: 705-707; see also Ludwig, 2000: 31-32) examples of lawsuits which presume that monetary compensation to aggrieved parties can never fully substitute for the "thing" given up, such as in cases of wrongful death and life insurance payouts, as well as Sunstein's (1994: 846) examples of compensation for damaging natural resources. According to Sunstein, the "expressive function" of law is important for two reasons. Firstly, law can influence the adoption of norms through reward or punishment that render laws a reflection of the norms of a group such as a society (Sunstein, 1994: 822). Secondly, law expresses the intrinsic motivations such as

"personal integrity, commitment and the narrative continuity of a life" that consequentialism associated with rational choice theory cannot account for as it is about one's belief in a type of life (Sunstein, 1994: 822-823); this makes the courts such as the US Supreme Court to possess an "educative effect" on the population as it is "often taken to be speaking on behalf of the nation's basic principles and commitments" and enable understanding of how the public views social issues even though the content of the law is not impacted on (Sunstein, 1994: 824). Sunstein (1994: 858) thus proposes "rule consequentialism" as an alternative to outcome consequentialism that is associated with rational choice theory in order to avoid monism, i.e. monistic theories of value. However, Sunstein (1994: 851) does not disavow the role of the market altogether. These views are thus reflected in Bachmann's (2010: 89-90) assumption that culture and institutions are "highly intertwined", and Schwartz's (2014c: 45) argument that the "ways the social institutions in a society are organized express the underlying cultural value emphases". However, the way that Bachmann and Schwartz view 'culture' should not be taken as such considering that Hypothesis 4 which is based on Bachmann's and Schwartz's arguments show that Yamagishi's "institutional view" of culture is the more appropriate view (elaborated below in section 8.2.3). Thus, what appears as 'cultural norms' that guide individuals' actions should instead be seen as tacitly accepted social 'rules' regulating interpersonal behavior in Ostrom's words.

If institutions defined as North's "rules of the game" and 'culture' as viewed by Yamagishi are indeed intertwined as results for Hypothesis 4 suggest, this may offer support for Yamagishi's argument for assurance in his explanation on why individuals are *more*—not *less*—willing to pay when a country is *more individualistic* even as the rule of law of a country improves in the wave 5 analysis. Recall that Ostrom (1998a: 8) uses observations from Yamagishi's (1986; 1988a;

1988b) experiments comparing American and Japanese group behaviors to explain that low-trusting individuals (Japanese) contribute more than high-trusting individuals (Americans) to public goods and CPRs when given the opportunity to contribute to a "punishment fund". Yamagishi observes that individuals in supposedly more 'collectivistic' societies (i.e. cultural frame < 6) such as Japanese society contribute *more* to the public good when systems of punishment are in place, i.e. rule of law is high. He also notes that stronger rule of law enables individuals to break out of their 'collectivistic' in-groups to join out-groups as strong rule of law reduces chances of social uncertainty (see Yamagishi, 2011: 255-256). Strong rule of law thus enables individuals to trust strangers based on their beliefs in the goodness of others or what Ahn and Ostrom (2008: 76) describe as one's beliefs in others' "pure motivations" to cooperate, which contrasts with individuals' 'calculated' intentions that seem to be found in 'collectivistic' societies as Yamagishi observes. If so, strong rule of law can ironically crowd out people's incentives to contribute to public goods as individuals feel that it is rules or punishment rather than trust that enables cooperation, which ironically fosters the former's dependency on punishment in order to effect cooperation and makes individuals feel less trusting of others and even exploit others, e.g. by free-riding (Yamagishi, 1988a: 534-535; Yamagishi and Yamagishi, 1994: 137; Yamagishi et al, 1998a: 190).

The above arguments thus explain the results for Hypothesis 4 that show the reductions in the rate of increase in probability that one is willing to pay via income payments and taxes as rule of law increases for 'collectivistic' societies in the longitudinal dataset after the initial increase in the rate, as well as increase in the rate of decrease in probability that one is willing to pay via income payments and taxes which eventually troughs in 'individualistic' societies as rule of law increases

(see section 7.5 above). These results reflect the 'crowding out' phenomenon that environmental economists such as Shogren (2012: 355-356) and their critics such as Gowdy (2008: 635) observe. Gowdy (2008: 635) also raises strategic bidding as an obstacle to environmental valuation which is supported by Shogren's (2012: 355-356) argument for 'crowding in' behavior of extrinsically motivated individuals. Crowding in further complements explanations of NIMBY-ism proffered by Portney (2013: 164-165) that individuals in 'individualistic' countries with high rule of law refuse to pay the costs (e.g. siting of waste recycling facilities in their neighborhoods) in exchange for the benefits of pollution mitigation (e.g. toxic waste recycling), such as in Western Europe as Donati (1997: 151-152) observes. Extrinsically motivated behavior such as NIMBY behavior is thus another example of strategic behavior (Avci et al, 2010: 230, 234) that is used to explain why the reductions in probability that one is willing to pay via income payments and taxes in 'individualistic' societies *decrease* for very high values of rule of law (see section 7.5 above): strong legal rules are needed to overcome strong NIMBY opposition. Such behavior also explains why individuals in 'collectivistic' societies are more willing to pay via income payments and taxes as rule of law initially increases: strong legal rules are needed to generate assurance of others' cooperation to overcome opportunistic behavior arising from calculated intentions—but too strong rules can ironically reduce trust in others and lead to exploitation of others, i.e. strategic behavior (see section 7.5 above). Complications from identifying which individual is susceptible to 'crowding in' or 'crowding out' behavior in *both* individualistic and collectivistic societies thus explain Shogren's (2012: 355-356) difficulty to design a policy mechanism that tailors to these two different groups of individuals.

In any case, above arguments for the courts as an alternative arena to the market for environmental valuation supports Ostrom's (1989: 38; 1992: 347-348; 2008b: 25; 2012b: 132) example of the South California water basin management where parties to all except one (Orange County) use lawsuits to "renegotiate their property rights" which transformed the court into a "legal forum for engaging a constitutional process" resulting in the appointment of an independent body (watermaster) to enable collection and sharing of information to all parties. In doing so, Ostrom (2005a: 844) argues that rules can help to overcome the weaknesses in explanations using rational choice theory. Ostrom admits that rules are not the solution to a game but can act to structure the situation. However, Ostrom argues that rules can help overcome CXN problems which overcomes the problem of "indeterminacy" in rational choice theory arising from multiple equilibria as a result from uncertainty in the number of rounds and types of players (Ostrom, 1998a: 4), as well as the "inadequacy" problem whereby rational choice theory is insufficient to predict individuals' actions due to the lack of empirical evidence for the theory (Ostrom, 1991: 240; 2010c: 156; 2009c: 53). Ostrom (1986: 21) observes that individuals can reach stable or near stable equilibria by adopting rules—and even achieve optimal or near optimal outcomes in contributing to the CPR (Ostrom, 2003: 23-24). Ostrom (1989: 17) thus criticizes the assumptions of complete information, infinitely repeated situations, absence of erroneous moves made by players and very small groups made in "standard game theory" as "extreme" as they are "rarely approximated" in the field and instead propose to treat these assumptions as "*variables affected by the situation* rather than as assumptions or constants unaffected by the situation" (author's italics).

A third conclusion is that it is doubtful that individuals' preferences can be treated as value neutral. A value neutral view of individuals' preferences may not be appropriate when individuals express

their preferences through institutions. If institutions are expressive as Sunstein argues by referring to the courts' "educative effect" and that individuals can change rules through such institutions as the courts as Ostrom observes in the management of the South California water basin example mentioned above, scholars such as Gowdy (2004: 246) may be vindicated for criticising the "nonjudgmental" treatment of people's preferences "by forcing individual preferences through the narrow funnel of rational choice theory" as this in effect ignores that individuals' preferences "depend on the individual's personal history, interaction with others, and social context". Claims for the endogeneity of one's preferences may be stronger given how institutions can mediate individuals' preferences. And as Sunstein (1994: 819) argues earlier, the state cannot be neutral over the kinds of valuation because the state "has to make decisions about how to allocate rights and entitlements; it has to decide what can be traded on markets and what will be subject to politics, and these decisions inevitably will take some sort of stand on appropriate valuations". Thus, Sunstein (1993: 220) argues that "fully acontextual" preferences "sometimes" do not exist as they are affected by or are "endogenous" to existing legal policy including "the setting of the legal entitlement".

Furthermore, different institutions can elicit different behaviors and affect how individuals interpret such behaviors. For example, Paavola and Adger (2005: 360) argue that different institutions specify the circumstances their rules apply in creating the institutional context which is complicated by agents who have multiple motivations but limited ability to detect other individuals' motivations. Social capital in the form of trust, Paavola and Adger (2005: 363) argue, can mediate interpersonal relationships in face of one's uncertainty about other actors' motivations and act to bridge 'cultural' explanations of institutional outcomes—such explanations more in line

with Yamagishi's "institutional view" of culture than that of the cross-cultural psychologists as aforementioned (see also section 8.2.3 below). Therefore, policy instruments need to account for the policy or institutional context as environmental valuation is "embedded into institutions that mediate environmental management" as Phelps et al (2017: 16; see also Edwards and Abivardi, 1998: 243-244) argue, such as when institutions commodify environmental resources into monetary objects for cost-benefit analysis, or create markets for these objects to be traded (Gómez-Baggethun and Ruiz-Pérez, 2011: 623-624). It seems that institutions can even perpetuate ideas that may be antithetical to other perspectives on the relation between humans and the natural environment as the commodification debate shows according to Pritchard et al (2000: 39)—including legalised NIMBY behavior as demonstrated above by Portney (2013: 164-165) and Donati (1997: 151-152). The non-neutrality of institutions thus perhaps explains scholars' support for the role of deliberation. These scholars include Spash (2007) who views that deliberation among individuals representative of a population can help to shape individuals' preferences which in turn influence individuals' collective valuation of the environment instead of a simple aggregation of preferences expressed as the sum of individuals' WTP, as well as Crocker et al (1998: 159) who argue for deliberation to overcome the incommensurability problem through public "exchange, and rational, critical value articulation". As Vatn (2004: 11) argues, the social character of preferences by introducing repetitive games in a form of "reciprocal altruism" is "too narrow" as deliberation is necessary which calls for a forum rather than a market. The role of deliberation may be a subject for future research, but it further supports Ostrom's argument for the role of communication among actors in a 'thick' model of rational choice.

8.2.2 Puzzle two: does rule of law impact more on one's WTP than culture?

If valuation is indeed contextual, the second puzzle concerns the extent to which institutions measured in terms of national rule of law exert a statistically significant impact on valuation as compared to culture defined in terms of the individualism-collectivism dimension. The results from both wave 5 and longitudinal analyses suggest that rule of law exerts statistically significant impacts across all three payment vehicles in *both* analyses as shown in Chapter 7 above, whether alone or in interaction with another independent variable for most values of trust in strangers and institutions in both wave 5 and longitudinal analyses (see section 7.4 above). This is in contrast with culture whose impact on one's WTP through cultural frame is more in line with Yamagishi's arguments than those of the cross-cultural psychologists as discussed above. The weak impact of culture is seen in the weak support for Hypothesis 1 which concerns the impact of an individual's cultural orientation (idiocentrism or allocentrism) on his/her WTP for most values of cultural orientation in both wave 5 and longitudinal analyses (see section 7.2 above), as well as for Hypothesis 2 which speculates that alignment between cultural frame and cultural orientation (i.e. collectivism-allocentrism or individualism-idiocentrism) can increase or decrease *further* one's willingness to pay for most values of cultural orientation in both wave 5 and longitudinal analyses (see section 7.3 above). This contrasts with clearer evidence for Hypothesis 3 (see section 7.4 above) on the rule of law, though its results are qualified as evidence is more manifest in its interaction with one's trust in strangers and institutions for most of their values in both wave 5 and longitudinal analyses.

If so, doubts are warranted concerning the thesis that individualism-collectivism can influence individuals' pro-environmental behavior as advanced by Cho et al (2013), Kopelman (2009), Roy and Goll (2014), Peng and Lin (2009), McCarthy and Shrum (2001), and Turkyilmaz et al (2015).

Rather, such evidence supports Yamagishi's (see Hashimoto et al, 2011: 146) arguments that individuals are both "cultural agents" influenced by their countries' 'cultures' (explained further in section 8.2.3 below) but also cultural game players who behave in response to their anticipation of other individuals' actions, and that they behave according to how they perceive the rules of the country. This supports Yamagishi and colleagues' (see Yamagishi and Suzuki, 2010: 195; Hashimoto and Yamagishi, 2015: 117, 121; Chiu et al, 2010: 483-484, 488) arguments for "preference expectation reversal" or "pluralistic ignorance" as one's actions depends on whether others in one's in-group also share in the belief that others behave collectivistically as they do as the example of Japanese show, as well as the efficacy of punishment meted out in terms of other in-group members' (e.g. compatriots') opinions on one's actions, i.e. public opinion (Yamagishi and Suzuki, 2010: 195). These factors are in addition to one's expectation of future benefit from other in-group members through reciprocation of one's favors as mentioned earlier. Thus, they further add support to Yamagishi and colleagues' (see Hashimoto et al, 2011: 2) labelling of individuals as "cultural game players" in addition to being "cultural agents" as cross-cultural psychologists conceive of individuals.

If valuation of environmental goods and services include both material and non-material benefits that individuals reap from the environment as proponents of "cultural ecosystem services" argue (e.g. Scholte et al 2015: 68; see also Millennium Ecosystem Assessment, 2005), then results support Yamagishi's finding that individuals reciprocate towards other members in their in-group in expectation of access to some of these benefits in the future by expecting that one's favors will be reciprocated by other in-group members. This informs Yamagishi's (1988a: 533, 534) argument for a "cultural-institutional" approach that stresses the presence of mutual monitoring and

sanctioning that prevents individuals from free-riding on in-group members rather than the "cultural-individualistic" approach that argues that it is individual members' collectivistic orientations that prevents them from free-riding. This point has been mentioned several times above in Yamagishi's "institutional view" of culture (see sections 7.5 above and also 8.2.3 below). Ultimately, it is still individuals' self-interests rather than culture as cross-cultural psychologists conceive that explains the observations of norm of reciprocity within a group, this norm maintained by punishing free-riders who do not reciprocate but want to benefit (Chiu et al, 2010: 486; Hashimoto and Yamagishi, 2013: 144; Hashimoto and Yamagishi, 2016: 286-287). This in turn creates a "self-sustaining system of shared beliefs" about how others in one's in-group will behave on the basis of individuals' very own beliefs about how others reciprocate and the incentives that reward appropriate individual behavior (Yamagishi, 2013: 24).

Yamagishi's account of the genesis of reciprocity thus differs from Ostrom's which does not address specifically the beginnings of reciprocity norm other than to argue that norms in general can be shared within a group only after individuals identify themselves as belonging to a group (Ostrom, 1989: 22), and that human beings do not "inherit" reciprocity norms through biological processes but can be learned through socialization such as from family, peers and schools, or as cultural norms (Ostrom, 2003: 44; Ostrom, 2010b: 5). It is thus this gap in Ostrom's explanation of the beginnings of reciprocity that scholars who study pro-environmental behavior from the individualism-collectivism perspective are proposed, such as Cho et al (2013) mentioned above. This leads to arguments by cross-cultural psychologists such as Triandis and colleagues (see Probst et al, 1999: 174) who propose that culture can be studied at the individual level as cultural orientation (i.e. idiocentrism and allocentrism) and at the social level as cultural frame, i.e.

individualism and collectivism. However, the impact of culture seems to be doubtful when Yamagishi's arguments encapsulated in his "institutional view" of culture seem to explain better than those of the cross-cultural psychologists the results on the interaction effects between one's trust in strangers and institutions on the one hand and cultural frame on the other hand across most of the three payment vehicles in both wave 5 and longitudinal analyses for most values of trust in strangers and institutions (see section 7.6.3 above). Such a view supports the role of enforcement of rules as noted earlier because effective rules are required to deter free-riders as Ostrom (2005c: 259-260) notes, whether as NIMBY behavior in 'individualistic' societies or as a necessary precondition for creating assurance of others' cooperation in 'collectivistic' societies. Thus, rule of law can 'intertwine' with culture as Bachmann argues. This also explains why Ostrom (2005b: 252) does not dismiss the role of 'culture' entirely as she recognizes that culture is multi-dimensional but essentially imposes rules on outsiders, even as she argues for the importance of macroinstitutional structure conceptualized as a country's political and legal structure on the success of community management of CPRs (Ostrom, 2005b: 249).

Then, if culture as cross-cultural psychologists conceive can still affect one's WTP as Yamagishi and associates (see Kuwabara et al, 2007: 462-464, 474-476; Romano et al, 2017: 12705) concede, a question to ask is whether individuals' *unwillingness* to pay can be explained by lexicographic preferences. Individuals express their lexicographic preferences for the environment by eliciting protest bids (Ryan and Spash, 2011: 684; Meinard and Grill, 2011: 1709) through value-articulating institutions (VAIs) such as CV surveys (Vatn, 2004: 12) that reflect, i.e. interact with, the underlying cultural frame of the country. However, when one looks at the results for Hypothesis 4 that examines the interaction effect between a country's quality of rule of law and

its cultural frame, results suggest that Yamagishi can explain the results through his "institutional view" of culture better than the cross-cultural psychologists observed only for lower values of (i.e. weaker) rule of law in wave 5 in contrast for most values of rule of law in the longitudinal analysis (see section 7.5 above). If Yamagishi's views are correct, lexicographic preferences can be explained as reflections of individuals' intrinsic motivations or "pure motivations" in Ahn and Ostrom's (2008: 76) words rather than extrinsic motivations which are driven more by material gains. Lockwood (1996: 87) defines lexicographic preferences as "in which a good with a particular value or attribute is always preferred to any amount of another good". They arise from one's refusal to accept any trade-off between money and target environmental good or service (Azqueta and Delacámara, 2006: 529; Spash and Hanley, 1995: 192, 193). Lexicographic preferences thus not only violate the axiom of continuity as trade-offs between money and the environmental good or service cannot be plotted on the graph as indifference curves (Spash et al, 2009: 956; Spash and Hanley, 1995: 193), but also render the Kaldor-Hicks potential compensation test also known as the potential Pareto efficiency/optimality criterion "inoperable" as infinite amounts of money would be required to compensate an individual for potential losses which is unrealistic and thus cost-benefit analysis is "meaningless" with non-compensatory preferences (Spash and Hanley, 1995: 196). Although there is debate over finiteness of compensation (see, for example, Veisten, 2007: 220; Sunstein, 1994: 836-837; 1993: 250-251), lexicographic preferences reflect some "hierarchy" of "public values" (Sunstein, 1994: 836-837; 1993: 250-251). This hierarchy is based on Georgescu-Roegen (1954) who argues that certain goods are "irreducible" and thus the notion of indifference (i.e. continuity axiom) does not apply, and Etzioni (1986; see also Gowdy and Mayumi, 2001: 228; Avci et al, 2010: 229; van den Bergh et al, 2000: 52; Farley

et al, 2015: 248; Spash, 2011: 360) who argues that some goods may elicit moral preferences which cannot be traded off against utilitarian goods.

If so, this goes back to the argument that valuation cannot avoid non-economic motives underlying environmental valuation (Martín-López et al, 2007: 67, 68). However, this dissertation does not explicitly focus on protest responses as the analysis does not examine respondents who refuse to answer the three payment vehicle questions in Table 11 (see Appendix A). Nevertheless, this view of valuation understandably informs Spash's (2011: 361) argument for doing away with the assumption of self-interested utility maximization so that the role of social norms in WTP can be explored as norms provide a "link" between individual motivators and societal motivators for one's action. Removing this assumption also allows bringing in the role of institutions into analysis which invoke the themes of power, trust and control as individuals can change their behaviors in respond to "requests and incentives" from these institutions; classical or critical institutional economists hold such a view of institutions as opposed to the neoclassical "new" institutional economists such as Ostrom.

Another possible explanation for the less evident impact of culture as seen from the results is that cultural evaluation of the natural environment requires deliberation as Chan et al (2012: 754) argue. Surveys such as those conducted by the WVS but also including the typical stated preference survey such as CV may not be able to capture this effect of deliberation as deliberation requires discussion among actors when surveys merely show the aggregation of individuals' responses at best without considering the impacts of discussion that may occur before or after the elicitation of responses from each individual. If this is the case, then how society values the environmental

resource may not correspond to a simple aggregation of individuals' preferences, i.e. societal WTP is not equivalent to sum of individuals' WTP. To aggregate individuals' preferences would run the risk of individualistic fallacy (Sagoff, 2007: 80), not to mention that individual's autonomy is disregarded but merely seen as a constitutive unit of an aggregated WTP as Sagoff (2007: 79) argues. Individual autonomy is manifest in the different socio-cultural values that individuals in a community hold which are "context-dependent and may also be related to different objectives, concerns and priorities for ecosystem management" (Iniesta-Arandia et al, 2014: 46). Cultural values require constant social negotiation among human beings as to what constitutes these values as Pröpper and Haupts (2014: 30) maintain. Such a view refutes the neoclassical economists' argument that individuals' exogenous preferences are given, stable and "rather similar" across all individuals as values as "culturally shared meanings" are changing which form "an integral part of endogenously evolving and transforming preferences" (Pröpper and Haupts, 2014: 31, 33). Consequently, weaker arguments for culture elevate arguments such as Ostrom's which advance that the quality of legal institutions affect how individuals treat the CPR even as she speculates the enculturation effect culture may have on collective resource management. This conclusion is on top of methodological problems mentioned earlier that have to do with the phrasing of the government spending question and the use of less reliable proxy measures for the following independent variables in order to enable longitudinal analysis to be conducted: cultural orientation, trust in strangers and trust in institutions (see section 7.5 above).

Still, to the extent that the argument for culture applies, the weaker effect of culture as the individualism-collectivism dimension may be attributed to problems with measuring cultural frame which are at best context specific if one considers that Hofstede's (1980, 2001b)

measurements are confined to the workplace, or at worst possibly arbitrary if one judges negatively the rigor of Triandis' measurements based on his personal observations (see Suh et al, 1998). However, in defense of the cultural school, Yamagishi and Ostrom did not run their experiments on countries but only on individuals, thus limiting the explanatory powers of their institutional arguments to individuals. Yet so, it would have been logistically difficult to perform experiments on culture at the country level as Oyserman and Uskul (2008: 168) recognise, let alone across countries. Furthermore, the effects of culture would have been difficult to isolate at the individual level and introduced at will during experiments when an individual's cultural orientation has been so ingrained into his/her psyche. In any case, this analysis does not claim to take sides in the debate between supporters of institutional framework approaches and proponents of ideas-based approaches. Comparing the results in both wave 5 and longitudinal analyses, they seem to suggest in sum that institutions more than culture exerts a greater impact on individuals' valuations. This is because institutions in the form of rule of law exhibit more theoretically consistent impact on individuals' WTP in line with Yamagishi's; even for 'culture', its impact seems to be better explained by Yamagishi's "institutional view" of culture than culture as cross-cultural psychologists conceive across all payment vehicles in both analyses, whether alone or in interaction with other independent variables.

The upshot from the above discussion is that the relation between institutions and the environment is not straightforward. Hayden (1993: 411-412) argues that there is "never a direct relationship between any one institution and an environment" as institutions do not operate in isolation to one another but "overlap" with other institutions in "any social endeavor"; institutions "work through" other institutions in "transaction with" the environment. The main takeaway is that governing

institutions seldom operate in isolation from their social environment in which they are embedded and arise from as results for Hypothesis 4 on the interaction between a country's rule of law and its cultural frame show (see section 7.5 above), which leads Hayden (1993: 412-413) to argue for "appropriate" institutions in crafting environmental policy. Hayden (1993: 414) also argues that ecological sustainability has "a social meaning" because ecologies and biodiversity have "a social context" as natural environments such as wetlands which can change due to "different technological and social habits", but also with "different technological and social regime". This reflection of the social context supports Ostrom and Ahn's (2001: 27; see also Ostrom and Nagendra, 2007: 194; Ostrom et al, 1992: 413-414; Ostrom, 1994: 545, 548; 2000a: 148; 2009a: 209) argument that rules must reflect their socio-cultural setting in order for rules to be recognised as legitimate in order to "counteract the perverse incentives that [individuals] face given the physical and cultural setting in which they are enmeshed". It also supports Gowdy's (2008: 637, 639-640) argument that human behavior can be "culturally conditioned" by rewards and punishments that is dictated by social, i.e. 'cultural' or institutional, norms such as reciprocity or "conspicuous consumption" to distinguish oneself from one's peers in a seemingly homogenous society as relative income hypothesis posits, notwithstanding that norms can vary across societies and conflict with other norms. It also lends support to Sunstein's and Hickerson's arguments for the expressiveness of institutions as mentioned earlier.

While the role of communal deliberation may support Ostrom's arguments for interpersonal communication among actors in a community managing CPRs, expressiveness would require going beyond mere communication on the rules and norms to focus on the meaning that actors in a community infuse into the natural environment beyond just mere derivatives as goods and

services as argued by proponents of ecosystem services. If so, this may explain the results in section 7.5 above that resonate more with Yamagishi's "institutional view" of culture than those of the cross-cultural psychologists when examining the interaction effect between a country's rule of law and its cultural frame in the longitudinal analysis as actors of different motivations—whether intrinsic or extrinsic—react differently to the rules and 'cultures' of their societies which demonstrate considerations of 'social apprpriateness' of their actions such as contributing to CPR (elaborated below in section 8.2.3). If so, Sandel's (2000: 89, 94-96) criticisms of commodification which denigrates the thing being exchanged for cash supports his argument for the 'appropriateness' of value which may apply to individuals who are more intrinsically motivated than those who are extrinsically motivated. Such considerations of appropriateness go back to the previous argument that one's preferences expressed as valuations through institutions such as policy instruments like the three payment vehicles in the WVS cannot be value neutral; in fact, institutions that entrench mainstream economists' views of the environment can be antithetical to environmental management and society's view of 'appropriateness' as results in section 7.5 show for 'individualistic' societies.

This harks back to Ostrom's invocation of March and Olsen's (1989: 160; see also Ostrom, 1991: 238-239; VanWey et al, 2014: 43; Varughese and Ostrom, 2001: 748) "logic of appropriateness" which argues that behavior is rule-governed rather than consequence-governed. However, Ostrom (1991: 239) cautions that March and Olsen's argument for rule-governed behavior should not dismiss the possibility of rational calculation that individuals can take as they can decide which actions to take as long as permitted under the rules as institutions do not specify what actions individuals can take but merely indicate what sets of actions are permitted and/or forbidden.

Ultimately, rules need human beings to enforce them in order to be effective as "rules are not self-formulating, self-determining, or self-enforcing" but are "formulated, implemented and upheld by human beings" as Ostrom (2005a: 833; 2014c: 90) recognises in conjunction with 'culture' in order to make rules 'legitimate'. However, such a view is "not consistent with the theory of norm-free, complete rationality" as Ostrom (1999a: 505) argues in agreement with Jon Elster (1989b: 40-41). It seems that the impacts of the interaction between governing institutions and culture on one's WTP is still inconclusive though it raises some interesting conclusions, a phenomenon which merits further future investigation.

8.2.3 Puzzle three: The counterintuitive impacts of 'culture'

The third puzzle concerns the counterintuitive findings found for Hypothesis 4 on a country's cultural frame interacting with its rule of law (see section 7.5 above) and with an individual's trust in strangers and institutions (see section 7.6.3 above) not as cross-cultural psychologists such as Hofstede and Schwartz expect, but as Yamagishi argues. The counterintuitiveness of this finding lies *not* in that cultural frame actually mediates the impact of one's trust in strangers and institutions or intertwines with rule of law to impact on one's willingness to pay and free-ride on government spending. Yamagishi has already anticipated that individuals behave as cultural agents whose actions are influenced by the cultural frames of their countries in addition to being cultural game players who behave in anticipation of how other individuals in their in-groups would react to them. What is counterintuitive is actually how these three interaction effects that involve culture via cultural frame actually contradict what cross-cultural psychologists would expect of the effects of culture on individuals' behaviors. Instead, Yamagishi seems to offer a better explanation as he observes that people such as Americans from an 'individualistic' society such as the US are

actually more trusting of strangers in contrast with individuals such as the Japanese from 'collectivistic' Japanese society; the former are thus more willing to pay and less willing to free ride on government spending. This is because a supposedly 'individualistic' environment 'releases' or 'emancipates' individuals from being bound to their in-groups, and facilitates—even compels—them to learn trusting outgroup members who are strangers as they interact with them especially if the former wants to cooperate with strangers in group enterprises such as environmental conservation; such outgroup members also include governing institutions.

Results for Hypothesis 4 in section 7.5 above and in section 7.6.3 above explain Yamagishi's (2011: 255) findings from the WVS that individuals from 'individualistic' societies such as Americans are more trusting of others and that these individuals are less likely to exit a group that has free-riders unlike those from 'collectivistic' societies such as the Japanese when costs of exiting are *high* (Yamagishi, 1988a: 539-540; Yamagishi et al, 1998a: 167). Ahn and Ostrom (2008: 76) describe the trust that supposedly individuals from 'individualistic' societies have in others as arising from "pure motivations" or beliefs in others' intentions to cooperate rather than from any calculated gain to be made from cooperation as individuals from 'collectivistic' societies expect in Yamagishi's view as aforementioned. If so, this has ramifications for the adoption of norms in 'individualistic' and 'collectivistic' groups such as the norm of reciprocity as Triandis (2001: 911) expects uptake of norms in groups to be more highly likely to be adopted among collectivists or in a collectivistic environment. To the extent that cross-cultural psychologists are unable to explain convincingly the marginal effects of the three interaction effects examined in sections 7.5 on Hypothesis 4 and 7.6.3 above, the field of study examining individuals' pro-environmental behaviors will be adversely affected as scholars in this field draw heavily from the

arguments of the cross-cultural psychologists, such scholars including Cho et al (2013), Kopelman (2009), Roy and Goll (2014), Peng and Lin (2009), McCarty and Shrum (2001), and Turkyilmaz et al (2015). However, this is not to suggest that cross-cultural psychologists have totally erred in their findings: they are correct in arguing that culture needs to be analyzed both at the individual level in terms of cultural orientation and at the group level in terms of cultural frame (see Probst et al, 1999: 174; Schwartz and Ros, 1995: 99; Fischer et al, 2010: 136), which supporters of Yamagishi's 'emancipation' theory of trust adopt (e.g. Gheorghiu et al, 2009).

Results from counterintuitive findings in section 7.6.3 above seem to highlight the importance of how an individual defines his/her in-group that both cross-cultural psychologists and Yamagishi recognise. One possible explanation for these counterintuitive findings centers on the putative boundaries of an individual's in-group in a 'collectivistic' society: an individual's in-group need not necessarily encompass all citizens of the country that he/she is in as the boundaries of his/her in-group are narrower than cross-cultural psychologists anticipate them to be. Yamagishi and Kiyonari (2000: 129) recognize this in their criticisms of the social identity thesis (e.g. Tajfel's "minimal group thesis") that mere shared social identities such as a common nationality does not automatically incline individuals of this identity to behave 'collectivistically' toward one another, i.e. favor one another as in-group members over outsiders or out-group members. Instead, Yamagishi and Kiyonari argue that these social identities are mere boundaries or 'containers' of one's in-group that creates expectations of reciprocity from other members of the same social identity. Such expectations of reciprocity must be upheld by 'social rules' that punish non-reciprocators in that group which give rise to Yamagishi's "institutional view" of culture which explains the 'convergence' in change in probability that individuals are willing to pay via direct

income payments and taxes in both 'individualistic' and 'collectivistic' societies (see section 7.5 above). This is contrary to cross-cultural psychologists' predictions such as Triandis (2004: 90) who expect no such convergence at all; rather, they see the relation between WTP and cultural frame as linear, e.g. Hofstede (2001b: 239). Cross-cultural psychologists such as Hofstede (2001b: 239) and Triandis (2004: 90) posit that individuals in an individualistic context see themselves as independent of the in-group which explains why they can trust out-group members such as strangers and governing institutions and are thus more likely to pay via direct income payments and taxes and less likely to free ride on the government. This reasoning suggests the mutability of the boundaries of one's in-group as Triandis (see Triandis et al, 1988: 326, 333) recognizes. Yet, Yamagishi is all the more cognizant that in-group members can change when mechanisms that monitor and punish non-reciprocating in-group members and bind them as an in-group are absent, as his explanations of behaviors among Japanese show (see Yamagishi and Suzuki, 2010: 195; Hashimoto and Yamagishi, 2015: 117, 121; Chiu et al, 2010: 483-484, 488). Yamagishi explains this finding through his "structural goal/expectation theory" that "the different opportunity structures available" in the "cultural" system rather than a country's cultural frame leads individuals to behave 'individualistically' or 'collectivistically': low exit cost (i.e. low barrier to exit) from one's in-group obviates the need for collectivistic solutions such as instituting a system of mutual monitoring and sanctioning but high exit costs requires such a collectivistic solution as the "only viable solution". If so, low costs of exiting an in-group that a supposedly 'individualistic' country facilitates 'frees' individuals from being obligated to contribute to in-group goals thus allowing individuals to contribute to public goods and CPRs such as environmental conservation; in short, such individuals are operating in a "trust-based society" as opposed to an "assurance-

based society" which describes 'collectivistic' societies such as Japan (Yamagishi, 2011: 255-256).

If so, support for environmental conservation in industrially advanced countries may have nothing to do with "postmaterialist" values that have been advanced by Inglehart and colleagues (Inglehart and Oyserman, 2004: 92-93; Inglehart, 1995; Inglehart and Abramson, 1999). They argue that postindustrial societies enable individuals to pursue goals beyond material wellbeing once their basic material needs have been met. Rather, it is the weakening of in-group monitoring and punishment mechanisms in such societies that come with individuals' wealth accumulation that these individuals face low exit costs leaving their in-groups to join as many out-groups as they desire in the pursuit of such 'postmaterialist' goals. The costs of exiting any one of these groups in these societies is low as they need not depend on particular groups for survival needs, i.e. a group's pooled resources, which thus obviates support from their 'collectivistic' in-groups. In fact, if there are enough (i.e. critical mass of) individuals in such an 'individualistic' country who support environmental conservation, this may result in individuals' perceptions that support for the environment is a socially desirable response that to violate such 'politically correct' behavior would render that individual (trustee) from the trustor's view as untrustworthy or devoid of 'pure motivations' as Ahn and Ostrom put it rather than 'less assured' or 'unassured' as trustors would feel towards their trustees in 'collectivistic' societies. In a sense then, such untrustworthy individuals can be labelled social pariahs such as NIMBY individuals in a supposedly 'individualistic' society as is described of typically 'Western' societies such as the US, Australia and western European countries, but weak punitive social mechanisms in these societies mean that such 'pariahs' receive little or no punishment such as social isolation or derision—rather, these

'deviants' are simply 'left alone' to their own devices. This is in stark contrast with unreciprocating individuals in supposedly 'collectivistic' societies such as Japan, South Korea and China where such individuals face palpable punishment such as gossip and social isolation from contravening group goals such as mandatory recycling; to avoid social ostracism, such individuals are compelled to engage in "default strategy" of behaving such as the "not-offend-others" strategy (Yamagishi and Suzuki, 2010: 187; Yamagishi et al, 2008: 580) or "collectively" adopt a particular strategy which is then adapted to the context or situation (Yamagishi and Suzuki, 2010: 185-186). While both 'individualistic' and 'collectivistic' societies result in stable interpersonal exchanges even for the former where individuals become adept at identifying which individuals can be trusted after a 'learning process' of trial-and-error while individuals in the latter have punitive mechanisms to ensure cooperation, the difference lies in that individuals in the former are supposedly 'free' to do as they please not so much because of putative 'cultural' values of 'freedom' associated with the socio-historical lineage of their societies but because of weak social monitoring and sanctioning mechanisms.

The above arguments possess substantial implications for environmental valuation. If the presence of social monitoring and punishment mechanisms makes the difference between an 'individualistic' and 'collectivistic' society with a higher value of cultural frame indicating weaker social monitoring and punishment mechanisms and vice-versa, explanation for the adoption of social norms such as recycling needs to be more nuanced as different explanations apply to explain why individuals in these two different societies adopt these norms. Hence, a few points can be made when analyzing in tandem the results from both wave 5 and longitudinal analyses on the interaction effect between a country's cultural frame and its rule of law (see Hypothesis 4 in section

7.5 above) on the one hand, and the interaction effect between a country's cultural frame and an individual's trust in strangers and institutions (see section 7.6.3 above) on the other. For 'individualistic' societies that supposedly encourage individuals to behave based on their faith in other individuals' cooperation or "pure motivations", pure altruism or citizen behavior may indeed explain why these individuals recycle as these individuals incur transaction costs in sorting, collecting, transporting and discarding recyclable wastes which is economically inefficient and are neither monitored nor punished if they do not recycle as van den Bergh et al (2000: 48-49) argue (see Chapter 3). Thus, individuals must believe that it is easy or morally rightful (i.e. legitimate) to recycle as Spash et al (2009: 962) argue, which leads Spash (2011: 361) to even suggest doing away altogether with the assumption of self-interested utility maximization. Removing this assumption allows for the exploration of the role of social norms as they provide a "link" between individual motivators and societal motivators for one's action and bring in the role of institutions that classical or critical institutional economists explore as opposed to the neoclassical "new" institutional economists such as Ostrom. For 'collectivistic' societies that encourage individuals to behave towards others based on calculated intentions with expectations of future benefits from others, Dasgupta's (2001: C18) explanation of why such individuals adopt such norms would be more appropriate as he argues that social norms can be practised "only among people who expect to encounter one another repeatedly in similar situations"; such repetitive encounters allows for more opportunities for mutual monitoring and punishment. Thus, this explains criticisms of policy mechanisms which fail to distinguish between 'crowding out' intrinsic motivations to do a 'good deed' that supposedly applies to individuals residing in 'individualistic' societies, or 'crowding in' actions that encourage desired behavior using extrinsic motivation such as monetary incentives

that supposedly apply to individuals living in 'collectivistic' societies, which Shogren (2012: 355-356) recognizes as difficult to implement.

The strength of social monitoring and punishment mechanisms would thus support Vatn and Bromley's (1994: 139) argument that the social context can shape one's preferences through society socializing an individual into identifying himself/herself with a social group, and why individuals in 'individualistic' societies have loose ties with another as opposed to individuals in 'collectivistic' societies characterised by stronger interpersonal ties as cross-cultural psychologists such as Hofstede note. However, it is only individuals in 'individualistic' societies who can choose from among these many social contexts to create their 'identity' as a basis for valuing environmental goods and services as Vatn and Bromley (1994: 142) observe. This is because individuals can freely join and leave social groups which accordingly influences how they identify themselves such as consumers involving their "preferences" or citizens using their "judgments". However, as Yamagishi above argues, social identity is not sufficient to explain in-group reciprocity as social identity merely demarcates in-groups and out-groups but assumes reciprocity to occur 'automatically' among in-group members when trust or faith in others' willingness to cooperate is needed to enable such reciprocity to occur. In contrast, individuals in 'collectivistic' societies would be hard pressed to identify themselves as 'citizens' unless some national level social monitoring and punishment mechanism is in place to 'enforce' one's identification with national identity—which even if available would be hard to enforce given the sheer scale of monitoring required. In a sense then, Sunstein's argument (1993: 240) that government can use laws to change attitudes towards preferences for activities (e.g. recycling) is valid but only up to a point: such laws ought not to crowd out individuals' good intentions to recycle in 'individualistic'

societies, while recycling laws need to be backed by substantial enforcement of a large scale in 'collectivistic' societies. Thus, what Veblen (1899) and Boulding (1970) propose is correct: that conspicuous consumption ought to be encouraged among individuals as an incentive to engage in CXN, but this applies more to individuals in 'collectivistic' societies and NIMBY individuals in 'individualistic' societies who require that extrinsic motivation or incentive to act.

Consequently, the values that individuals vest in such CXN as environmental conservation are different as Brown (1984: 244) observes, simply because individuals belong to two entirely different societies that are classified based on whether monitoring and punishment mechanisms are strong. This explains why some philosophers such as Sandel (2000: 89, 94-96) rail against treating the environment as a commodity as it fails to account for the environment's 'inherent' value that individuals in 'individualistic' societies can perceive, while others such as Walzer (1983) argue otherwise that it depends on the social norms that have been socially 'molded' or encouraged by advertising, tax incentives and other extrinsic motivations. Thus, whether an environmental resource is seen as fungible or commensurate with money as Sunstein (1994: 846) notes of legal compensation for environmental violations will have to depend on whether individuals live in societies that encourage individuals to behave based on intrinsic or extrinsic motivations: legal compensation is inappropriate to the former but not for the latter. However, this does *not* explain Fourcade's (2011: 1734) example of why US courts would award extensive legal damages for environmental violations while French courts would award symbolic damages if both US and France are 'individualistic' societies and the courts are society's 'voice' via its "educative effect" (Sunstein, 1994: 824). Instead, the US example serves to support the view that an 'individualistic' society can accommodate not just instrinsic but also extrinsic motivations.

Extrinsic motivations explain why the US courts award extensive legal damages by treating the environment as *more* commensurate with money than the French even as Americans are putatively motivated by instrinsic motivations which is consistent with identifications of NIMBY individuals in such societies (e.g. Donati, 1997: 151-152; Portney, 2013: 164-165); this describes the duality of 'individualistic' societies as seen from results concerning Hypothesis 4 (see section 7.5 above).

If societies are really differentiated along the lines of whether mechanisms of social surveillance and punishment are strong rather than on the individualism-collectivism dimension, it would appear mistaken to suggest support for van den Bergh et al's (2000: 49) argument that valuation can be culturally determined even when cultural frame mediates the impact of one's trust in strangers and institutions to affect his/her probability to pay and free ride (see seciton 7.6.3 above). The cultural valuation argument is important to the ecosystem service (ES) framework because non-material aspects account "for a great part" of the reasons humans value nature, and act to "complement or counterbalance" the utilitarian aspects of value (Pröpper and Haupts, 2014: 29-30). The argument is also adopted by the Millennium Ecosystem Assessment (2005) and by implication all signatory states which defines cultural ecosystem services as "the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g., knowledge systems, social relations, and aesthetic values". However, the socio-cultural meaning that individuals vest with the environment such as its inherent "wilderness' value (Fourcade, 2011: 1735-1736) or social obligation to future generations of mankind (O'Neill, 2001: 1867) are only possible in 'individualistic' societies where these individuals are more likely to behave with "pure motivations" or the willingness to conserve the environment as a 'good deed'. 'Collectivistic'

societies would ‘crowd out’ such pure or intrinsic motivations as individuals come to perceive that others behave based on calculated intentions regardless whether individuals are intrinsically or extrinsically motivated, i.e. they operate based on assurance not trust. Thus, while O’Neill (2001: 1866) is correct in arguing that monetary transactions are “not exercises in the use of a measuring rod” but are “social acts which have a social meaning” which “are constituted by particular kinds of shared understanding which are such that they are incompatible with market relations”, the social meanings that individuals vest in the natural environment differ between those who live in ‘individualistic’ societies and those who live in ‘collectivistic’ societies. If the latter vest meaning in terms of extrinsic motivation more so than the former, then this casts doubt on Gowdy’s (2008: 633, 634) criticism that the rational choice model is unable to apply to all individuals as those in supposedly ‘collectivistic’ societies treat the environment based on the incentives they can obtain from it, i.e. as rational consumers.

If individuals behave in the way described above, the implications for deliberative monetary valuation (DMV) that supporters of cultural valuation such as Chan et al (2012: 754) advocate are limited in its use as it depends on the type of society individuals are in. Seen as an antidote to a fixation with utilitarian measures of environmental goods and services, DMV’s ability to incorporate non-monetary benefits and costs from environmental extraction is more useful in ‘individualistic’ societies which encourage individuals with pure motivations to express their preferences and thus are more likely to take those into account; individuals in ‘collectivistic’ societies would see this exercise as unnecessary and futile as extrinsic motivations are encouraged and thus see conventional valuation approaches as adequate to capture their preferences expressed in monetary costs and benefits. Hence, Turner et al’s (1998: 62, 63) charges of “scaling problems”

levelled at Costanza et al's (1997: 253-260) valuation of the world's ecosystems is somewhat premature as Costanza et al's valuation would have likely appealed to those individuals in 'collectivistic' societies, while those in 'individualistic' societies would more likely find it repulsive.

It is also more likely that as individuals in 'individualistic' societies can enter and exit social groups at will that they are more likely to hold different socio-cultural values that Iniesta-Arandia et al (2014: 46) note—which makes it all the more relevant for DMV to be implemented in these societies. However, this would be at odds with Winthrop's (2014: 211) argument that DMV should apply to tribal societies that putatively seem more 'collectivistic', such as Winthrop's (2014: 211) observation of American Indians who vest spiritual significance in the natural environment. Yet, given the extensive social monitoring and punishment mechanisms that tribal groups institute to regulate interpersonal behavior within the group, DMV is unlikely to be useful to individuals in these 'collectivistic' societies as punitive mechanisms incentivize them to espouse similar if not identical views towards the environment, or otherwise face punishment from their 'elders' which act as negative incentives for non-cooperation. If so, this view is consistent with how culture as their proponents conceive enables a societal WTP through reaching consensus by deliberation within the group as opposed to aggregation of individuals' WTP. Nevertheless, Iniesta-Arandia et al (2014: 36) find that there are "contrasting perceptions of some ecosystem services among stakeholders and of the relevant drivers of change and wellbeing" within groups that engage in traditional practices of managing ecosystem services—which may be interesting to researchers by examining how such supposedly 'cultural' values change when social monitoring and punishment mechanisms wax and wane in such societies over time.

Given the above diversity in how individuals respond depending on the society they are in, it is unsurprising that cultural ecosystem service values still remain to be accounted for in monetary valuations despite recognition of their importance (e.g. Millennium Ecosystem Assessment, 2005: 40) as Chan et al (2012: 746) find. In contrast, Vriend (1996: 270-271) argues that "cultural factors, ruling morals, social customs or duties, habits, herd behavior, etc." can be easily incorporated into the economic framework—the latter more likely if individuals live in 'collectivistic' societies where atomism (i.e. self-interests) and monetary profitability are more likely to be emphasized. It also explains the contention between Hahnel and Albert on one hand and O'Neill (2002: 155, 157) on the other over consequentialism which applies more to individuals in 'collectivistic' societies than those in 'individualistic' societies. Thus, O'Neill (2002: 157) and also Gowdy (2004: 247-248) defend procedural rationality where individuals' concerns with 'means' (e.g. fairness) and not just with 'ends' matter—but this applies more for 'individualistic' societies where individuals operate out of "pure motivations". It also explains the dichotomy in cultural goods that Winthrop (2014: 209) observes: as "a special category of commodities" that individuals in 'collectivistic' societies are more likely to embrace, or as "a system of understandings through which social life is transacted" that are likely to resonate more with individuals in 'individualistic' societies. Or that, individuals in 'individualistic' societies are more likely to be "non-egotistic" than those in 'collectivistic' societies as Sen (1977: 326) notes of the difference, or that individuals in 'individualistic' societies exercise 'reason' or 'jugdment' in situations of making 'comparable' choices and are thus more 'expressive' but individuals in 'collectivistic' societies make choices based on 'commensurability' using Sunstein's (1994: 810, 811) distinction.

At the micro-contextual or individual level, the counterintutive findings support the following observations of human behaviors. Results explain why individuals would vie for status goods to distinguish themselves from the rest of the population in an ostentatious display (Sagoff, 2007: 75-76; Spash, 2011: 359), i.e. they are more inclined to pay if they obtain public recognition for their contribution as Gowdy (2008: 641) observes. Such 'conspicuous consumption' is more likely to occur in 'collectivistic' societies where individuals are driven more by extrinsic motivations (i.e material incentives) to act. It also explains why individuals would find human relationships 'enriching' as Spash (2011: 359) submits which are more likely to occur in 'individualistic' societies where individuals view their relationships with others as meaningful if they can trust them out of their faith in others' cooperation. Thus, Gowdy (2008: 635) cautions against the use of monetary incentives and that human behavior can be "culturally conditioned" (Gowdy, 2008: 637) but this applies to individuals in 'individualistic' societies—which thus explains the criticism that the *homo economicus* model of human behavior is neither deterministic nor definitive as the only model of human behavior (Faber et al, 2002: 325). Or that why individuals who elicit protest bids should not have their bids excluded from research analysis as Christian Becker (2006: 18) argues as these individuals tend to be more expressive of their intrinsic motivations in 'individualistic' societies. Thus, where strategic behavior is concerned, individuals in 'individualistic' societies are presumably more likely to overbid a project supporting environmental conservation driven by their intrinsic motivations to do good while individuals in supposedly 'collectivistic' societies are more likely to underbid as they operate more on extrinsic, i.e. material or monetary, motivations. However, this does not preclude individuals in 'individualistic' societies from engaging in NIMBY behavior as aforementioned; if so, there are

limits to the arguments (e.g. Sypnowich, 2016) that such NIMBY behavior is actually a form of protest bid when NIMBY behavior may actually be driven by individuals' extrinsic motivations.

Concerning trust, the counterintuitive findings explain the two forms of trust that benefit society as Scholz and Lubell (1998: 399) identify: "vertical trust" between citizen and state that is more associated with 'collectivistic' societies when social monitoring and sanctioning mechanisms are strong, and "horizontal trust" between one citizen and another which reduces the need for social monitoring and punishment that is more likely to be found in 'individualistic' societies as individuals cooperate with one another based on one's faith in the other's propensity to cooperate. It also fits the expectation that individuals in 'individualistic' societies who possess low trust in the institution's ability to supply the good may lead to "institution-related bias" which can generate high protest response rates (Remoundou et al, 2012: 382) or conversely are less inclined to free ride on government spending as rule of law improves (see results for Hypothesis 1 in section 7.2 above) or as society becomes *more* 'individualistic' (see results for Hypothesis 2 in section 7.3 above). It also explains why individuals may perceive less need to pay taxes to reduce environmental damage if they perceive that their governments do well in reducing environmental deterioration (Torgler and García-Valiñas, 2007: 541) as stronger punishment mechanisms in the form of laws can ironically lead to free-riding on government spending in 'collectivistic' societies (see results for Hypothesis 4 in section 7.5 above). Such trust is important when payment vehicle bias arises from the lack of trust in governing institutions (Blamey, 1998: 63-64). Trust, not assurance, also explains the formation of social capital in postindustrial 'individualistic' countries such as the US where individuals can trust each other and their governments enough to engage confidently in collective action such as mass protests without fear of government reprisals or zero

contribution from other individuals contrary to what Olson (1965) expects and at odds with Putnam (2000) and the 'network school' of social capital (see Welzel et al, 2005: 124). To paraphrase Yamagishi and colleagues (see Hashimoto et al, 2011: 141), this explains why individuals are both "cultural agents" influenced by 'culture' and "cultural game players" influenced by their anticipation of others' responses towards their own behaviors: cultural agents seem to be associated with individuals in 'individualistic' societies who can express their motivations, while cultural game players are more likely to be found in 'collectivistic' societies where individuals behave in anticipation of possible punishment from others in their in-groups.

8.3 Concluding remarks

This dissertation commences with a research question which investigates the role of contextual factors in their impacts on individuals' valuation of the environment by comparing the effects of two contextual factors: institutions as a macro-institutional structure against culture focusing on the individualism-collectivism dimension. A survey of current literature justifies this research by identifying the role of interpersonal trust among individuals in affecting individuals' environmental WTP which forms the micro context, and the role of norms and institutions as the macro context which reveal how individuals can each elicit different WTP despite being in a supposedly homogenous group such as a country. From these, I identify and test four hypotheses as possible explanations of variations of valuations among individuals in a group at the country level drawing from major theorists of both camps: Hofstede, Triandis, and Schwartz on the cultural side; and Ostrom and Yamagishi on the institutional side. By applying multilevel analysis to both wave 5 and longitudinal datasets that encompass waves 2, 3, 4 and 5 of the WVS, a comparison of results from both analyses reveals that Ostrom and Yamagishi's rules measured by the quality of

national rule of law mostly impacts on individuals' valuations but only when interacted with interpersonal trust and trust in institutions. On the other hand, culture as the individualism-collectivism dimension exhibits weak even counterintuitive impacts when examining the interaction effect between cultural orientation and cultural frame, and their interactions with other variables at both the individual and country levels. The analysis rounds off with a discussion of the findings that suggest that: 1) in the larger economic literature, environmental valuations can be political subject to manipulation; 2) institutions as rules embodied in the macro-institutional structure impact on valuations more than individualistic and collectivistic cultures; and 3) a country's 'culture' can interact with its rule of law and mediate the impacts of one's trust in strangers and institutions to affect the change in probability of one's willingness to pay and free ride on government spending *not* as how cross-cultural psychologists would predict, but more as how Yamagishi would foresee.

What the above holds as implications for policymaking and politics, then, is threefold. Firstly, national rule of law and national 'culture' as social rules regulating interpersonal exchanges set an important context for people's decisions to opt to pay and decide on how much to pay. However, both rule of law and 'culture' can be perceived as shown above via how one's perceived trust in institutions interacts with rule of law as measured based on society's perceptions (see section 7.4 above), and individuals' (un)willingness to pay via income payments and taxes in 'collectivistic' societies (see sections 7.5 and 7.6.3 above). Policymakers can manipulate people's perceptions of law through exploiting the macro-institutional structure or dismiss 'cultural' opposition to valuation in order to canvass or quell support for pollution mitigation (see Kopelman et al, 2002: 142 on framing effects). On the other hand, it would be tragic if advancements in quality of rule

of law are not matched by changes in people's perceptions of the law or if socially appropriate valuation instruments (e.g. DMV for 'individualistic' societies and CBA for 'collectivistic' societies) are not used, as seen in public misconceptions about climate change (Lorenzoni and Pidgeon, 2006: 80, 85; Immerwahr, 1999: 2) and unfamiliarity with payment vehicles creating payment vehicle bias (Morrison et al, 2000: 412, 421). Secondly, valuation is political by being vulnerable to factors at the contextual level and prone to biases at the individual level which individuals can exploit, such as strategic behavior. If so, this raises the question of how much the 'objective' value of an economic resource can be calculated using standard economic valuation approaches by isolating the influence of contextual factors and parochial interests. If economic valuation approaches are the only method currently available to value natural resources, this may result in a case of relying on blind evaluators to lead the blind public in the absence of an objective price of the resource. Thirdly, policymakers would need to be conscious of the 'culture' of the country, but this is *not* in terms of innate motivations as cross-cultural psychologists conceive it but in terms of the social mechanisms of monitoring and punishment that exist in various domestic sub-groups. Thus, rules cannot be simply transferred, i.e. copied, from other contexts such as from other countries without paying attention to the local socio-cultural contexts which may determine the appropriateness of valuation instruments aforementioned and support for laws, as criticisms of valuation methods such as benefit transfer show with one context (e.g. country) adopting another context's valuation calculations by assuming similar local conditions. Social contexts can change, as cross-cultural psychologists such as Hofstede, Schwartz and Triandis and evolutionary psychologists such as Yamagishi recognise. Moreover, such a warning is echoed by Adler and Posner (2000: 1111) who argue that cost-benefit analysis is not a "superprocedure, which implements all the moral considerations bearing upon governmental choice", but is just "one part

of the set of procedures and institutions comprising government", and by Turner et al (1998: 61) who argue for the cultural specificity of valuation. The important goal is to determine whether it is appropriate not to 'crowd out' individuals' incentives to contribute to environmental conservation by appealing to individuals' intrinsic motivations, or to 'crowd in' efforts to conserve the environment by appealing to individuals' extrinsic motivations using appropriate monetary incentives as the previous sections show (see section 7.6.3 and 8.2.3 above).

A few areas can be suggested to deepen research following this line of inquiry. Firstly, data wise, more WTP questions can be incorporated into future waves of the WVS. For unknown reasons, wave 6 of the WVS did not survey respondents using the three questions reported in Table 11 (World Values Survey Association, 2014). My work has demonstrated their usefulness. Secondly, more countries can be surveyed to improve generalizability of results. At present, only a fraction of all countries have been surveyed. Barring the logistical and financial considerations that come with expanding the geographical coverage of research, having more data from other geographical regions can improve the reliability of estimates but also the generalizability of results. Thirdly, more research can be conducted on the formation of culture by studying the social mechanisms of monitoring and punishment in each society. This is useful not just to policymakers formulating appropriate mechanisms to encourage certain behaviors in their populations, but also from a research standpoint as it contradicts the observations of cross-cultural psychologists. Popularity of the field is seen in studies in support of Yamagishi's 'emancipation' theory of trust which seem to be gaining traction (e.g. Gheorghiu et al, 2009). Fourthly, further research can include an examination of the legitimacy of governments to enact mandatory recycling or carbon tax policies nationwide that are not necessarily commensurate with citizens' WTP, e.g. Australia's carbon

pricing scheme (see Bullen, 2016), or whether better rule of law can encourage interpersonal deliberation resulting in valuations reflective of the environmental commodity. This may not only benefit policymakers who aim to canvass public support for policies such as carbon pricing by identifying the dominant motivations behind people's support, especially in times of economic downturn. Scholars who study the 'behavioral' aspect of the social science disciplines may also benefit such as behavioral economics which lend their assumptions, e.g. bounded rationality and loss aversion, to the understanding of actors' environmental valuations, e.g. Kahneman et al (1999). Fifthly, more analysis can be carried out examining how culture impacts on institutions and vice-versa. Research on law and culture—or 'culture' as Yamagishi views—tends to be conducted separately though attempts have been made to bridge the two. It remains to be seen how individuals account for both law and culture simultaneously in deciding on undertaking certain actions legal or otherwise, and more interesting as to how individuals will behave when law and culture conflict with each other such as using laws to encroach on aboriginal lands for the sake of 'national development' as the case of Keystone XL Pipeline in the US demonstrates (Luxen, 2017).

The field of economic valuation has come a long way since its inception in the mid-twentieth century. Stated preference and revealed preference approaches have been used extensively by governments, corporations (e.g. Exxon in the Exxon Valdez oil spill case; see Hausman et al, 1995) and NGOs (e.g. Greenpeace; see Kosonen, 2012). These approaches have gained increasing applicability and attention as environmental issues become increasingly prominent internationally with the various climate summits of heads of states and governments with the latest resulting in the 2016 Paris Agreement (United Nations Framework Convention on Climate Change, 2018) and extreme meteorological events that threaten peoples of large and small states alike. Scholars have

continued to improve valuation methods, among the most recent by examining individuals' motivations for the values they bid. This dissertation contributes to this debate by showing that the institutional, and to a lesser extent cultural, contexts matter in influencing individuals' decisions to pay. Unlike previous studies which tend to be siloed in their disciplines or restricted in their scope, this dissertation has engaged diverse views from different disciplines involving economics, political science, sociology, psychology, law, philosophy and the environmental sciences using statistical models and data from over 50 countries in an attempt to illustrate that context matters across these countries. It is not just context alone that matters which economists and rational choice theorists are clearly cognizant of; it is also about the nature of the context—whether it is a matter of rules and/or culture—and how actors interact with and within these contexts. Further study and incorporation of these contextual factors into our understanding of valuations can serve not only to advance the field of valuation and the larger disciplines in which the valuation literature is situated, but also the environmental cause that should be seen, in terms of context, more as an issue of assurance rather than trust mediated more by rules than by culture respective to each society. On a more hopeful note, CPR management need not *always* be bound by the prisoner's dilemma model of CPR management associated with Mancur Olson and Garrett Hardin. Ostrom has shown how individuals time and again have been able to trust one another to work together to break out of the prison—helped more by the rules that they create as Yamagishi shows than their innate cultures that Hofstede, Triandis and Schwartz maintain.

Appendix A

Table 11. Questions on an individual's environmental attitudes that appear in most of the survey waves of the World Values Survey.

"I am going to read out some statements about the environment. For each one, can you tell me whether you strongly agree, agree, disagree or strongly disagree?"

	Strongly agree	*Agree*	*Disagree*	*Strongly disagree*
1. I would give part of my income if I were certain that the money would be used to prevent environmental pollution.	*1*	*2*	*3*	*4*
2. I would agree to an increase in taxes if the extra money were used to prevent environmental pollution.	*1*	*2*	*3*	*4*
3. The Government should reduce environmental pollution, but it should not cost me any money. (absent in wave 3)	*1*	*2*	*3*	*4*

Table 12. Questions on an individual's cultural orientation from wave 5 of the World Values Survey.

"Now I will briefly describe some people. Using this card, would you please indicate for each description whether that person is very much like you, like you, somewhat like you, not like you, or not at all like you?"

		Very much like me	*Like me*	*Some-what like me*	*A little like me*	*Not like me*	*Not at all like me*
1.	*It is important to this person to think up new ideas and be creative; to do things one's own way.*	*1*	*2*	*3*	*4*	*5*	*6*
2.	*It is important to this person to be rich; to have a lot of money and expensive things.*	*1*	*2*	*3*	*4*	*5*	*6*
3.	*Living in secure surroundings is important to this person; to avoid anything that might be dangerous.*	*1*	*2*	*3*	*4*	*5*	*6*
4.	*It is important to this person to have a good time; to "spoil" oneself.*	*1*	*2*	*3*	*4*	*5*	*6*
5.	*It is important to this person to help the people nearby; to care for their well-being.*	*1*	*2*	*3*	*4*	*5*	*6*
6.	*Being very successful is important to this person; to have people to recognize one's achievements.*	*1*	*2*	*3*	*4*	*5*	*6*

7.	*Adventure and taking risks are important to this person; to have an exciting life.*	*1*	*2*	*3*	*4*	*5*	*6*
8.	*It is important to this person to always behave properly; to avoid doing anything people would say is wrong.*	*1*	*2*	*3*	*4*	*5*	*6*
9.	*Looking after the environment is important to this person; to care for nature.*	*1*	*2*	*3*	*4*	*5*	*6*
10.	*Tradition is important to this person; to follow the customs handed down by one's religion or family.*	*1*	*2*	*3*	*4*	*5*	*6*

Table 13. Questions on qualities that respondent feels are desirable to be instilled in his or her children from the all six waves of the World Values Survey.

"Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five!"

		Mentioned	*Not mentioned*
1	*Independence*	*1*	*2*
2	*Feeling of responsibility*	*1*	*2*
3	*Imagination*	*1*	*2*
4	*Tolerance and respect for other people*	*1*	*2*
5	*Determination, perseverance*	*1*	*2*
6	*Religious faith*	*1*	*2*
7	*Unselfishness*	*1*	*2*
8	*Obedience*	*1*	*2*

Table 14. Questions on an individual's perceived trust in social groups from wave 5 of the World Values Survey.

"I'd like to ask you how much you trust people from various groups. Could you tell me for each whether you trust people from this group completely, somewhat, not very much or not at all?"

		Trust completely	*Trust somewhat*	*Do not trust very much*	*Do not trust at all*
1.	*Your family*	*1*	*2*	*3*	*4*
2.	*Your neighborhood*	*1*	*2*	*3*	*4*
3.	*People you know personally*	*1*	*2*	*3*	*4*
4.	*People you meet for the first time*	*1*	*2*	*3*	*4*
5.	*People of another religion*	*1*	*2*	*3*	*4*
6.	*People of another nationality*	*1*	*2*	*3*	*4*

Table 15. Question that measures an individual's trust in other people generally in all six waves of the World Values Survey.

"Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?"

1 *Most people can be trusted.*

2 *Need to be very careful.*

Table 16. Questions on an individual's perceived confidence in institutions from all six waves of the World Values Survey.

"I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?"

		A great deal	*Quite a lot*	*Not very much*	*None at all*
1.	*The churches*	*1*	*2*	*3*	*4*
2.	*The armed forces*	*1*	*2*	*3*	*4*
3.	*The press*	*1*	*2*	*3*	*4*
4.	*Television* (absent in wave 1)	*1*	*2*	*3*	*4*
5.	*Labor unions*	*1*	*2*	*3*	*4*
6.	*The police*	*1*	*2*	*3*	*4*
7.	*The courts* (absent in wave 4)	*1*	*2*	*3*	*4*
8.	*The government (in your nation's capital)* (absent in wave 1)	*1*	*2*	*3*	*4*
9.	*Political parties* (absent in wave 1)	*1*	*2*	*3*	*4*
10.	*Parliament*	*1*	*2*	*3*	*4*
11.	*The Civil service*	*1*	*2*	*3*	*4*
12.	*Major Companies*	*1*	*2*	*3*	*4*
13.	*Environmental organizations* (absent in waves 1 and 2)	*1*	*2*	*3*	*4*
14.	*Women's organizations* (absent in waves 1 and 2)	*1*	*2*	*3*	*4*
15.	*Charitable or humanitarian organizations* (absent in waves 1, 2 3 and 4)	*1*	*2*	*3*	*4*

16.	*The European Union* (or appropriate regional organizations outside Europe) (absent in wave 1)	*1*	*2*	*3*	*4*
17.	*The United Nations* (absent in waves 1 and 2)	*1*	*2*	*3*	*4*

Note: Not all organizations mentioned above are surveyed in all waves as indicated in parentheses next to each organization.

Table 17. Question on an individual's perception of respect for human rights in his/her country in wave 4 of the World Values Survey.

How much respect is there for individual human rights nowadays (in our country)? Do you feel there is:

1 A lot of respect for individual human rights
2 Some respect
3 Not much respect
4 No respect at all

Table 18. Questions on an individual's education level in wave 5 of the World Values Survey.

"What is the highest educational level that you have attained?"

1. *No formal education*
2. *Incomplete primary school*
3. *Complete primary school*
4. *Incomplete secondary school: technical/vocational type*
5. *Complete secondary school: technical/vocational type*
6. *Incomplete secondary: university-preparatory type*
7. *Complete secondary: university-preparatory type*
8. *Some university-level education, without degree*
9. *University-level education, with degree*

Table 19. Questions on an individual's household income in wave 5 of the World Values Survey.

"On this card is a scale of incomes on which 1 indicates the "lowest income decile" and 10 the "highest income decile" in your country. We would like to know in what group your household is. Please, specify the appropriate number, counting all wages, salaries, pensions and other incomes that come in.

Lowest decile									*Highest decile*
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*

Appendix B

Principal Components Analysis of Instruments Measuring Cultural Orientation

Excluding question 9 in Table 12 (see Appendix A) on maturity universal value type as it measures based on one's appreciation of the natural environment so as to avoid conflation with the dependent variable which is also operationalized with respect to the natural environment, exploratory factor analysis is applied to discern the relations between all other questions in Table 12 (see Appendix A) as each represents one of Schwartz's universal value types, and the cultural orientation each of these questions reflects: individualism or collectivism. Doing so go towards informing the operationalization of an individual's cultural orientation as seen in [1], [2] and [3]. Principal components factor analysis is selected to maximize the variability of the latent variable for analysis (Hill and Lewicki, 2007). Tables 20 to 25 (see Appendix C) report the eigenvalues and factor loadings after subjecting all questions excluding question 9 in Table 12 in tandem to a singular principal components factor analysis. Across the three payment vehicles of income payments, taxation and government spending and regardless whether an individual's trust in the military is included, results shown in Tables 20 to 25 suggest the presence of two factors which are relevant to my analysis, factors 1 and 2, from the Kaiser test which mandates that only factors with eigenvalues of 1.0 or greater are meaningful to analysis. All questions *sans* question 9 in Table 12 are then subjected to a varimax rotation of the original variable space to discern the composition of the two factors above by identifying the questions and grouping them under either factor. The rotated factor loadings of the varimax rotation are reported in Tables 26 to 31 (see Appendix D).

Interpreting Tables 26 to 31 (in Appendix D) through Schwartz's (1990: 144) universal value types aforementioned yields the following results that apply to all three payment vehicles and contexts

regardless whether one's trust in the military is included or not. Question 1 on self-direction, question 2 on social power, question 4 on hedonism, question 6 on achievement and question 7 on stimulation appear to load heavily on factor 1 as factor loadings are greater for factor 1 than those for factor 2. This suggests that these questions together reflect an individual's individualistic cultural orientation as represented by factor 1. This is in contrast with question 3 on security, question 5 on prosocial, question 8 on restrictive conformity, and question 10 on tradition which seem to load more on factor 2 as factor loadings exceed those of factor 1; these in the aggregate measures an individual's collectivistic cultural orientation which are grouped under factor 2. Based on these results, questions in Table 12 are segregated according to [1] and [2] as shown earlier. These questions, furthermore, appear superior compared to other possible measures of an individual's cultural orientation in wave 5 of the WVS due to their acceptably high factor loadings as well as the fact that these questions are crafted by Schwartz who, as introduced earlier, is among the influential scholars on individualism-collectivism cross-cultural research and which lends high internal validity to these questions.

Equation [3] is constructed based on the scale reliability coefficients or Cronbach's alpha of the questions respective to individualistic and collectivistic cultural orientations mentioned above, as well as when these questions are combined and tested in tandem. The argument that these polar orientations should be recalculated into a single measure of one's cultural orientation is based on the scale reliability coefficients for all questions excluding question 9 in Table 12 when tested in tandem which are greater than those respective to questions on individualism and collectivism. For all three payment vehicles and both cases of including and excluding one's trust in the armed forces, the scale reliability coefficient of all questions *sans* question 9 in Table 12 consistently

exceeds 0.7 which surpasses not only the 0.50 threshold imposed by the Kaiser test but also the coefficients reported for both individualistic and collectivistic orientations which are lower than 0.7. The coefficients of both cultural orientations cross the 0.5 threshold of the Kaiser test with at least 0.64, which suggests the respective questions to be related to a single factor (factors 1 or 2 above) which reflect the polarity of the orientations. The assumption of orthogonality between the concepts of individualism and collectivism orientations as Oyserman et al (2002: 5) suggest, however, becomes suspect in view of the higher scale reliability coefficients yielded from testing these questions in tandem, which suggest that these questions are related to a single factor as Schwartz (1990) argues—which [3] seeks to reflect.

Appendix C

Table 20. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *direct income payments* and an individual's trust in the military is *included*.

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.73418	1.27264	0.3038	0.3038
Factor 2	1.46154	0.55829	0.1624	0.4662
Factor 3	0.90326	0.06613	0.1004	0.5666
Factor 4	0.83713	0.08831	0.0930	0.6596
Factor 5	0.74881	0.09158	0.0832	0.7428
Factor 6	0.65723	0.05646	0.0730	0.8158
Factor 7	0.60077	0.04637	0.0668	0.8825
Factor 8	0.55440	0.05172	0.0616	0.9441
Factor 9	0.50268	.	0.0559	1.0000

Table 21. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *taxation* and an individual's trust in the military is *included*.

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.73453	1.27261	0.3038	0.3038
Factor 2	1.46192	0.56001	0.1624	0.4663
Factor 3	0.90191	0.06442	0.1002	0.5665
Factor 4	0.83749	0.08902	0.0931	0.6595
Factor 5	0.74847	0.09075	0.0832	0.7427
Factor 6	0.65772	0.05772	0.0731	0.8158
Factor 7	0.60000	0.04508	0.0667	0.8824
Factor 8	0.55492	0.05187	0.0617	0.9441
Factor 9	0.50305	.	0.0559	1.0000

Table 22. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *government spending* and an individual's trust in the military is *included*.

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.74275	1.28290	0.3047	0.3047
Factor 2	1.45985	0.55622	0.1622	0.4670
Factor 3	0.90362	0.06919	0.1004	0.5674
Factor 4	0.83443	0.08677	0.0927	0.6601
Factor 5	0.74766	0.09120	0.0831	0.7431
Factor 6	0.65646	0.05708	0.0729	0.8161
Factor 7	0.59938	0.04529	0.0666	0.8827
Factor 8	0.55409	0.05234	0.0616	0.9442
Factor 9	0.50175	.	0.0558	1.0000

Table 23. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *direct income payments* and an individual's trust in the military is *excluded*.

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.73098	1.26722	0.3034	0.3034
Factor 2	1.46375	0.56088	0.1626	0.4661
Factor 3	0.90288	0.06525	0.1003	0.5664
Factor 4	0.83762	0.08800	0.0931	0.6595
Factor 5	0.74963	0.09189	0.0833	0.7428
Factor 6	0.65773	0.05708	0.0731	0.8158
Factor 7	0.60066	0.04675	0.0667	0.8826
Factor 8	0.55390	0.05105	0.0615	0.9441
Factor 9	0.50286	.	0.0559	1.0000

Table 24. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *taxation* and an individual's trust in the military is *excluded*.

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.73113	1.26702	0.3035	0.3035
Factor 2	1.46411	0.56270	0.1627	0.4661
Factor 3	0.90142	0.06355	0.1002	0.5663
Factor 4	0.83787	0.08833	0.0931	0.6594
Factor 5	0.74954	0.09139	0.0833	0.7427
Factor 6	0.65815	0.05815	0.0731	0.8158
Factor 7	0.60000	0.04549	0.0667	0.8825
Factor 8	0.55451	0.05124	0.0616	0.9441
Factor 9	0.50327	.	0.0559	1.0000

Table 25. Eigenvalues and factor loadings from a principal components factor analysis of all questions excluding question 9 in Table 11 from wave 5 of the World Values Survey when payment vehicle is *government spending* and an individual's trust in the military is *excluded*.

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.73933	1.27725	0.3044	0.3044
Factor 2	1.46209	0.55895	0.1625	0.4668
Factor 3	0.90313	0.06837	0.1003	0.5672
Factor 4	0.83476	0.08591	0.0928	0.6599
Factor 5	0.74885	0.09188	0.0832	0.7431
Factor 6	0.65697	0.05764	0.0730	0.8161
Factor 7	0.59933	0.04577	0.0666	0.8827
Factor 8	0.55356	0.05157	0.0615	0.9442
Factor 9	0.50198	.	0.0558	1.0000

Appendix D

Table 26. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *direct income payments* and an individual's trust in the military is *included*.

Variable	Factor 1	Factor 2	Uniqueness
Question 1	0.5458	0.2454	0.6418
Question 2	0.6958	0.0774	0.5099
Question 3	0.1186	0.6784	0.5258
Question 4	0.5743	0.0767	0.6643
Question 5	0.1315	0.6545	0.5543
Question 6	0.6450	0.3309	0.4745
Question 7	0.7423	-0.0657	0.4447
Question 8	0.1042	0.7112	0.4833
Question 10	-0.0018	0.7031	0.5056

Table 27. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *taxation* and an individual's trust in the military is *included*.

Variable	Factor 1	Factor 2	Uniqueness
Question 1	0.5462	0.2460	0.6411
Question 2	0.6957	0.0777	0.5100
Question 3	0.1204	0.6780	0.5258
Question 4	0.5745	0.0754	0.6643
Question 5	0.1321	0.6540	0.5548
Question 6	0.6454	0.3305	0.4742
Question 7	0.7417	-0.0660	0.4455
Question 8	0.1037	0.7117	0.4827
Question 10	-0.0030	0.7034	0.5052

Table 28. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *government spending* and an individual's trust in the military is *included*.

Variable	Factor 1	Factor 2	Uniqueness
Question 1	0.5467	0.2474	0.6399
Question 2	0.6961	0.0795	0.5091
Question 3	0.1209	0.6786	0.5249
Question 4	0.5746	0.0758	0.6641
Question 5	0.1326	0.6546	0.5538
Question 6	0.6474	0.3294	0.4724
Question 7	0.7425	-0.0657	0.4444
Question 8	0.1050	0.7111	0.4832
Question 10	-0.0018	0.7032	0.5056

Table 29. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *direct income payments* and an individual's trust in the military is *excluded*.

Variable	Factor 1	Factor 2	Uniqueness
Question 1	0.5461	0.2441	0.6422
Question 2	0.6952	0.0768	0.5108
Question 3	0.1178	0.6787	0.5255
Question 4	0.5746	0.0760	0.6641
Question 5	0.1311	0.6545	0.5544
Question 6	0.6451	0.3310	0.4744
Question 7	0.7424	-0.0658	0.4445
Question 8	0.1034	0.7117	0.4827
Question 10	-0.0017	0.7024	0.5067

Table 30. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *taxation* and an individual's trust in the military is *excluded*.

Variable	Factor 1	Factor 2	Uniqueness
Question 1	0.5468	0.2444	0.6412
Question 2	0.6952	0.0770	0.5108
Question 3	0.1197	0.6783	0.5256
Question 4	0.5747	0.0748	0.6641
Question 5	0.1315	0.6540	0.5550
Question 6	0.6455	0.3305	0.4741
Question 7	0.7418	-0.0660	0.4454
Question 8	0.1032	0.7120	0.4823
Question 10	-0.0030	0.7027	0.5061

Table 31. Rotated factor loadings from a variance maximizing rotation of original variable space of all questions excluding question 9 on an individual's cultural orientation in Table 11 from wave 5 of the World Values Survey when payment vehicle is *government spending* and an individual's trust in the military is *excluded*.

Variable	Factor 1	Factor 2	Uniqueness
Question 1	0.5473	0.2459	0.6400
Question 2	0.6957	0.0787	0.5099
Question 3	0.1203	0.6788	0.5247
Question 4	0.5748	0.0752	0.6640
Question 5	0.1319	0.6547	0.5540
Question 6	0.6476	0.3294	0.4722
Question 7	0.7425	-0.0659	0.4443
Question 8	0.1049	0.7112	0.4832
Question 10	-0.0021	0.7026	0.5064

Appendix E

Table 32. List of countries/territories that are included in and excluded from wave 5 of the World Values Survey.

Included in the dataset	Excluded from the dataset
Australia	Andorra
Brazil	Argentina
Bulgaria	Colombia
Burkina Faso	Cyprus
Canada	Egypt
Chile	France
China	Georgia
Ethiopia	Guatemala
Finland	Hong Kong
Germany	Iran
Ghana	Iraq
Hungary	Italy
India	Japan
Indonesia	Mali
Jordan	Moldova

Malaysia	Netherlands
Mexico	New Zealand
Morocco	Russia
Norway	Rwanda
Peru	Trinidad and Tobago
Poland	United Kingdom
Romania	
Serbia	
Slovenia	
South Africa	
South Korea	
Spain	
Sweden	
Switzerland	
Taiwan	
Thailand	
Turkey	

Ukraine	
United States of America	
Uruguay	
Vietnam	
Zambia	

Appendix F

Table 33. List of countries/territories that are included in and excluded from the World Values Survey longitudinal dataset for each wave 2, 3, 4 and 5.

Included in the dataset	Excluded from the dataset
Wave 2	
India	Argentina
Nigeria	Belarus
	Brazil
	Czech Republic
	Chile
	China
	Japan
	Mexico
	Poland
	Russia
	Slovakia
	South Africa
	South Korea
	Spain

	Switzerland
	Turkey
Wave 3*	
Albania	Armenia
Argentina	Azerbaijan
Australia	Belarus
Bangladesh	Bosnia and Herzegovina
Bulgaria	Colombia
Chile	Croatia
Estonia	Czech Republic
Finland	China
Germany	Dominican Republic
India	El Salvador
Latvia	Georgia
Lithuania	Hungary
Mexico	Japan
New Zealand	Macedonia

Nigeria	Moldova
Norway	Montenegro
Peru	Pakistan
Puerto Rico	Philippines
Romania	Poland
Russia	Serbia
Slovakia	Slovenia
South Africa	United Kingdom
South Korea	
Spain	
Sweden	
Switzerland	
Taiwan	
Turkey	
Ukraine	
United States of America	
Uruguay	

Venezuela	
Wave 4	
Albania	Algeria
Argentina	Bosnia and Herzegovina
Bangladesh	China
Canada	Egypt
Chile	Indonesia
India	Iran
Japan	Iraq
Mexico	Israel
Peru	Jordan
Philippines	Kyrgyzstan
Puerto Rico	Macedonia
South Africa	Moldova
Spain	Montenegro
Tanzania	Morocco
United States of America	Nigeria

Zimbabwe	Pakistan
	Saudi Arabia
	Serbia
	Singapore
	South Korea
	Sweden
	Turkey
	Uganda
	Venezuela
	Vietnam
Wave 5	
Australia	Andorra
Brazil	Argentina
Bulgaria	Colombia
Burkina Faso	Cyprus
Canada	Egypt
Chile	Ethiopia

China	France
Ethiopia	Georgia
Finland	Guatemala
Germany	Hong Kong
Ghana	Iraq
Hungary	Mali
India	Moldova
Indonesia	Netherlands
Iran	Russia
Italy	Rwanda
Japan	Serbia
Jordan	South Africa
Malaysia	South Korea
Mexico	United Kingdom
Morocco	Vietnam
New Zealand	
Norway	

Peru	
Poland	
Romania	
Slovenia	
Spain	
Sweden	
Switzerland	
Taiwan	
Thailand	
Trinidad and Tobago	
Turkey	
Ukraine	
United States of America	
Uruguay	
Zambia	

* Wave 3 of the WVS is dropped from analysis when the dependent variable concerns government spending as the payment vehicle as individuals' WTP with respect to government spending was not asked in wave 3.

REFERENCES

Adaman, Fikret, Nihan Karali, Gürkan Kumbaroğlu, İlhan Or, Begüm Özkaynak and Ünal Zenginobuz. "What determines urban households' willingness to pay for CO2 emission reductions in Turkey: A contingent valuation survey". *Energy Policy*, Vol. 39, No. 2 (February 2011), pp 689-698.

Adler, Matthew D., and Eric A. Posner. "Implementing Cost-Benefit Analysis When Preferences Are Distorted". *The Journal of Legal Studies*, Vol. 29, No. S2 (June 2000), pp 1105-1147.

Ahn, T. K., and Elinor Ostrom. "Social Capital and Collective Action". In *The Handbook of Social Capital*, eds. Dario Castiglione, Jan W. van Deth, and Guglielmo Wolleb. Oxford; New York: Oxford University Press, 2008, pp 70-100.

Al-Kandari, Abdullah R. "Environmental Economic Valuation – Methods and Techniques". *GeoJournal*, Vol. 34, No. 4 (December 1994), pp 371-377.

Aldred, Jonathan. "Incommensurability and Monetary Valuation". *Land Economics*, Vol. 82, No. 2 (May, 2006), pp 141-161.

Alesina, Alberto, and Paola Giuliano. "Culture and Institutions". Journal of Economic Literature, Vol. 53, No. 4 (December 2015), pp 898-944.

Alevy, Jonathan, John A. List and Wiktor L. Adamowicz. "How Can Behavioral Economics Inform Nonmarket Valuation? An Example from the Preference Reversal Literature". *Land Economics*, Vol. 87, No. 3 (August 2011), pp 365-381.

Allison, Graham. *Essence of Decision: Explaining the Cuba Missile Crisis*. New York: Longman, 1971. In Laurans, Yann, and Laurent Mermet. "Ecosystem services economic valuation, decision-support system or advocacy?". *Ecosystem Services*, Vol. 7 (March 2014), pp 98-105.

Allison, Graham, and Philip Zelikow. *Essence of Decision: Explaining the Cuba Missile Crisis*. 2nd ed. New York, USA: 1999. In Laurans, Yann, and Laurent Mermet. "Ecosystem services economic valuation, decision-support system or advocacy?". *Ecosystem Services*, Vol. 7 (March 2014), pp 98-105.

Almond, Gabriel A., and G. Bingham Powell. *Comparative Politics: A Developmental Approach*. Boston: Little, Brown, 1966.

Almond, Gabriel A., and Sidney Verba. *The Civic Culture: Political Attitudes and Democracy in Five Nations*. United States of America: Princeton University Press, 1963.

Anderson, Elizabeth. *Value in Ethics and Economics*. Cambridge, Massachusetts: Harvard University Press, 1993. In Wilfred Beckerman and Joanna Pasek. "Plural Values and Environmental Valuation". *Environmental Values*, Vol. 6, No. 1 (February 1997), pp 65-86.

Arrow, Kenneth J. *Social Choice and Individual Values*. New Haven, CT: Yale University Press, 1963.

———. *The Limits of Organization*. New York: W.W. Norton, 1974. In Huang, Peter H. "International Environmental Law and Emotional Rational Choice". *The Journal of Legal Studies*, Vol. 31, No. S1, Rational Choice and International Law, A Conference Sponsored by the University of Chicago Law School (January 2002), pp S237-S258.

Arrow, Kenneth J., Bert Bolin, Robert Costanza, Partha Dasgupta, Carl Folke, C. S. Holling, Bengt-Owe Jansson, Simon Levin, Karl-Göran Mäler, Charles Perring, and David Pimentel. "Economic growth, carrying capacity, and the environment". *Ecological Economics*, Vol. 15, No. 2 (November 1995), pp 91-95.

Arrow, Kenneth J., Maureen L. Cropper, George C. Eads, Robert W. Hahn, Lester B. Lave, Roger G. Noll, Paul R. Portney, Milton Russell, Richard Schmalensee, V. Kerry Smith and Robert N. Stavins. "Is There A Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?". *Science*, Vol. 272, No. 5259 (12 April 1996), pp 221-222. In Chan, Kai M. A., Anne D. Guerry, Patricia Balvanera, Sarah Klain, Terre Satterfield, Xavier Basurto, Ann Bostrom, Ratana Chuenpagdee, Rachelle Gould, Benjamin S. Halpern, Neil Hannahs, Jordan Levine, Bryan Norton, Mary Ruckelshaus, Roly Russell, Jordan Tam and Ulalia Woodside. "Where are *Cultural* and *Social* in Ecosystem Services? A Framework for Constructive Engagement", *BioScience*, Vol. 62, No. 8 (August 2012), pp 744-756.

Arrow, Kenneth J., Robert Solow, Paul R. Portney, Edward E. Leamer, Roy Radner and Howard Schuman. *Report of the NOAA Panel on Contingent Valuation*. Washington, D.C.: Resources for the Future, 1993.

Ascher, William, and Toddi Steelman. "Valuation in the Environmental Policy Process". *Policy Sciences*, Vol. 39, No. 1 (Mar., 2006), pp 73-90.

Avci, Duygu, Fikret Adaman and Begüm Özkaynak. "Valuation languages in environmental conflicts: How stakeholders oppose or support gold mining at Mount Ida, Turkey". *Ecological Economics*, Vol. 70, No. 2 (15 December 2010), pp 228-238.

Azqueta, Diego, and Gonzalo Delacámara. "Ethics, economics and environmental management". *Ecological Economics*, Vol. 56, No. 4 (April 2006), pp 524-533.

Baarsma, Barbara E., and Jan G. Lambooy. "Valuation of externalities through neo-classical methods by including institutional variables". *Transportation Research Part D: Transport and Environment*, Vol. 10, No. 6 (November 2005), pp 459-475.

Bachmann, Reinhard. "Towards a context-sensitive approach to researching trust in inter-organizational relationships". In *Organizational Trust: A Cultural Perspective*, eds. Mark N. K. Saunders, Denise Skinner, Graham Dietz, Nicole Gillespie and Roy J. Lewicki. United Kingdom: Cambridge University Press, 2010, pp 87-106.

Baker, Rick, and Brad Ruting. *Environmental Policy Analysis: A Guide to Non-Market Valuation*. Productivity Commission Staff Working Paper. Canberra, Australia: Commonwealth of Australia, 2014.

Bartkowski, Bartosz, and Nele Lienhoop. "Democracy and valuation: A reply to Schläpfer (2016)". *Ecological Economics*, Vol. 131 (January 2017), pp 557-560.

Baskerville, Rachel F. "Hofstede never studied culture". *Accounting, Organizations and Society*, Vol. 28, No. 1 (January 2003), pp 1-14.

Bateman, Ian J., Ian H. Langford, R. Kerry Turner, Ken G. Willis, and Guy D. Garrod. "Elicitation and truncation effects in contingent valuation studies". *Ecological Economics*, Vol. 12, No. 2 (February 1995), pp 161-179. In Mavra Stithou and Riccardo Scarpa. "Collective versus voluntary payment in contingent valuation for the conservation of marine biodiversity: An exploratory study from Zakynthos, Greece". *Ocean & Coastal Management*, Vol. 56 (February 2012), pp 1-9.

Bateman, Ian J., Richard T. Carson, Brett Day, Michael Hanemann, Nick Hanley, Tannis Hett, Michael, Jones-Lee, Graham Loones, Susana Mourato, Ece Özdemiroğlu, David W. Pearce OBE, Robert Sugden and John Swanson. *Economic Valuation with Stated Preference Techniques: A Manual*. United Kingdom: Edward Elgar Publishing Limited, 2002.

Bauler, Tom, and Nathalie Pipart. "Ecosystem Services in Belgian Environmental Policy Making: Expectations and Challenges Linked to the Conceptualization and Valuation of Ecosystem Services". In *Ecosystem Services: Global Issues, Local Practices*, eds. Sander Jacobs, Nicolas Dendoncker and Hans Keune. China: Elsevier Inc., 2014, pp 121-133.

Becker, Christian. "The human actor in ecological economics: Philosophical approach and research perspectives". *Ecological Economics*, Vol. 60, No. 1 (November 2006), pp 17-23.

Becker, Gary S. "Irrational behavior and economic theory". *Journal of Political Economy*, Vol. 70, No. 1 (Feb., 1962), pp 1-13. In Vriend, Nicolaas J. "Rational behavior and economic theory". *Journal of Economic Behavior and Organization*, Vol. 29, No. 2 (March 1996), pp 263-285.

———. "The Economic Way of Looking at Life". *Coase-Sandor Institute for Law & Economics*, Coase-Sandor Working Paper Series in Law and Economics, Working Paper No. 12, 1993.

———. *The economic approach to human behavior*. Chicago: The University of Chicago Press, 1976.

Beckerman, Wilfred, and Joanna Pasek. "Plural Values and Environmental Valuation". *Environmental Values*, Vol. 6, No. 1 (February 1997), pp 65-86.

Bettman, James R., Mary Frances Luce and John W. Payne. "Preference construction and preference stability: Putting the pillow to rest". *Journal of Consumer Psychology*, Vol. 18, No. 3 (July 2008), pp 170-174.

Bilsky, Wolfgang, and Shalom H. Schwartz. “Values and personality”. *European Journal of Personality*, Vol. 8 (1994), pp 163-181.

Blamey, Russell. “Contingent valuation and the activation of environmental norms”. *Ecological Economics*, Vol. 24, Issue 1 (January 1998), pp 47-72.

Börger, Tobias. “Keeping up appearances: Motivations for socially desirable responding in contingent valuation interviews”. *Ecological Economics*, Vol. 87 (March 2013), pp 155-165.

Boulding, Kenneth E. *Economics as a Science*. New York: McGraw-Hill, 1970. In Brown, Thomas C. “The concept of value in resource allocation”. *Land Economics*, Vol. 60, No. 3 (Aug., 1984), pp 231-246.

Bowles, Samuel. “Endogenous Preferences: The Cultural Consequences of Markets and Other Economic Institutions”. *Journal of Economic Literature*, Vol. 36, No. 1 (1998), pp 75-111.

Boyle, James. “Cultural Environmentalism and Beyond”. *Law and Contemporary Problems*, Vol. 70, No. 2, Cultural Environmentalism @ 10 (Spring, 2007), pp 5-21.

Brennan, Geoffrey, and Loren Lomasky. *Democracy and Decision: The Pure Theory of Electoral Preference*. Cambridge: Cambridge University Press, 1993. In Andrew Hindmoor. *Rational Choice*, New York: Palgrave Macmillan, 2006.

Brown, Thomas C. “The concept of value in resource allocation”. *Land Economics*, Vol. 60, No. 3 (Aug., 1984), pp 231-246.

Bullen, James. “Welfare groups call on party leaders to retain carbon tax compensation ‘energy supplement’”. *ABC News*, 22 August 2016 [cited 28 August 2016]. Available from: www.abc.net.au/news/2016-08-22/acoss-appeals-for-federal-government-to-keep-carbon-tax-payment/7771458.

Bureau of Meteorology. *Guide to environmental accounting in Australia*. Environmental Information Programme Publication Series no. 3. Canberra, Australia: Australian Government, 2013.

Cárdenas, Juan-Camilo, and Elinor Ostrom. “What do people bring into the game? Experiments in the field about cooperation in the commons”. *Agricultural Systems*, Vol. 82, No. 3 (December 2004), pp 307-326.

Carson, Richard T., and W. M. Hanemann. “Contingent valuation”. In *Handbook of Environmental Economics: Valuing Environmental Changes*, eds. Karl-Goran Maler and Jeffrey Vincent, Vol. 2, Amsterdam, North Holland: Elsevier, 2005, pp 821-936.

Carson, Richard T., Nicholas E. Flores, and Norman F. Meade. “Contingent Valuation: Controversies and Evidence”. *Environment and Resource Economics*, Vol. 19, No. 2 (June 2001), pp 173-210.

Chan, Kai M. A., Anne D. Guerry, Patricia Balvanera, Sarah Klain, Terre Satterfield, Xavier Basurto, Ann Bostrom, Ratana Chuenpagdee, Rachelle Gould, Benjamin S. Halpern, Neil Hannahs, Jordan Levine, Bryan Norton, Mary Ruckelshaus, Roly Russell, Jordan Tam and Ulalia Woodside. "Where are *Cultural* and *Social* in Ecosystem Services? A Framework for Constructive Engagement", *BioScience,* Vol. 62, No. 8 (August 2012), pp 744-756.

Chan, Kai M. A., Terre Satterfield and Joshua Goldstein. "Rethinking ecosystem services to better address and navigate cultural values". *Ecological Economics*, Vol. 74 (February 2012), pp 8-18.

Chee, Yung En. "An ecological perspective on the valuation of ecosystem services". *Biological Conservation*, Vol. 120, No. 4 (December 2004), pp 549-565.

Chen, Wendy Y., and Junyi Hua. "Citizens' distrust of government and their protest responses in a contingent valuation study of urban heritage trees in Guangzhou, China". *Journal of Environmental Management*, Vol. 155 (May 2015), pp 40-48.

Chen, Xiao-Ping, S. Arzu Wasti, and Harry C. Triandis. "When does group norm or group identity predict cooperation in a public goods dilemma? The moderating effects of idiocentrism and allocentrism". *International Journal of Intercultural Relations*, Vol. 31, No. 2 (March 2007), pp 259-276.

Chiu, Chi-Yue, Michele J. Gelfand, Toshio Yamagishi, Garriy Shteynberg, and Ching Wan. "Intersubjective Culture: The Role of Intersubjective Perceptions in Cross-Cultural Research". *Perspectives on Psychological Science,* Vol. 5, No. 4 (2010), pp 482-493.

Cho, Yoon-Na, Anastasia Thyroff, Molly I. Rapert, Seong-Yeon Park and Hyun Ju Lee. "To be or not to be green: Exploring individualism and collectivism as antecedents of environmental behavior". *Journal of Business Research*, Vol. 66, No. 8 (2013), pp 1052-1059.

Ciriacy-Wantrup, S. V. "Capital Returns from Soil-Conservation Practices". *Journal of Farm Economics*, Vol. 29, No. 4, Part 2: Proceedings Number (Nov., 1947), pp 1181-1196.

———. "The Economics of Environmental Policy". *Land Economics*, Vol. 47, No. 1 (Feb., 1971), pp 36-45.

Coase, Ronald. "The Nature of the Firm". *Economica*, Vol. 4, No. 16 (Nov., 1937), pp 386-405. In Baarsma, Barbara E., and Jan G. Lambooy. "Valuation of externalities through neo-classical methods by including institutional variables". *Transportation Research Part D: Transport and Environment*, Vol. 10, No. 6 (November 2005), pp 459-475.

———. "The problem of social cost". *Journal of Law and Economics*, Vol. 3 (Oct., 1960), pp 1-44.

Cohen, I. Glenn. "The Price of Everything, the Value of Nothing: Reframing the Commodification Debate". *Harvard Law Review*, Vol. 117, No. 689 (2003), pp 689-710.

Commission for Racial Justice. *Toxic Wastes and Race in the United States: National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste Sites*. New York: Commission for Racial Justice, United Church of Christ, 1987. In Hamilton, James T. "Testing for Environmental Racism: Prejudice, Profits, Political Power?", *Journal of Policy Analysis and Management*, Vol. 14, No. 1 (Winter, 1995), pp 107-132.

Connelly, James, and Graham Smith. *Politics and the Environment: From theory to practice*. London: Routledge, 1999.

Cook, Karen S., Toshio Yamagishi, Coye Cheshire, Robin Cooper, Masafumi Matsuda, and Rie Mashima. "Trust Building via Risk Taking: A Cross-Societal Experiment". *Social Psychology Quarterly*, Vol. 68, No. 2 (2005), pp 121-142.

Cooper, Nigel, Emily Brady, Helen Steen and Rosalind Bryce. "Aesthetic and spiritual values of ecosystems: Recognising the ontological and axiological plurality of cultural ecosystem 'services'". *Ecosystem Services*, Vol. 21, Part B (October 2016), pp 218-229.

Costanza, Robert. "Social Goals and the Valuation of Ecosystem Services". *Ecosystems*, Vol. 3, No. 1 (Jan., - Feb., 2000), pp 4-10.

———. "Thinking broadly about costs and benefits in ecological management". *Integrated Environmental Assessment and Management*, Vol. 2, No. 2 (April 2006), pp 166-173.

Costanza, Robert, and Herman E. Daly. "Natural Capital and Sustainable Development". *Conservation Biology*, Vol. 6, No. 1 (Mar., 1992), pp 37-46.

Costanza, Robert, Ralph d'Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, Shahid Naeem, Robert V. O'Neill, Jose Paruelo, Robert G. Raskin, Paul Sutton and Marjan van den Belt. "The value of ecosystem services: putting the issues in perspective", *Ecological Economics*, Vol. 25, No. 1 (April 1998), pp 67-72.

———. "The value of the world's ecosystem services and natural capital", *Nature*, Vol. 387 (15 May 1997), pp 253-260.

Crocker, Thomas D., Jason F. Shogren and Paul R. Turner. "Incomplete beliefs and nonmarket valuation". *Resource and Energy Economics*, Vol. 20, No. 2 (June 1998), pp 139-162.

Cronbach, Lee J. *Essentials of psychological testing*. 5th edition. New York: HarperCollins, 1990. In Theodore M. Singelis et al, "Horizontal and Vertical Dimensions of Individualism and Collectivism: A Theoretical and Measurement Refinement", *Cross-Cultural Research*, Vol. 29, No. 3 (August 1995), pp 240-275.

Cronbach, Lee J., and Goldine C. Gleser. *Psychological Tests and Personnel Decisions*. Urbana: University of Illinois Press, 1965. In Theodore M. Singelis et al, "Horizontal and Vertical

Dimensions of Individualism and Collectivism: A Theoretical and Measurement Refinement", *Cross-Cultural Research*, Vol. 29, No. 3 (August 1995), pp 240-275.

Daly, Herman E. "The return of Lauderdale's paradox". *Ecological Economics*, Vol. 25, No. 1 (April 1998), pp 21-23.

Daly, Herman E., and John B. Cobb, Jr. *For the Common Good*. Boston: Beacon Press, 1989.

Dasgupta, Partha. "Social capital and economic performance: analytics". In *Foundations of Social Capital: Critical Studies in Economic Institutions*, eds. Elinor Ostrom and T. K. Ahn. Cheltenham, UK: Edward Elgar, 2003, pp 309-339. In Paavola, Jouni, and W. Neil Adger. "Institutional ecological economics", *Ecological Economics*, vol. 53, No. 3 (15 May 2005), pp 353-368.

———. "Valuing Objects and Evaluating Policies in Imperfect Economies". *The Economic Journal*¸ Vol. 111, No. 471, Conference Papers (May, 2001), pp C1-C29.

Davis, Darren W., and Christian Davenport. "Assessing the Validity of the Postmaterialism Index". *American Political Science Review*, Vol. 93, No. 3 (Sep., 1999), pp 649-664.

De Marchi, Bruna and Jerome R. Ravetz. *Participatory Approaches to Environmental Policy*. Environmental Valuation in Europe, Policy Research Brief, No. 10. Cambridge: Cambridge Research for the Environment, 2001.

Debreu, Gérard. *Theory of Value*. New York: Wiley, 1959. In Faber, Malte, Thomas Petersen and Johannes Schiller. "Homo oeconomicus and homo politicus in Ecological Economics". *Ecological Economics*, Vol. 40, No. 3 (March 2002), pp 323-333.

Delegation of the European Union to China. "China, EU deepen ties on environmental policies and natural capital accounting". *Global Times*, 12 November 2017.

Devos, Thierry, Dario Spini, and Shalom H. Schwartz. "Conflicts among human values and trust in institutions". *British Journal of Social Psychology*, Vol. 41, No. 4 (2002), pp 481-494.

Dietz, Thomas. "The Darwinian trope in the drama of the commons: variations on some themes by the Ostroms". *Journal of Economic Behavior & Organization*, Vol. 57, No. 2 (June 2005), pp 205-225.

Dietz, Thomas, and Paul C. Stern. "Toward a Theory of Choice: Socially Embedded Preference Construction". *The Journal of Socio-Economics*, Vol. 24, No. 2 (1995), pp 261-279.

Dobewall, Henrik, Toivo Aavik, Kenn Konstabel, Shalom H. Schwartz, and Anu Realo. "A comparison of self-other agreement in personal values versus the Big Five personality traits". *Journal of Research in Personality*, Vol. 50 (June 2014), pp 1-10.

Donati, Paolo. "Environmentalism, postmaterialism and anxiety: the new politics of individualism". *Arena Journal*, No. 8 (1997), pp 147-172.

Dougherty, Keith L. “Public Goods Theory from Eighteenth Century Political Philosophy to Twentieth Century Economics”. *Public Choice*, Vol. 117, No. 3/4, Essays in Memory of Mancur Olson (Dec., 2003), pp 239-253.

Douglas, Mary. *How Institutions Think*. Syracuse, New York: Syracuse University Press, 1986. In Vatn, Arild, and Daniel W. Bromley. “Choices without Prices without Apologies”. *Journal of Environmental Economics and Management*, Vol. 26, No. 2 (March 1994), pp 129-148.

Dowding, Keith. “Rational choice and trust”. *Critical Review of International Social and Political Philosophy*, Vol. 4, No. 4 (2001), pp 207-220.

Duch, Raymond M., and Michaell A. Taylor. “A Reply to Abramson and Inglehart’s “Education, Security, and Postmaterialism”. *American Journal of Political Science*, Vol. 38, No. 3 (Aug., 1994), pp 815-824.

Durlauf, Steven N., and Marcel Fafchamps. “Social Capital”. *Centre for the Study of African Economies Working Paper Series*, CSAE WPS/2004-14, 28 April 2004.

Edwards, Peter J., and Cyrus Abivardi. “The value of biodiversity: Where ecology and economy blend”. *Biological Conservation*, Vol. 83, No. 3 (March 1998), pp 239-246.

Elkins, David J., and Richard E. B. Simeon. “A Cause in Search of Its Effect, or What Does Political Culture Explain?”. *Comparative Politics*, Vol. 11, No. 2 (Jan., 1979), pp 127-145.

Elster, Jon. *Solomonic Judgments: Studies in the Limitations of Rationality*. New York: Cambridge University Press, 1989a.

———. *The Cement of Society: A Study of Social Order*. Cambridge, UK: Cambridge University Press, 1989b. In Elinor Ostrom. “Coping with Tragedies of the Commons”. *Annual Review of Political Science*, Vol. 2 (June 1999a), pp 493-535.

Engelmann, Jan B., and Grit Hein. “Contextual and social influences on valuation and choice”. *Progress in Brain Research*, Vol. 202 (2013), pp 215-237.

Eriksson, Kimmo, Pontus Strimling, Per A. Andersson, Mark Aveyard, Markus Brauer, Vladimir Gritskov, Toko Kiyonari, David M. Kuhlman, Angela T. Maitner, Zoi Manesi, Catherine Molho, Leonard S. Peperkoorn, Muhammad Rizwan, Adam S. Stivers, Qirui Tian, Paul A. M. Van Lange, Irina Vartanova, Junhui Wu, and Toshio Yamagishi. “Cultural Universals and Cultural Differences in Meta-Norms about Peer Punishment”. *Management and Organization Review*, Vol. 13, No. 4 (December 2017), pp 851-870.

Eriksson, Ralf. “On the ethics of environmental economics as seen from textbooks”. *Ecological Economics*, Vol. 52, No. 4 (1 March 2005), pp 421-435.

Etzioni, Amitai. “The Case for a Multiple-Utility Conception”. *Economics and Philosophy*, Vol. 2, No. 2 (October 1986), pp 159-184. In Michael Lockwood. “Non-compensatory preference structures in non-market valuation of natural area policy”. *Australian Journal of Agricultural Economics*, Vol. 40, No. 2 (August 1996), pp 85-101.

———. *The Spirit of Community: Rights, Responsibilities, and the Communitarian Agenda*. New York: Crown Publishers, 1993.

Evans, Tom P., Abigail M. York, and Elinor Ostrom. “Institutional Dynamics, Spatial Organization, and Landscape Change”. In *Political Economies of Landscape Change: Places of Integrative Power*, eds. James L. Westcoat, Jr., and Douglas M. Johnston. The Netherlands: Springer, 2008, pp 111-129.

Faber, Malte, Thomas Petersen and Johannes Schiller. “Homo oeconomicus and homo politicus in Ecological Economics”. *Ecological Economics*, Vol. 40, No. 3 (March 2002), pp 323-333.

Farber, Stephen C., Robert Costanza, and Matthew A. Wilson. “Economic and ecological concepts for valuing ecosystem services”. *Ecological Economics*, Vol. 41, No. 3 (June 2002), pp 375-392.

Farley, Joshua, Abdon Schmitt Filho, Matthew Burke and Marigo Farr. “Extending market allocation to ecosystem services: Moral and practical implications on a full and unequal planet”. *Ecological Economics*, Vol. 117 (September 2015), pp 244-252.

Fehr, Ernst, and Simon Gächter. “Altruistic punishment in humans”. *Nature*, Vo. 415 (2002), pp 137-140.

———. “Cooperation and Punishment in Public Goods Experiments”. *The American Economic Review*, Vol. 90, No. 4 (Sep., 2000), pp 980-994. In Vatn, Arild. “Rationality, institutions and environmental policy”. *Ecological Economics*, Vol. 55, No. 2 (1 November 2005a), pp 203-217.

Field, Barry C., and Martha K. Field. *Environmental Economics: An Introduction*. 3rd ed. New York, NY: The McGraw-Hill Companies, Inc., 2002.

Fischer, Ronald, and Shalom H. Schwartz. “Whence Differences in Value Priorities? Individual, Cultural, or Artifactual Sources”. *Journal of Cross-Cultural Psychology*, Vol. 42, No. 7 (2011), pp 1127-1144.

Fischer, Ronald, C.-Melanie Vauclair, Johnny R. J. Fontaine and Shalom H. Schwartz. “Are Individual-Level and Country-Level Value Structures Different? Testing Hofstede’s Legacy With the Schwartz Value Survey”. *Journal of Cross-Cultural Psychology*, Vol. 41, No. 2 (2010), pp 135-151.

Fourcade, Marion. “Cents and Sensibility: Economic Valuation and the Nature of “Nature””. *American Journal of Sociology*, Vol. 116, No. 6 (May 2011), pp 1721-1777.

Frank, David. “Biodiversity, conservation biology, and rational choice”. *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, Vol. 45 (March 2014), pp 101-104.

Franzen, Axel, and Dominikus Vogl. “Two decades of measuring environmental attitudes: A comparative analysis of 33 countries”. *Global Environmental Change*, Vol. 23, No. 5 (October 2013), pp 1001-1008.

Franzen, Axel, and Reto Meyer. “Environmental Attitudes in Cross-National Perspective: A Multilevel Analysis of the ISSP 1993 and 2000”. *European Sociological Review*, Vol. 26, No. 2 (2010), pp 219-234.

Friedman, Milton. *Capitalism and Freedom*. 40th Anniversary ed. United States of America: The University of Chicago, 2002.

Fuchs, Dieter. “The Political Culture Paradigm”. In *The Oxford Handbook of Political Behavior*, eds. Russell J. Dalton and Hans-Dieter Klingemann. Great Britain: Oxford University Press, 2007, pp 161-184.

Fukuyama, Francis. *Trust: The Social Virtues and the Creation of Prosperity*. New York: The Free Press, 1995. In Philip Keefer, and Stephen Knack. “Social Capital, Social Norms and the New Institutional Economics”. In *Handbook of New Institutional Economics*, eds. Claude Ménard and Mary M. Shirley. The Netherlands: Springer, 2005), pp 701-725.

Funtowicz, S. O., and J. R. Ravetz. “The worth of a songbird: ecological economics as a post-normal science”. *Ecological Economics*, Vol. 10, No. 3 (August 1994), pp 197-207. In Giuseppe Munda. “Cost-benefit analysis in integrated environmental assessment: some methodological issues”. *Ecological Economics*, Vol. 19, No. 2 (November 1996), pp 157-168.

Gardner, Roy, and Elinor Ostrom. “Rules and Games”. *Public Choice*, Vol. 70, No. 2 (1991), pp 121-149.

Gardner, Roy, Elinor Ostrom and James Walker. “The Nature of Common-Pool Resource Problems”. *Rationality and Society*, Vol. 2, No. 3 (July 1990), pp 335-358.

Garrod, Guy, and Kenneth G. Willis. *Economic Valuation of the Environment: Methods and Case Studies*. United Kingdom: Edward Elgar Publishing Limited, 1999.

Gatto, Marino, and Giulio A. De Leo. “Pricing Biodiversity and Ecosystem Services: The Never-Ending Story”. *BioScience*, Vol. 50, No. 4 (April 2000), pp 347-355.

Gelissen, John. “Explaining Popular Support for Environmental Protection: A Multilevel Analysis of 50 Nations”. *Environment and Behavior*, Vol. 39, No. 3 (May 2007), pp 392-415.

Georgescu-Roegen, Nicholas. “Choice, Expectations and Measurability”. *The Quarterly Journal of Economics*, Vol. 68, No. 4 (Nov., 1954), pp 503-534. In Michael Lockwood. “Non-

compensatory preference structures in non-market valuation of natural area policy". *Australian Journal of Agricultural Economics*, Vol. 40, No. 2 (August 1996), pp 85-101.

———. *The Entropy Law and the Economic Process*. London: Harvard University Press, 1971. In Erik Gómez-Baggethun and Manuel Ruiz-Pérez. "Economic valuation and the commodification of ecosystem services". *Progress in Physical Geography*, Vol. 35, No. 5 (2011), pp 613-628.

Geoscience Australia. *Minerals and Petroleum in Australia: A Guide for Investors*. Canberra, Australia: Commonwealth of Australia, 2017.

Ghate, Rucha, Suresh Ghate, and Elinor Ostrom. "Cultural norms, cooperation, and communication: taking experiments to the field in indigenous communities". *International Journal of the Commons*, Vol. 7, No. 2 (August 2013), pp 498-520.

Gheorghiu, Mirona A., Vivian L. Vignoles, and Peter B. Smith. "Beyond the United States and Japan: Testing Yamagishi's Emancipation Theory of Trust across 31 Nations". *Social Psychology Quarterly*, Vol. 72, No. 4 (December 2009), pp 365-383.

Gilpin, Alan. *Environmental Economics: A critical overview*. England: John Wiley & Sons Ltd, 2000.

Gintis, Herbert. "A framework for the unification of the behavioral sciences". *Behavioral and Brain Sciences*, Vol. 30, No. 1 (February 2007), pp 1-16.

———. "Beyond *Homo economicus*: evidence from experimental economics". *Ecological Economics*, Vol. 35, No. 3 (December 2000), pp 311-322.

———. "Classical *Versus* Evolutionary Game Theory". *Journal of Consciousness Studies*, Vol. 7, No. 1-2 (2007), pp 300-304.

Givens, Jennifer E., and Andrew K. Jorgenson. "Individual environmental concern in the world polity: A multilevel analysis". *Social Science Research*, Vol. 42, No. 2 (March 2013), pp 418-431.

Gómez-Baggethun, Erik, and Manuel Ruiz-Pérez. "Economic valuation and the commodification of ecosystem services". *Progress in Physical Geography*, Vol. 35, No. 5 (2011), pp 613-628.

Gowdy, John M. "Behavioral economics and climate change policy". *Journal of Economic Behavior & Organization*, Vol. 68, No. 3-4 (December 2008), pp 632-644.

———. "The Revolution in Welfare Economics and Its Implications for Environmental Valuation and Policy". *Land Economics*¸ Vol. 80, No. 2 (May, 2004), pp 239-257.

Gowdy, John M., and Kozo Mayumi. "Reformulating the foundations of consumer choice theory and environmental valuation". *Ecological Economics*, Vol. 39, No. 2 (November 2001), pp 223-237.

Grafton, R. Quentin, Wiktor Adamowicz, Diane Dupont, Harry Nelson, Robert J. Hill, and Steven Renzetti. *The Economics of the Environment and Natural Resources*. United Kingdom: Blackwell Publishing Ltd, 2004.

Grenstad, Gunnar, and Per Selle. "Cultural Theory and the New Institutionalism". *Journal of Theoretical Politics*, Vol. 7, No. 1 (1995), pp 5-27.

Grønhøj, Alice, and John Thøgersen. "Action speaks louder than words: The effect of personal attitudes and family norms on adolescents' pro-environmental behaviour". *Journal of Environmental Psychology*, Vol. 33, No. 1 (February 2012), pp 292-302.

———. "Like father, like son? Intergenerational transmission of values, attitudes and behaviours in the environmental domain". *Journal of Environmental Psychology*, Vol. 29, No. 2 (February 2009), pp 313-319.

Guala, Francesco. "Reciprocity: Weak or strong? What punishment experiments do (and do not) demonstrate". *Behavioral and Brain Sciences*, Vol. 35, No. 1 (February 2012), pp 1-15.

Guiso, Luigi, Paola Sapienza and Luigi Zingales. "Does Culture Affect Economic Outcomes?". *Journal of Economic Perspectives*, Vol. 20, No. 2 (Spring 2006), pp 23-48.

Haab, Timothy C., and Kenneth E. McConnell. *Valuing Environmental and Natural Resources: The Econometrics of Non-Market Valuation*. United Kingdom: Edward Elgar Publishing Limited, 2002.

Hahn, Robert W., and Patrick M. Dudley. "How Well Does the U.S. Government Do Benefit-Cost Analysis?". *Review of Environmental Economics and Policy*, Vol. 1, No. 2 (Summer 2007), pp 192-211.

Hamilton, James T. "Politics and Social Costs: Estimating the Impact Collective Action on Hazardous Waste Facilities". *Rand Journal of Economics*, Vol. 24, No. 1 (1993). In Hamilton, James T. "Testing for Environmental Racism: Prejudice, Profits, Political Power?". *Journal of Policy Analysis and Management*, Vol. 14, No. 1 (Winter, 1995), pp 107-132.

———. "Testing for Environmental Racism: Prejudice, Profits, Political Power?". *Journal of Policy Analysis and Management*, Vol. 14, No. 1 (Winter, 1995), pp 107-132.

Hanley, Nick, Bengt Kriström and Jason F. Shogren. "Coherent Arbitrariness: On Value Uncertainty for Environmental Goods". *Land Economics*, Vol. 85, No. 1 (Feb., 2009), pp 41-50.

Hanley, Nick, Jason F. Shogren, and Ben White. *Environmental Economics: In Theory and Practice*. 2nd ed. Great Britain: Palgrave Macmillan, 2007.

Haque, A. K. Enamul, M. N. Murty and Priya Shyamsundar. "Environmental Valuation: A Review of Methods". In *Environmental Valuation in South Asia*, eds. A. K. Enamul Haque, M. N. Murty and Priya Shyamsundar. Cambridge; New York: Cambridge University Press, 2011, pp 19-35.

Hardin, Garrett. “The tragedy of the commons”. *Science*, Vol. 162, No. 3859 (13 December 1968), pp 1243-1248.

Hardin, Russell. “Gaming Trust”. In *Trust and Reciprocity: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker. New York, NY: Russell Sage Foundation, 2003, pp 80-101.

———. *Collective Action*. Washington, D.C.: Resources for the Future, 1982. In Scholz, John T., and Mark Lubell. “Trust and Taxpaying: Testing the Heuristic Approach to Collective Action”. *American Journal of Political Science*, Vol. 42, No. 2 (Apr., 1998), pp 398-417.

Harvey, Ann H., Ulrich Kirk, George H. Denfield and P. Read Montague. “Monetary Favors and Their Influence on Neural Responses and Revealed Preference”. *Journal of Neuroscience*, Vol. 30, No. 28 (14 July 2010), pp 9597-9602. In Engelmann, Jan B., and Grit Hein. “Contextual and social influences on valuation and choice”. *Progress in Brain Research*, Vol. 202 (2013), pp 215-237.

Hashimoto, Hirofumi, and Toshio Yamagishi. “Duality of independence and interdependence: An adaptationist perspective”. *Asian Journal of Social Psychology*, Vol. 19, No. 4 (October 2016), pp 286-297.

———. “Preference-expectation reversal in the ratings of independent and interdependent individuals: A USA-Japan comparison”. *Asian Journal of Social Psychology*, Vol. 18, No. 2 (June 2015), pp 115-123.

———. “Two faces of interdependence: Harmony seeking and rejection avoidance”. *Asian Journal of Social Psychology*, Vol. 16, No. 2 (June 2013), pp 142-151.

Hashimoto, Hirofumi, Yang Li and Toshio Yamagishi. “Beliefs and preferences in cultural agents and cultural game players”. *Asian Journal of Social Psychology*, Vol. 14, No. 2 (June 2011), pp 140-147.

Hausman, Jerry A., Gregory K. Leonard and Daniel McFadden. “A utility-consistent, combined discrete choice and count data model: Assessing recreational use losses due to natural resource damage”. *Journal of Public Economics*, Vol. 56, No. 1 (January 1995), pp 1-30.

Hayashi, Nahoko, Elinor Ostrom, James Walker, and Toshio Yamagishi. “Reciprocity, Trust, and the Sense of Control: A Cross-Societal Study”. *Rationality and Society*, Vol. 11, No. 1 (1999), pp 27-46.

Hayden, F. Gregory. “Ecosystem Valuation: Combining Economics, Philosophy, and Ecology”. *Journal of Economic Issues*, Vol. 27, No. 2 (Jun., 1993), pp 409-420.

Hayek, Friedrich A. “Economics and Knowledge”. *Economica*, Vol. 4, No. 13 (1937), pp 35-54. In Barbara E. Baarsma, and Jan G. Lambooy. “Valuation of externalities through neo-classical

methods by including institutional variables". *Transportation Research Part D: Transport and Environment*, Vol. 10, No. 6 (November 2005), pp 459-475.

———. *Economic Freedom*. Oxford: Basil Blackwell, 1991. In Zafirovski, Milan. "Classical and neoclassical conceptions of rationality—Findings of an exploratory survey". *The Journal of Socio-Economics*, Vol. 37, No. 2 (April 2008), pp 789-820.

———. *The Counter-Revolution of Science*. Indianapolis: Liberty Press, 1979 [orig. 1952]. In Vanberg, Viktor J. "Rational choice, preferences over actions and rule-following behavior". Working paper, Freiburg Discussion Papers on Constitutional Economics 07/6, Walter Eucken Institut.

Heywood, Andrew. *Politics*. 2nd edition. Great Britain: Palgrave, 2002.

Hickerson, Steven R. "Instrumental Valuation: The Normative Compass of Institutional Economics". *Journal of Economic Issues*, Vol. 21, No. 3, Evolutionary Economics I: Foundations of Institutional Thought (Sep., 1987), pp 1117-1143.

Higgins, Rosalyn. *Themes & Theories: Selected Essays, Speeches, and Writings in International Law*. Vol. 1. Oxford; New York: Oxford University Press, 2009.

Hill, Daniel W. "Why Governments Cede Sovereignty: Evidence From Regional Human Rights Courts". *Foreign Policy Analysis* (2016), pp 1-27.

Hill, T., and P. Lewicki. *STATISTICS: Methods and Applications*. Tulsa, Oklahoma: StatSoft, Inc., 2007 [cited 07 June 2016]. Available from: http://www.statsoft.com/Textbook/Principal-Components-Factor-Analysis.

Hindmoor, Andrew. *Rational Choice*. New York: Palgrave Macmillan, 2006.

Hofstede, Geert. "A Case for Comparing Apples with Oranges: International Differences in Values". *International Journal of Comparative Sociology*, Vol. 39, No. 1 (March 1998), pp 16-31.

———. "Culture's Recent Consequences: Using Dimension Scores in Theory and Research". *International Journal of Cross Cultural Management*, Vol. 1, No. 1 (2001a), pp 11-30.

———. "Dimensions do not exist: A reply to Brendan McSweeney". *Human Relations*, Vol. 55, No. 11 (November 2002), pp 1355-1361.

———. "What is culture? A reply to Baskerville". *Accounting, Organizations and Society*, Vol. 28, No. 7-8 (October-November 2003), pp 811-813.

———. *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations*. 2nd ed. Thousand Oaks, California: Sage Publications, 2001b.

———. *Culture's Consequences: International Differences in Work-Related Values*. Beverly Hills, CA: Sage, 1980.

Hofstede, Geert, and Gert Jan Hofstede . "Dimension Data Matrix". *Geert Hofstede & Gert Jan Hofstede*, 2012 [cited 26 August 2016]. Available from: www.geerthofstede.nl/dimension-data-matrix.

Hofstede, Geert, and Robert R. McCrae. "Personality and Culture Revisited: Linking Traits and Dimensions of Culture". *Cross-Cultural Research*, Vol. 38, No. 1 (February 2004), pp 52-88.

Hofstede, Geert, Adriana V. Garibaldi de Hilal, Sigmar Malvezzi, Betania Tanure, and Henk Vinken. "Comparing Regional Cultures Within a Country: Lessons From Brazil". *Journal of Cross-Cultural Psychology*, Vol. 41, No. 3 (2010), pp 336-352.

Holler, Manfred J. "Classical, Modern and New Game Theory". Jahrbücher für Nationalökonomie und Statistik, Vol. 222 (2002), pp 556-583.

Hotelling, Harold. Letter of June 18, 1947, to Newton B. Drury. In *The Economics of Public Recreation: An Economic Study of the Monetary Evaluation of Recreation in the National Parks*. Mimeographed. Washington, D.C.: Land and Recreational Planning Division, National Park Service, 1949.

Howarth, Richard B., and Stephen Farber. "Accounting for the value of ecosystem services". *Ecological Economics*, Vol. 41, No. 3 (June 2002), pp 421-429.

Hox, Joop J. *Multilevel Analysis: Techniques and Applications*. 2nd edition. New York; Great Britain: Routledge, 2010.

Huang, Peter H. "International Environmental Law and Emotional Rational Choice". *The Journal of Legal Studies*, Vol. 31, No. S1, Rational Choice and International Law, A Conference Sponsored by the University of Chicago Law School (January 2002), pp S237-S258.

Hufschmidt, Maynard M., David E. James, Anton D. Meister, Blair T. Bower and John A. Dixon. *Environment, Natural Systems, and Development: An Economic Valuation Guide*. United States of America: East-West Center, East-West Environment and Policy Institute, 1983.

Huntington, Samuel. *The Clash of Civilizations and the Remaking of World Order*. New York: Simon & Schuster, 1996.

Husted, Bryan W. "Culture and Ecology: A Cross-National Study of the Determinants of Environmental Sustainability". *MIR: Management International Review*, Vol. 45, No. 3 (2005), pp 349-371.

Immerwahr, John. "Waiting for a Signal: Public Attitudes toward Global Warming, the Environment and Geophysical Research". *American Geophysical Union*, 1999 [cited 28 August 2016]. Available from: http://research.policyarchive.org/5662.pdf.

Inglehart, Ronald. "Changing values among Western publics from 1970 to 2006". *West European Politics*, Vol. 31, No. 1/2 (2008), pp 130-146. In Michael Minkov and Geert Hofstede, "The evolution of Hofstede's doctrine", *Cross Cultural Management: An International Journal*, Vol. 18, No. 1 (2011), pp 10-20.

———. "Public Support for Environmental Protection: Objective Problems and Subjective Values in 43 Societies". *PS: Political Science and Politics*, Vol. 28, No. 1 (Mar., 1995), pp 57-72.

———. *Modernization and postmodernization: cultural, economic, and political change in 43 societies*. Princeton: Princeton University Press, 1997.

Inglehart, Ronald, and Christian Welzel. "Political Culture and Democracy: Analyzing Cross-Level Linkages". *Comparative Politics*, Vol. 36, No. 1 (Oct., 2003), pp 61-79. In Kwang-Il Yoon, "Political Culture of Individualism and Collectivism", Doctoral dissertation, University of Michigan, 2010.

———. *Modernization, Cultural Change, and Democracy: The Human Development Sequence*. United States of America: Cambridge University Press, 2005.

Inglehart, Ronald, and Daphna Oyserman. "Individualism, Autonomy and Self-Expression: The Human Development Syndrome". In *Comparing Cultures, Dimensions of Culture in a Comparative Perspective*, eds. Henk Vinken, Joseph Soeters, and Peter Ester. Leiden, The Netherlands: Brill, 2004, pp 74-96.

Inglehart, Ronald, and Marita Carballo. "Does Latin America Exist? (And Is There a Confucian Culture?): A Global Analysis of Cross-Cultural Differences". *PS: Political Science and Politics*, Vol. 30, No. 1 (Mar., 1997), pp 34-47.

Inglehart, Ronald, and Paul R. Abramson. "Measuring Postmaterialism". *American Political Science Review*, Vol. 93, No. 3 (Sep., 1999), pp 665-677.

Inglehart, Ronald, and Wayne E. Baker. "Modernization, Cultural Change, and the Persistence of Traditional Values". *American Sociological Review*, Vol. 65, No. 1, Looking Forward, Looking Back: Continuity and Change at the Turn of the Millennium (Feb., 2000), pp 19-51.

Iniesta-Arandia, Irene, Marina García-Llorente, Pedro A. Aguilera, Carlos Montes and Berta Martín-López. "Socio-cultural valuation of ecosystem services: uncovering the links between values, drivers of change, and human well-being". *Ecological Economics*, Vol. 108 (December 2014), pp 36-48.

International Organization for Standardization. "Online Browsing Platform". *ISO*, 2016 [cited 26 August 2016]. Available from: https://www.iso.org/obp/ui/#search. In International Union for Conservation of Nature and Natural Resources. "Countries by Region". *The IUCN Red List of Threatened Species*, 2016 [cited 26 August 2016]. Available from: http://www.iucnredlist.org/technical-documents/data-organization/countries-by-regions.

IPCC. *Climate Change: 2014: Synthesis Report.* Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, eds. Core Writing Team, R. K. Pachauri and L. A. Meyer. Geneva, Switzerland: IPCC, 2014.

Jacobs, Sander, Nicolas Dendoncker, Berta Martín-López, David Nicholas Barton, Erik Gomez-Baggethun, Fanny Boeraeve, Francesca L. McGrath, Kati Vierikko, David Geneletti, Katharina J. Sevecke, Nathalie Pipart, Eeva Primmer, Peter Mederly, Stefan Schimidt, Alexandra Aragão, Himlal Baral, Rosalind H. Bark, Tania Briceno, Delphine Brogna, Pedro Cabral, Rik De Vreese, Camino Liquete, Hannah Mueller, Kelvin S.-H. Peh, Anna Phelan, Alexander R. Rincón, Shannon H. Rogers, Francis Turkelboom, Wouter Van Reeth, Boris T. van Zanten, Hilde Karine Wam and Carla-Leanne Washbourne. "A new valuation school: Integrating diverse values of nature in resource and land use decisions". *Ecosystem Services*, Vol. 22, Part B (December 2016), pp 213-220.

Jennings, M. Kent. "Political Socialization". In *The Oxford Handbook of Political Behavior*, eds. Russell J. Dalton and Hans-Dieter Klingemann. New York: Oxford University Press Inc., 2007, pp 29-44.

Kahneman, Daniel, and Ilana Ritov. "Determinants of Stated Willingness to Pay for Public Goods: A Study in the Headline Method". *Journal of Risk and Uncertainty*, Vol. 9, No. 1 (1994), pp 5-37.

Kahneman, Daniel, Ilana Ritov and David Schkade. "Economic Preferences or Attitude Expressions?: An Analysis of Dollar Responses to Public Issues". *Journal of Risk and Uncertainty*, Vol. 19, No. 1-3 (1999), pp 203-235.

Kahneman, Daniel, Ilana Ritov, Karen E. Jacowitz and Paul Grant. "Stated Willingness to Pay for Public Goods: A Psychological Perspective". *Psychological Science*, Vol. 4, No. 5 (Sep., 1993), pp 310-315.

Kahneman, Daniel, Jack L. Knetsch and Richard H. Thaler. "Experimental Tests of the Endowment Effect and the Coase Theorem". *Journal of Political Economy*, Vol. 98, No. 6 (Dec., 1990), pp 1325-1348. In Louie, Kenway, and Benedetto De Martino. "The Neurobiology of Context-Dependent Valuation and Choice". In *Neuroeconomics: Decision Making and the Brain*, eds. Paul W. Glimcher and Ernst Fehr, 2nd ed. United States of America: Elsevier, Inc., 2014, pp 455-476.

Kallis, Giorgos, Erik Gómez-Baggethun and Christos Zografos. "To value or not to value? That is not the question". *Ecological Economics*, Vol. 94 (October 2013), pp 97-105.

Katznelson, Ira. "Structure and Configuration in Comparative Politics". In *Comparative Politics: Rationality, Culture and Structure*, eds. Mark Irving Lichbach and Alan S. Zuckerman. New York: Cambridge University Press, 1997, pp 81-112.

Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi. "The Worldwide Governance Indicators: Methodology and Analytical Issues". World Bank Policy Research Working Paper No. 5430, 2010

[cited 27 August 2016]. Available from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1682130.

Keefer, Philip, and Stephen Knack. "Social Capital, Social Norms and the New Institutional Economics". In *Handbook of New Institutional Economics*, eds. Claude Ménard and Mary M. Shirley. The Netherlands: Springer, 2005), pp 701-725.

Keith, Linda Camp. "Judicial independence and human rights protection around the world". *Judicature*, Vol. 85, No. 4 (January-February 2002), pp 195-200.

Kidd, Quentin, and Aie-Rie Lee. "Postmaterialist Values and Environment: A Critique and Reappraisal". *Social Science Quarterly*, Vol. 78, No. 1 (March 1997), pp 1-15.

King, Dennis M., and Marisa J. Mazzotta. "Market Price Method". *Ecosystem Valuation* [cited 12 May 2015]. Available from: www.ecosystemvaluation.org/market_price.htm.

Kirkpatrick, Colin. "Economic Valuation of Environmental Impacts". In *Environmental Assessment in Developing and Transitional Countries: Principles, Methods and Practice*, eds. Norman Lee and Clive George. England: John Wiley & Sons Ltd., 2000, pp 111-123.

Kiyonari, Toko, Toshio Yamagishi, Karen S. Cook, and Coye Cheshire. "Does Trust Beget Trustworthiness? Trust and Trustworthiness in Two Games and Two Cultures: A Research Note". *Social Psychology Quarterly*, Vol. 69, No. 3 (Sep., 2006), pp 270-283.

Kluckhohn, Clyde. "Culture and behavior". In *Handbook of Social Psychology*, ed. Gardner Lindzey. Cambridge, MA: Addison-Wesley, 1954, pp 921-976.

Knight, Kyle W., and Benjamin L. Messer. "Environmental Concern in Cross-National Perspective: The Effects of Affluence, Environmental Degradation, and World Society". *Social Science Quarterly*, Vol. 93, No. 2 (June 2012), pp 521-537.

Kolstad, Charles D. *Environmental Economics*. 2nd ed. United States of America: Oxford University Press, Inc., 2011.

Kontoleon, Andreas, Richard Macrory and Timothy Swanson. "Individual preference-based values and environmental decision making: Should valuation have its day in court?". *An Introduction to the Law and Economics of Environmental Policy: Issues in Institutional Design*, Vol. 20 (2002), pp 177-214.

Kopelman, Shirli. "The effect of culture and power on cooperation in commons dilemmas: Implications for global resource management". *Organizational Behavior and Human Decision Processes*, Vol. 108, No. 1 (January 2009), pp 153-163.

Kopelman, Shirli, J. Mark Weber and David M. Messick. "Factors Influencing Cooperation in Commons Dilemmas: A Review of Experimental Psychological Research". In Committee on the Human Dimensions of Global Change, Division of Behavioral and Social Sciences and Education

and National Research Council, *The Drama of the Commons*, eds. Elinor Ostrom, Thomas Dietz, Nives Dolšak, Paul C. Stern, Susan Stonich, and Elke U. Weber. Washington, D.C.: National Academy Press, 2002, pp 113-156.

Kosonen, Kaisa. "Beyond GDP: Measuring what really matters to our prosperity and future". *Greenpeace,* June 2012 [cited 28 August 2016]. Available from: www.greenpeace.org/international/Global/international/publications/RioPlus20/Beyond-GDP.pdf.

Kountouris, Yiannis, Zoran Nakic and Johannes Sauer. "Political instability and non-market valuation: Evidence from Croatia". *Resource and Energy Economics,* Vol. 41 (August 2015), pp 19-39.

Kriström, Bengt. "Contingent valuation". In *Handbook of Environmental and Resource Economics,* ed. Jeroen C. J. M. van den Bergh. United Kingdom: Edward Elgar Publishing Limited, 1999, pp 777-795.

Krutilla, John V. "Conservation Reconsidered". *The American Economic Review*, Vol. 57, No. 4 (Sep., 1967), pp 777-786.

Kumar, Manasi, and Pushpam Kumar. "Valuation of the ecosystem services: A psycho-cultural perspective". *Ecological Economics,* Vol. 64, No. 4 (1 February 2008), pp 808-819.

Kuwabara, Ko, Robb Willer, Michael W. Macy, Rie Mashima, Shigeru Terai, and Toshio Yamagishi. "Culture, Identity, and Structure in Social Exchange: A Web-Based Trust Experiment in the United States and Japan". *Social Psychology Quarterly*, Vol. 70, No. 4, Birthday Issue (Dec., 2007), pp 461-479.

Laurans, Yann, and Laurent Mermet. "Ecosystem services economic valuation, decision-support system or advocacy?". *Ecosystem Services,* Vol. 7 (March 2014), pp 98-105.

Levi, Margaret. "Comment on "Incentives, Rules of the Game, and Development", by Elinor Ostrom". In *Annual World Bank Conference on Development Economics 1995,* eds. Michael Bruno and Boris Pleskovic. Washington, D.C.: The International Bank for Reconstruction and Development/The World Bank, 1996, pp 241-246.

Lewinsohn-Zamir, Daphna. "Consumer Preferences, Citizen Preferences, and the Provision of Public Goods". *The Yale Law Journal*, Vol. 108, No. 2 (Nov., 1998), pp 377-406.

Li, Jian, Erte Xiao, Daniel Houser and P. Read Montague. "Neural responses to sanction threats in two-party economic exchange". *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 106, No. 39 (29 September 2009), pp 16835-16840. In Engelmann, Jan B., and Grit Hein. "Contextual and social influences on valuation and choice". *Progress in Brain Research,* Vol. 202 (2013), pp 215-237.

Liebe, Ulf, Peter Preisendörfer, and Jürgen Meyerhoff. “To Pay or Not to Pay: Competing Theories to Explain Individuals’ Willingness to Pay for Public Environmental Goods”. *Environment and Behavior*, Vol. 43, No. 1 (2011), pp 106-130.

Liekens, Inger, Leo De Nocker, Steven Broekx, Joris Aertsens, and Anil Markandya. “Ecosystem Services and Their Monetary Value”. In *Ecosystem Services: Global Issues, Local Practices*, eds. Sander Jacobs, Nicolas Dendoncker and Hans Keune. China: Elsevier Inc., 2014, pp 13-28.

Liu, Shuang, and Robert Costanza. “Ecosystem services valuation in China”. *Ecological Economics*, Vol. 69, No. 7 (15 May 2010), pp 1387-1388.

Lockwood, Michael. “Non-compensatory preference structures in non-market valuation of natural area policy”. *Australian Journal of Agricultural Economics*, Vol. 40, No. 2 (August 1996), pp 85-101.

Lorenzoni, Irene, and Nick F. Pidgeon. “Public Views on Climate Change: European and USA Perspectives”. *Climate Change*, Vol. 77, No. 1 (July 2006), pp 73-95.

Louie, Kenway, and Benedetto De Martino. “The Neurobiology of Context-Dependent Valuation and Choice”. In *Neuroeconomics: Decision Making and the Brain*, eds. Paul W. Glimcher and Ernst Fehr, 2nd ed. United States of America: Elsevier, Inc., 2014, pp 455-476.

Ludwig, Donald. “Limitations of Economic Valuation of Ecosystems”. *Ecosystems*, Vol. 3, No. 1 (Jan., - Feb., 2000), pp 31-35.

Luxen, Micah. “Keystone XL pipeline: Why is it so disputed?”. *BBC*, 24 January 2017 [cited 15 May 2018]. Available from: www.bbc.com/news/world-us-canada-30103078.

Madhoo, Yeti Nisha. “Valuation of non-market environmental goods and services”. In *Saving Small Island Developing States: Environmental and Natural Resource Challenges*, eds. Shyam Nath, John L. Roberts and Yeti Nisha Madhoo. United Kingdom: Commonwealth Secretariat, 2010, pp 32-47.

March, James G., and Johan P. Olsen. *Rediscovering Institutions: The Organizational Basis of Politics*. New York: Free Press, 1989.

Markus, Hazel Rose, and Shinobu Kitayama. “Culture and the Self: Implications for Cognition, Emotion, and Motivation”. *Psychological Review*, Vol. 98, No. 2 (1991), pp 224-253.

Marquart-Pyatt, Susan T. “Contextual influences on environmental concerns cross-nationally: A multilevel investigation”. *Social Science Research*, Vol. 41, No. 5 (September 2012), pp 1085-1099.

Marre, Jean-Baptiste, Olivier Thébaud, Sean Pascoe, Sarah Jennings, Jean Boncoeur, Louisa Coglan. “Is economic valuation of ecosystem services useful to decision-makers? Lessons learned

from Australian coastal and marine management". *Journal of Environmental Management*, Vol. 178 (1 August 2016), pp 52-62.

Martín-López, Berta, Carlos Montes and Javier Benayas. "The non-economic motives behind the willingness to pay for biodiversity conservation". *Biological Conservation*, Vol. 139, No. 1-2 (September 2007), pp 67-82.

Martinez-Alier, Joan, and Martin O'Connor. "Distributional issues: an overview". In *Handbook of Environmental and Resource Economics*, ed. Jeroen C. J. M. van den Bergh. UK: Edward Elgar Publishing Limited, 1999, pp 380-393. In Kallis, Giorgos, Erik Gómez-Baggethun and Christos Zografos. "To value or not to value? That is not the question". *Ecological Economics*, Vol. 94 (October 2013), pp 97-105.

Matthies, Ellen, Sebastian Selge and Christian A. Klöckner. "The role of parental behaviour for the development of behaviour specific environmental norms – The example of recycling and re-use behaviour". *Journal of Environmental Psychology*, Vol. 32, No. 3 (September 2012), pp 277-284.

Matulis, Brett Sylvester. "The economic valuation of nature: A question of justice?". *Ecological Economics*, Vol. 104 (August 2014), pp 155-157.

McCarty, John A., and L. J. Shrum. "The Influence of Individualism, Collectivism, and Locus of Control on Environmental Beliefs and Behavior". *Journal of Public Policy & Marketing*, Vol. 20, No. 1, Competition Policy and Antitrust Law (Spring, 2001), pp 93-104.

McGinnis, Michael, and Elinor Ostrom. "Will Lessons from Small-Scale Social Dilemmas Scale Up?". In *New Issues and Paradigms in Research on Social Dilemmas*, eds. Anders Biel, Daniel Eek, Tommy Gärling, and Mathias Gustafsson. The Netherlands: Springer Science+Business Media, LLC, 2008, pp 189-211.

———. *Design Principles for Local and Global Commons*. Paper prepared for presentation at a Conference on "Linking Local and Global Commons", Harvard Center for International Affairs, Cambridge, Massachusetts, 23-25 April 1992.

Meinard, Yves, and Philippe Grill. "The economic valuation of biodiversity as an abstract good". *Ecological Economics*, Vol. 70, No. 10 (15 August 2011), pp 1707-1714.

Meinard, Yves, Malgorzata Dereniowska and Jean-Sébastien Gharbi. "The ethical stakes in monetary valuation methods for conservation purposes". *Biological Conservation*, Vol. 199 (July 2016), pp 67-74.

Miljkovic, Dragan. "Rational choice and irrational individuals or simply an irrational theory: A critical review of the hypothesis of perfect rationality". *The Journal of Socio-Economics*, Vol. 34, No. 5 (October 2005), pp 621-634.

Millennium Ecosystem Assessment (MEA). *Ecosystems and Human Well-being: Synthesis*. Washington, D.C.: Island Press, 2005. In Chan, Kai M. A., Anne D. Guerry, Patricia Balvanera, Sarah Klain, Terre Satterfield, Xavier Basurto, Ann Bostrom, Ratana Chuenpagdee, Rachelle Gould, Benjamin S. Halpern, Neil Hannahs, Jordan Levine, Bryan Norton, Mary Ruckelshaus, Roly Russell, Jordan Tam and Ulalia Woodside. "Where are *Cultural* and *Social* in Ecosystem Services? A Framework for Constructive Engagement", *BioScience*, Vol. 62, No. 8 (August 2012), pp 744-756.

Miller, David. *Market, State, and Community: Theoretical Foundations of Market Socialism*. Oxford: Oxford University Press, 1989. In Neuteleers, Stijn, and Bart Engelen. "Talking money: How market-based valuation can undermine environmental protection". *Ecological Economics*, Vol. 117 (September 2015), pp 253-260.

Minkov, Michael, and Geert Hofstede. "Is National Culture a Meaningful Concept? : Cultural Values Delineate Homogeneous National Clusters of In-Country Regions". *Cross-Cultural Research*, Vol. 46, No. 2 (2012), pp 133-159.

———. "Nations Versus Religions: Which Has a Stronger Effect on Societal Values?". *Management International Review*, Vol. 54, No. 6 (December 2014), pp 801-824.

———. "The evolution of Hofstede's doctrine". *Cross Cultural Management: An International Journal*, Vol. 18, No. 1 (2011), pp 10-20.

Minkov, Michael, Vesselin Blagoev, and Geert Hofstede. "The Boundaries of Culture: Do Questions About Societal Norms Reveal Cultural Differences". *Journal of Cross-Cultural Psychology*, Vol. 44, No. 7 (2013), pp 1094-1106.

Mishra, S. K. "Valuation of Environmental Goods and Services: An Institutionalistic Assessment". *Michigan State University* [cited 12 May 2015]. Available from: www.msu.edu/user/schmid/mishra.htm.

Mitchell, R. C., and R. T. Carson. *Using Surveys to Value Public Goods*. Washington D.C.: Resources for the Future, 1989.

Morrison, Mark D., Russell K. Blamey and Jeff W. Bennett. "Minimising Payment Vehicle Bias in Contingent Valuation Studies". *Environmental and Resource Economics*, Vol. 16, No. 4 (August 2000), pp 407-422.

Munasinghe, Mohan. "Biodiversity Protection Policy: Environmental Valuation and Distribution Issues". *Ambio*, Vol. 21, No. 3, Economics of Biodiversity Loss (May, 1992), pp 227-236.

Munda, Giuseppe. "Cost-benefit analysis in integrated environmental assessment: some methodological issues". *Ecological Economics*, Vol. 19, No. 2 (November 1996), pp 157-168.

———. *Conceptualising and Responding to Complexity*. Environmental Valuation in Europe, Policy Research Brief, No. 2. Cambridge: Cambridge Research for the Environment, 2000.

Munro, Alistair. “Environmental valuation methods in SIDS”. In *Saving Small Island Developing States: Environmental and Natural Resource Challenges*, eds. Shyam Nath, John L. Roberts and Yeti Nisha Madhoo. United Kingdom: Commonwealth Secretariat, 2010, pp 94-107.

Neurath, Otto. “Physicalism, Planning and the Social Sciences: Bricks Prepared for a Discussion v. Hayek”. 26th July, 1945, *The Otto Neurath Nachlass in Haarlem*, 202 K.56. In John O’Neill, Al Campbell, Robin Hahnel and Michael Albert. “Socialist Calculation and Environmental Valuation: Money, Markets and Ecology”. *Science & Society*, Vol. 66, No. 1, Building Socialism Theoretically: Alternatives to Capitalism and the Invisible Hand (Spring, 2002), pp 137-158.

Neuteleers, Stijn, and Bart Engelen. “Talking money: How market-based valuation can undermine environmental protection”. *Ecological Economics,* Vol. 117 (September 2015), pp 253-260.

Nikolakis, William D., R. Quentin Grafton and Hang To. “Indigenous values and water markets: Survey insights from northern Australia”. *Journal of Hydrology*, Vol. 500 (13 September 2013), pp 12-20.

Ninan, K. N., and Makoto Inoue. “Valuing forest ecosystem services: What we know and what we don’t”. *Ecological Economics*, Vol. 93 (September 2013), pp 137-149.

Norgaard, Richard B. “The Process of Loss: Exploring the Interactions between Economic and Ecological Systems”. *American Zoologist*, Vol. 34, No. 1 (1994), pp 145-158.

North, Douglass C. “Institutions and the Performance of Economies Over Time”. In *Handbook of New Institutional Economics*, eds. Claude Ménard and Mary M. Shirley. The Netherlands: Springer, 2005, pp 21-30.

Norton, Bryan, Robert Costanza and Richard C. Bishop. “The evolution of preferences: Why ‘sovereign’ preferences may not lead to sustainable policies and what to do about it”. *Ecological Economics,* Vol. 24, No. 2-3 (February-March 1998), pp 193-211.

Nyborg, Karine. “Homo Economicus and Homo Politicus: interpretation and aggregation of environmental values”. *Journal of Economic Behavior & Organization*, Vol. 42, No. 3 (July 2000), pp 305-322.

O’Connor, Martin. *Natural Capital*. Environmental Valuation in Europe, Policy Research Brief, No. 3. Cambridge: Cambridge Research for the Environment, 2000.

O’Neill, John. “Managing without Prices: The Monetary Valuation of Biodiversity”. *Ambio*, Vol. 26, No. 8 (Dec., 1997), pp 546-550.

———. “Markets and the Environment: The Solution Is the Problem”. *Economic and Political Weekly*, Vol. 36, No. 1 (May 26 – Jun. 1, 2001), pp 1865-1873.

O'Neill, John, Al Campbell, Robin Hahnel and Michael Albert. "Socialist Calculation and Environmental Valuation: Money, Markets and Ecology". *Science & Society*, Vol. 66, No. 1, Building Socialism Theoretically: Alternatives to Capitalism and the Invisible Hand (Spring, 2002), pp 137-158.

Office of Best Practice Regulation. *Research Report: Environmental valuation and uncertainty*. Canberra, Australia: Department of the Prime Minister and Cabinet, Australian Government, July 2014.

Oh, Hyunga, and Jong Ho Hong. "Citizens' trust in government and their willingness-to-pay". *Economic Letters*, Vol. 115, No. 3 (June 2012), pp 345-347.

Olson, Mancur. *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press, 1965.

Organisation for Economic Co-operation and Development. "List of OECD Member countries – Ratification of the Convention on the OECD". *OECD*, 2016 [cited 26 August 2016]. Available from: www.oecd.org/about/membersandpartners/list-oecd-member-countries.htm.

Ostrom, Elinor. "A Behavioral Approach to the Rational Choice Theory of Collective Action: Presidential Address, American Political Science Association, 1997". *The American Political Science Review*, Vol. 92, No. 1 (Mar., 1998a), pp 1-22.

———. "A diagnostic approach for going beyond panaceas". *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 104, No. 39 (2007), pp 15181-15187. In Cooper, Nigel, Emily Brady, Helen Steen and Rosalind Bryce. "Aesthetic and spiritual values of ecosystems: Recognising the ontological and axiological plurality of cultural ecosystem 'services'". *Ecosystem Services*, Vol. 21, Part B (October 2016), pp 218-229.

———. "A Frequently Overlooked Precondition of Democracy: Citizens Knowledgeable about and Engaged in Collective Action". In *Elinor Ostrom and the Bloomington School of Political Economy*, eds. Daniel H. Cole and Michael D. McGinnis. Lanham, Maryland: Lexington Books, 2014d, pp 337-352.

———. "A general framework for analyzing sustainability of socio-ecological systems". *Science*, Vol. 325, No. 5939 (24 July 2009e), pp 419-422. In Cooper, Nigel, Emily Brady, Helen Steen and Rosalind Bryce. "Aesthetic and spiritual values of ecosystems: Recognising the ontological and axiological plurality of cultural ecosystem 'services'". *Ecosystem Services*, Vol. 21, Part B (October 2016), pp 218-229.

———. "A Polycentric Approach for Coping with Climate Change". *Analysis Of Economics And Finance*, Vol. 15, No. 1 (2014b), pp 97-134.

———. "An Agenda for the Study of Institutions". *Public Choice*, Vol. 48, No. 1 (1986), pp 3-25. In Barbara E. Baarsma, and Jan G. Lambooy. "Valuation of externalities through neo-classical

methods by including institutional variables". *Transportation Research Part D: Transport and Environment*, Vol. 10, No. 6 (November 2005), pp 459-475.

———. "Analyzing collective action". *Agricultural Economics*, Vol. 41, No. s1 (November 2010c), pp 155-166.

———. "Beyond Markets and States: Polycentric Governance of Complex Economic Systems". *Transnational Corporations Review*, Vol. 2, No. 2 (2010b), pp 1-12.

———. "Building Trust to Solve Commons Dilemmas: Taking Small Steps to Test an Evolving Theory of Collective Action". In *Games, Groups, and the Global Good*, ed. Simon A. Levin. Berlin, Germany: Springer, 2009a, pp 207-228.

———. "Challenges and growth: the development of the interdisciplinary field of institutional analysis". *Journal of Institutional Analysis*, Vol. 3, No. 3 (2007), pp 239-264.

———. "Collective Action and the Evolution of Social Norms". *The Journal of Economic Perspectives*, Vol. 14, No. 3 (Summer, 2000a), pp 137-158.

———. "Community and the Endogenous Solution of Commons Problems". *Journal of Theoretical Politics*, Vol. 4 No. 3 (1992), pp 343-351.

———. "Constituting Social Capital and Collective Action". *Journal of Theoretical Politics*, Vol. 6, No. 4 (1994), pp 527-562.

———. "Coping with Tragedies of the Commons". *Annual Review of Political Science*, Vol. 2 (June 1999a), pp 493-535.

———. "Covenants, Collective Action, and Common-Pool Resources". In *The Constitution of Good Societies*, eds. Karol Soltan and Stephen L. Elkin. University Park: Penn State University, 1996, pp 23-38.

———. "Design Principles of Robust Property Rights Institutions: What Have We Learned?". In *Property Rights and Land Policies*, eds. Gregory K. Ingram and Yu-Hung Hong. New Hampshire: Lincoln Institute of Land Policy, 2009b, pp 25-51.

———. "Do institutions for collective action evolve?". *Journal of Bioeconomics*, Vol. 16, No. 1 (April 2014a), pp 3-30.

———. "Doing Institutional Analysis: Digging Deeper Than Markets and Hierarchies". In *Handbook of New Institutional Economics*, eds. Claude Ménard and Mary M. Shirley. The Netherlands: Springer, 2005a, pp 819-848.

———. "Experiments combining communication with punishment options demonstrate how individuals can overcome social dilemmas". *Behavioral and Brain Sciences*, Vol. 35, No. 1 (February 2012c), pp 33-34.

———. “Frameworks and theories of environmental change”. *Global Environmental Change*¸ Vol. 18, No. 2 (May 2008a), pp 249-252.

———. “Governance and Institutions”. In *The Princeton Guide to Ecology*, eds. Simon A. Levin, Stephen R. Carpenter, H. Charles J. Godfray, Ann P. Kinzig, Michael Loreau, Jonathan B. Losos, Brian Walker, David S. Wilcove. New Jersey: Princeton University Press, 2009d, pp 748-753.

———. “Institutional Analysis and Development: Elements of the Framework in Historical Perspective”. In *Historical Developments and Theoretical Approaches in Sociology*, ed. Charles Crothers. Oxford, UK: Encyclopedia of Life Support Systems (EOLSS) Publishers, 2010f, pp 261-288.

———. “Institutions and Sustainability of Ecological Systems”. In *Institutions, Property Rights, and Economic Growth: The Legacy of Douglass North*, eds. Sebastian Galiani and Itai Sened. New York, NY: Cambridge University Press, 2014c, pp 84-106.

———. “Institutions and the environment”. *Economic Affairs*, Vol. 28, No. 3 (2008b), pp 24-31.

———. “Microconstitutional Change in Multiconstitutional Political Systems”. *Rationality and Society*, Vol. 1, No. 1 (July 1989), pp 11-49.

———. “Nested externalities and polycentric institutions: must we wait for global solutions to climate change before taking actions at other scales?”. *Economic Theory*, Vol. 49, No. 2, Special Issue on Economic Theory and the Global Environment (February 2012d), pp 353-369.

———. “Policies That Crowd out Reciprocity and Collective Action”. In *Moral Sentiments and Material Interests: The Foundation of Cooperation in Economic Life*, eds. Herbert Gintis, Samuel Bowles, Robert Boyd, and Ernst Fehr. United States of America: The MIT Press, 2005c, pp 253-275.

———. “Polycentric Systems: Multilevel Governance Involving a Diversity of Organizations”. In *Global Environmental Commons: Analytical and Political Challenges in Building Governance Mechanisms*, eds. Eric Brousseau, Tom Dedeurwaerdere, Pierre-André Jouvet, and Marc Willinger. Oxford: Oxford University Press, 2012a, pp 105-25.

———. “Polycentric systems for coping with collective action and global environmental change”. *Global Environmental Change*, Vol. 20, No. 4 (October 2010e), pp 550-557.

———. “Polycentricity, Complexity, and the Commons”. *The Good Society*, Vol. 9, No. 2 (1999b), pp 37-41.

———. “Property-Rights Regimes and Common Goods: A Complex Link”. In *Common Goods: Reinventing European and International Governance*, ed. Adrienne Héritier. United States of America: Rowman & Littlefield Publishers, Inc., 2002, pp 29-57.

———. “Reformulating the Commons”. *Swiss Political Science Review*, Vol. 6, No. 1 (2000b), pp 29-52.

———. “Review: Rational Choice Theory and Institutional Analysis: Toward Complementarity”. *The American Political Science Review*, Vol. 85, No. 1 (Mar., 1991), pp 237-243.

———. “Revising theory in light of experimental findings”. *Journal of Economic Behavior & Organization*, Vol. 73, No. 1 (January 2010a), pp 68-72.

———. “Revisiting the Commons: Local Lessons, Global Challenges”. *Science*, Vol. 284, No. 5412 (09 April 1999), pp 278-282. In Lenka Slavíková, Tatiana Kluvánková-Oravská and Jiřina Jílková. “Bridging theories on environmental governance: Insights from free-market approaches and institutional ecological economics perspectives”. *Ecological Economics*, Vol. 69, No. 7 (15 May 2010), pp 1368-1372.

———. “Scales, Polycentricity, and Incentives: Designing Complexity to Govern Complexity”. In *Protection of Global Biodiversity: Converging Strategies*, eds. Lakshman D. Guruswamy and Jeffrey A. McNeely. Durham, NC: Duke University Press, 1998b, pp 149-167.

———. “Social capital: a fad or fundamental concept?”. In *Social Capital: A Multifaceted Perspective*, eds. Partha Dasgupta and Ismail Serageldin. Washington, D.C.: World Bank, 2000c, pp 172-214.

———. “Social Cooperation in Collective-Action Situations”. In *Beiträge der genossenschaftlichen Selbsthilfe zur wirtschaftlichen und sozialen Entwicklung* [Contributions of cooperative self-help to economic and social development], eds. Hans Jürgen Rösner and Frank Schulz-Nieswandt. Berlin: LIT Verlag, 2009c, pp 49-69.

———. “The Challenge of Common-Pool Resources”. *Environment: Science and Policy for Sustainable Development*, Vol. 50, No. 4 (2008c), pp 8-21.

———. “The Challenge of Self-Governance in Complex Contemporary Environments”. *The Journal of Speculative Philosophy*, Vol. 24, No. 4 (2010d), pp 316-332.

———. “The Comparative Study of Public Economies”. *The American Economist*, Vol. 61, No. 1 (2016), pp 91-107.

———. “The future of the commons: beyond market failure and government regulation”. In *The Future of the Commons*, ed. Elinor Ostrom. Great Britain: The Institute of Economic Affairs, 2012e, pp 68-83.

———. “Toward a Behavioral Theory Linking Trust, Reciprocity, and Reputation”. In *Trust and Reciprocity: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker. New York, NY: Russell Sage Foundation, 2003, pp 19-79.

———. “Why Do We Need to Protect Institutional Diversity?”. *European Political Science*, Vol. 11, No. 1 (March 2012b), pp 128-147.

———. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press, 1990.

———. *Understanding Institutional Diversity*. Princeton, NJ: Princeton University Press, 2005b.

Ostrom, Elinor, and Harini Nagendra. “Tenure alone is not sufficient: monitoring is essential”. *Environmental Economics and Policy Studies*, Vol. 8, No. 3 (September 2007), pp 175-199.

Ostrom, Elinor, and Michael Cox. “Moving beyond panaceas: a multi-tiered diagnostic approach for social-ecological analysis”. *Environmental Conservation*, Vol. 37, No. 4 (December 2010), pp 1-13.

Ostrom, Elinor, and T. K. Ahn. “Introduction”. In *Foundations of Social Capital*, Critical Studies in Economic Institutions, Vol. 2, eds. Elinor Ostrom and T. K. Ahn. Cheltenham, UK; Northhampton, MA: Edward Elgar Publishing Limited, 2003, pp 1-24.

———. *A Social Science Perspective on Social Capital: Social Capital and Collective Action*. Paper to be presented at the European Research Conference on “Social Capital: Interdisciplinary Perspectives”, Exeter, United Kingdom, September 15-20, 2001.

Ostrom, Elinor, James Walker, and Roy Gardner. “Covenants With and Without a Sword: Self-Governance is Possible”. *The American Political Science Review*, Vol. 86, No. 2 (Jun., 1992), pp 404-417.

Ostrom, Elinor, Joanna Burger, Christopher B. Field, Richard B. Norgaard and David Policansky. “Revisiting the Commons: Local Lessons, Global Challenges”. *Science*, Vol. 284, No. 5412 (April 1999), pp 278-282.

Ostrom, Vincent, and Elinor Ostrom. “Cultures: Frameworks, Theories, and Models”. In *Culture Matters: Essays in Honor of Aaron Wildavsky*, eds. Richard J. Ellis and Michael Thompson. United States of America: Westview Press, 1997, pp 79-88.

Owen, Ann L., and Julio Videras. “Civic cooperation, pro-environment attitudes, and behavioral intentions”. *Ecological Economics*, Vol. 58, No. 4 (1 July 2006), pp 814-829.

Oyserman, Daphna, and Ayse K. Uskul. “Individualism and Collectivism: Societal-Level Processes with Implications for Individual-Level and Society-Level Outcomes”. In *Multilevel Analysis of Individuals and Cultures*, eds. Fons J. R. van de Vijver, Dianne A. van Hemert, and Ype H. Poortinga. New Jersey: Lawrence Erlbaum Associates, Inc., Publishers, 2008, pp 145-173.

Oyserman, Daphna, Heather M. Coon and Markus Kemmelmeier. “Rethinking Individualism and Collectivism: Evaluation of Theoretical Assumptions and Meta-Analyses”. *Psychological Bulletin*, Vol. 128, No. 1 (2002), pp 3-72.

Oyserman, Daphna, Markus Kemmelmeier and Heather M. Coon. “Cultural Psychology, A New Look: Reply to Bond (2012), Fiske (2002), Kitayama (2002), and Miller (2002)”. *Psychological Bulletin*, Vol. 128, No. 1 (2002), pp 110-117.

Paavola, Jouni. “Institutions and environmental governance: A reconceptualization”. *Ecological Economics*, Vol. 63, No. 1 (15 June 2007), pp 93-103.

Paavola, Jouni, and W. Neil Adger. “Institutional ecological economics”. *Ecological Economics*, vol. 53, No. 3 (15 May 2005), pp 353-368.

Paldam, Martin. “Social Capital: One or Many? Definition and Measurement”. *Journal of Economic Surveys*, Vol. 14, No. 5 (December 2000), pp 629-653. In Torgler, Benno, and María A. García-Valiñas. “The determinants of individuals’ attitudes towards preventing environmental damage”. *Ecological Economics*, Vol. 63, No. 2-3 (1 August 2007), pp 536-552.

Palmquist, Raymond B. “Hedonic models”. In *Handbook of Environmental and Resource Economics*, eds. Jeroen C. J. M. van den Bergh. United Kingdom: Edward Elgar Publishing Limited, 1999, pp 765-776.

Payne, John W., James R. Bettman, Eloise Coupey and Eric J. Johnson. “A constructive process view of decision making: Multiple strategies in judgment and choice”. *Acta Psychologica*, Vol. 80 (1992), pp 107-141.

Pearce, David. “An Intellectual History of Environmental Economics”. *Annual Review of Energy and the Environment*, Vol. 27 (November 2002), pp 57-81.

Pearce, David, and C. A. Nash. *The Social Appraisal of Projects*. London: MacMillan, 1981. In Munda, Giuseppe. “Cost-benefit analysis in integrated environmental assessment: some methodological issues”. *Ecological Economics*, Vol. 19, No. 2 (November 1996), pp 157-168.

Pearce, David, and Dominic Moran. *The Economic Value of Biodiversity*. In Association with the Biodiversity Programme of IUCN – The World Conservation Union. London: Earthscan Publications, Ltd, 1994.

Peng, Yu-shu, and Shing-Shiuan Lin. “National Culture, Economic Development, Population Growth and Environmental Performance: The Mediating Role of Education”. Journal of Business Ethics, Vol. 90, No. 2 (December 2009), pp 203-219.

Perman, Roger, Yue Ma, Michael Common, David Maddison, and James McGilvray. *Natural Resource and Environmental Economics*. 4th ed. England: Pearson Education Limited, 2011.

Perry, Michael J. “Protecting Human Rights in a Democracy: What Role for the Courts?”. *Wake Forest Law Review*, Vol. 38, No. 2 (2003), *Judicial Review: Blessing or Curse - Or Both - A Symposium In Commemoration of the Bicentennial of Marbury V. Madison*, pp 635-696.

Phelps, Jacob, Ahmad Dermawan and Eneko Garmendia. “Institutionalizing environmental valuation into policy: Lessons from 7 Indonesian agencies”. *Global Environmental Change*, Vol. 43 (March 2017), pp 15-25.

Plott, Charles R., and Kathryn Zeiler. “The Willingness to Pay-Willingness to Accept Gap, the “Endowment Effect”, Subject Misconceptions, and Experimental Procedures for Eliciting Valuations”. *The American Economic Review*, Vol. 95, No. 3 (June 2005), pp 530-545. In Louie, Kenway, and Benedetto De Martino. “The Neurobiology of Context-Dependent Valuation and Choice”. In *Neuroeconomics: Decision Making and the Brain*, eds. Paul W. Glimcher and Ernst Fehr, 2nd ed. United States of America: Elsevier, Inc., 2014, pp 455-476.

Plottu, Eric, and Beatrice Plottu. “The concept of Total Economic Value of environment: A reconsideration within a hierarchical rationality”. *Ecological Economics*, Vol. 61, No. 1 (15 Feb 2007), pp 52-61.

Portney, Kent E. *Taking Sustainable Cities Seriously: Economic Development, the Environment, and Quality of Life in American Cities*. 2nd edition. Cambridge, Massachusetts; London, England: The MIT Press, 2013.

Poteete, Amy R., and Elinor Ostrom. “Heterogeneity, Group Size and Collective Action: The Role of Institutions in Forest Management”. *Development and Change*, Vol. 35, No. 3 (2004), pp 435-461.

Poteete, Amy, Marco A. Janssen, and Elinor Ostrom. *Working Together: Collective Action, The Commons, and Multiple Methods in Practice*. New Jersey: Princeton University Press, 2009.

Powe, Neil A. *Redesigning Environmental Valuation: Mixing Methods within Standard Preference Technique*. United Kingdom: Edward Elgar Publishing Limited, 2007.

Pritchard, Jr., Lowell, Carl Folke and Lance Gunderson. “Valuation of Ecosystem Services in Institutional Context”. *Ecosystems*, Vol. 3, No. 1 (Jan. – Feb., 2000), pp 36-40.

Probst, Tahira M., Peter J. Carnevale and Harry C. Triandis. “Cultural Values in Intergroup and Single-Group Social Dilemmas”. *Organizational Behavior and Human Decision Processes*, Vol. 77, No. 3 (March 1999), pp 171-191.

Pröpper, Michael, and Felix Haupts. “The culturality of ecosystem services. Emphasizing process and transformation”. *Ecological Economics*, Vol. 108 (December 2014), pp 28-35.

Putnam, Robert D. *Bowling Alone: The Collapse and Revival of American Community*. United States of America: Simon and Schuster, Inc., 2000.

Putnam, Robert D., Robert Leonardi, and Raffaella Nanetti. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton, NJ: Princeton University Press, 1993.

Rapoport, Anatol. *Two-Person Game Theory: The Essential Ideas*. Ann Arbor: University of Michigan Press, 1966.

Remoundou, Kyriaki, Yiannis Kountouris and Phoebe Koundouri. "Is the value of an environmental public service good sensitive to the providing institution?". *Resource and Energy Economics*, Vol. 34, No. 3 (September 2012), pp 381-395.

Retellack, Matthew, and Stephan Schott. "Cultural Values and Ecosystem Management at the Subwatershed Level". *Environmental Policy and Governance*, Vol. 24, No. 5 (September/October 2014), pp 351-363.

Ring, Irene, Bernd Hansjürgens, Thomas Elmqvist, Heidi Wittmer and Pavan Sukhdev. "Challenges in framing the economics of ecosystems and biodiversity: the TEEB initiative". *Current Opinion in Environmental Sustainability*, Vol. 2, No. 1-2 (May 2010), pp 15-26.

Roccas, Sonia, Lilach Sagiv, Shalom H. Schwartz, and Ariel Knafo. "The Big Five Personality Factors and Personal Values". *Personality and Social Psychology Bulletin*, Vol. 28, No. 6 (June 2002), pp 789-801.

Romano, Angelo, Daniel Balliet, Toshio Yamagishi, and James H. Liu. "Parochial trust and cooperation across 17 societies". *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 114, No. 48 (28 November 2017), pp 12702-12707.

Ross, Marc Howard. "Culture and Identity in Comparative Political Analysis". In *Comparative Politics: Rationality, Culture and Structure*, eds. Mark Irving Lichbach and Alan S. Zuckerman. New York: Cambridge University Press, 1997, pp 42-80.

Roy, Abhijit, and Irene Goll. "Predictors of various facets of sustainability of nations: The role of cultural and economic factors". *International Business Review*, Vol. 23, No. 5 (October 2014), pp 849-861.

Ryan, Anthony M., and Clive L. Spash. "Is WTP an attitudinal measure? Empirical analysis of the psychological explanation for contingent values". *Journal of Economic Psychology*, Vol. 32, No. 5 (2011), pp 674-687.

Sagoff, Mark. *The Economy of the Earth*. 2nd edition. New York: Cambridge University Press, 2007.

Samuelson, Paul A. "The Pure Theory of Public Expenditure". *The Review of Economics and Statistics*, Vol. 36, No. 4 (Nov., 1954), pp 387-389. In Venkatachalam, L. "The contingent valuation method: a review", *Environmental Impact Assessment Review*, Vol. 24, No. 1 (January 2004), pp 89-124.

Sandel, Michael. "What Money Can't Buy: The Moral Limits of Markets". In *The Tanner Lectures on Human Values*, Vol. 21, ed. Grethe B. Peterson. United States of America: University of Utah Press, 2000, pp 89-122. In I. Glenn Cohen. "The Price of Everything, the Value of Nothing:

Reframing the Commodification Debate". *Harvard Law Review*, Vol. 117, No. 689 (2003), pp 689-710.

Schaeffer, Peter V. "Thoughts concerning the economic valuation of landscapes". *Journal of Environmental Management*, Vol. 89, No. 3 (November 2008), pp 146-154.

Schläpfer, Felix. "Democratic valuation (DV): Using majority voting principles to value public services". *Ecological Economics*, Vol. 122 (February 2016), pp 36-42.

Schokkaert, Erik. "Cost-benefit analysis of difficult decisions". *Ethical Perspectives*, Vol. 2, No. 2 (June 1995), pp 71-84. In Neuteleers, Stijn, and Bart Engelen. "Talking money: How market-based valuation can undermine environmental protection". *Ecological Economics*, Vol. 117 (September 2015), pp 253-260.

Scholte, Samantha S. K., Astrid J. A. van Teeffelen and Peter H. Verburg. "Integrating socio-cultural perspectives into ecosystem service valuation: A review of concepts and methods". *Ecological Economics*, Vol. 114 (June 2015), pp 67-78.

Scholz, John T., and Mark Lubell. "Trust and Taxpaying: Testing the Heuristic Approach to Collective Action". *American Journal of Political Science*, Vol. 42, No. 2 (Apr., 1998), pp 398-417.

Schröter, Matthias, Emma H. van der Zanden, Alexander P. E. van Oudenhoven, Roy P. Remme, Hector M. Serna-Chavez, Rudolf S. de Groot, and Paul Opdam. "Ecosystem Services as a Contested Concept: A Synthesis of Critique and Counter-Arguments". *Conservation Letters*, Vol. 7, No. 6 (November/December 2014), pp 514-523.

Schuhmann, Peter W., and Robin Mahon. "The valuation of marine ecosystem goods and services in the Caribbean: A literature review and framework for future valuation efforts". *Ecosystem Services*, Vol. 11 (11 February 2015), pp 56-66.

Schumacher, Ingmar. "How Beliefs Influence the Willingness to Contribute to Prevention Expenditure". *American Journal of Agricultural Economics*, Vol. 97, No. 5 (1 October 2015), pp 1417-1432.

Schwartz, Shalom H. "A Theory of Cultural Value Orientations: Explication and Applications". *Comparative Sociology*, Vol. 5, No. 2-3 (2006), pp 137-182.

———. "A Theory of Cultural Values and Some Implications for Work". *Applied Psychology: An International Review*, Vol. 48, No. 1 (1999), pp 23-47.

———. "Beyond Individualism-Collectivism: New Cultural Dimensions of Values". In *Individualism and collectivism: Theory, method, and applications*, eds. Uichol Kim, Harry C. Triandis, Çiğdem Kâğitçibaşi, Sang-Chin Choi, and Gene Yoon. Thousand Oaks, CA: Sage Publications, Inc., 1994, pp 85-119.

———. “Causes of Culture: National Differences in Cultural Embeddedness”. In *Quod Erat Demonstrandum: From Herodotus’ ethnographic journeys to cross-cultural research*, eds. Aikaterini Gari and Kostas Mylonas. Athens, Greece: Pedio Books Publishing, 2009a, pp 1-11.

———. “Culture Matters: National Value Cultures, Sources and Consequences”. In *Understanding Culture: Theory, Research and Application*, eds. C.-Y. Chiu, Y. Y. Hong, S. Shavitt and R. S. Wyer, Jr. New York: Psychology Press, 2009b, pp 127-150.

———. “Individualism-Collectivism: Critique and Proposed Refinements”. *Journal of Cross-Cultural Psychology*, Vol. 21, No. 2 (June 1990), pp 139-157.

———. “Kul’turnye tsennostnye orientatsii: priroda i sledstviya natsional’nykh razlichiy” [Cultural Value Orientations: Nature & Implications of National Differences]. *Psychology: Journal of Higher School of Economics*, Vol. 5, No. 2 (2008), pp 37-67 (in Russian).

———. “Mapping and Interpreting Cultural Differences Around the World.” In *Comparing Cultures: Dimensions of Culture in A Comparative Perspective*, eds. H. Vinken, J. Soeters and P. Ester. Leiden; Boston: Brill, 2004, pp 43-73.

———. “National Culture as Value Orientations: Consequences of Value Differences and Cultural Distance”. In *Handbook of the Economics of Art and Culture*, Vol. 2, eds. Victor A. Ginsburgh and David Throsby. Oxford, UK: Elsevier B.V., 2014a, pp 547-586.

———. “Normative Influences on Altruism”. *Advances in Experimental Social Psychology*, Vol. 10 (1977), pp 221-279.

———. “Rethinking the Concept and Measurement of Societal Culture in light of Empirical Findings”. *Journal of Cross-Cultural Psychology*, Vol. 45, No. 1 (2014b), pp 5-13.

———. “Societal Value Culture: Latent and Dynamic”. *Journal of Cross-Cultural Psychology*, Vol. 45, No. 1 (2014c), pp 42-46.

———. “Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries”. *Advances in Experimental Social Psychology*, Vol. 25 (1992), pp 1-65.

———. “Value orientations: measurement, antecedents and consequences across nations”. In *Measuring Attitudes Cross-Nationally: Lessons from the European Social Survey*, eds. Roger Jowell, Caroline Roberts, Rory Fitzgerald and Gillian Eva. London: Sage Publications Ltd, 2007, pp 161-193.

Schwartz, Shalom H., and Anat Bardi. “Value Hierarchies Across Cultures: Taking a Similarities Perspective”. *Journal of Cross-Cultural Psychology*, Vol. 32, No. 3 (2001), pp 268-290.

Schwartz, Shalom H., and Klaus Boehnke. “Evaluating the structure of human values with confirmatory factor analysis”. *Journal of Research in Personality*, Vol. 38, No. 3 (June 2004), pp 230-255.

Schwartz, Shalom H., and Maria Ros. “Values in the West: A Theoretical and Empirical Challenge to the Individualism-Collectivism Cultural Dimension”. *World Psychology*, Vol. 1 (August 1995), pp 99-122.

Schwartz, Shalom H., and Wolfgang Bilsky. “Toward a Theory of the Universal Content and Structure of Values: Extensions and Cross-Cultural Replications”. *Journal of Personality and Social Psychology*, Vol. 58, No. 5 (1990), pp 878-891.

———. “Toward A Universal Psychological Structure of Human Values”. *Journal of Personality and Social Psychology*, Vol. 53, No. 3 (1987), pp 550-562.

Sen, Amartya. “Environmental Evaluation and Social Choice: Contingent Valuation and the Market Analogy”. *The Japanese Economic Review*, Vol. 46, No. 1 (March 1995), pp 23-37.

———. “Rational Fools: A Critique of the Behavioral Foundations of Economic Theory”. *Philosophy & Public Affairs*, Vol. 6, No. 4 (Summer, 1977), pp 317-344.

———. “Rationality and Uncertainty”. *Theory and Decision*, Vol. 18, No. 2 (1985), pp 109-127. In Vriend, Nicolaas J. “Rational behavior and economic theory”. *Journal of Economic Behavior and Organization*, Vol. 29, No. 2 (March 1996), pp 263-285.

———. “Rights and agency”. In *Consequentialism and its critics*, ed. Samuel Scheffler. Oxford: Oxford University Press 1982, pp 187-223. In Zsolnai, Laszlo. “Rational Choice and the Diversity of Choices”. *Journal of Socio-Economics*, Vol. 27, No. 5 (1998), pp 613-622.

———. “The Discipline of Cost-Benefit Analysis”. *Journal of Legal Studies*, Vol. 29, No. S2 (June 2000), pp 931-952.

———. “Utilitarianism and Welfarism”. *The Journal of Philosophy*, Vol. 76, No. 9 (Sep., 1979), pp 463-489. In Yves Meinard, and Philippe Grill. “The economic valuation of biodiversity as an abstract good”. *Ecological Economics*, Vol. 70, No. 10 (15 August 2011), pp 1707-1714.

———. *Choice, Welfare and Measurement*. Oxford: Blackwell, 1982.

Shepsle, Kenneth A., and Mark S. Bonchek. *Analyzing Politics: Rationality, Behavior, and Institutions*. United States of America: W. W. Norton & Company, Inc., 1997.

Shinada, Mizuho, and Toshio Yamagishi. “Punishing free riders: direct and indirect promotion of cooperation”. *Evolution and Human Behavior*, Vol. 28, No. 5 (September 2007), pp 330-339.

Shinada, Mizuho, Toshio Yamagishi and Yu Ohmura. “False friends are worse than bitter enemies: “Altruistic” punishment of in-group members”. *Evolution and Human Behavior*, Vol. 25, No. 6 (November 2004), pp 379-393.

Shogren, Jason F. “Experimental Methods and Valuation”. In *Handbook of Environmental Economics,* eds. K.-G. Mäler and J. R. Vincent. The Netherlands: Elsevier B.V., 2005, pp 970-1027.

———. “WAEA Keynote Address Behavioral Environmental Economics: Money Pumps & Nudges”. *Journal of Agricultural and Resource Economics,* Vol. 37, No. 3 (December 2012), pp 349-360.

Siebenhüner, Bernd. “*Homo sustinens* – towards a new conception of humans for the science of sustainability”. *Ecological Economics,* Vol. 32, No. 1 (January 2000), pp 15-25.

Simon, Herbert A. *Administrative Behavior: A Study of Decision-making Processes in Administrative Organization*. New York: Free Press, [1947]1965.

Simonson, Itamar. “Regarding inherent preferences”. *Journal of Consumer Psychology*, Vol. 18, No. 3 (July 2008b), pp 191-196.

———. “Will I like a “medium” pillow? Another look at constructed and inherent preferences”. *Journal of Consumer Psychology*, Vol. 18, No. 3 (July 2008a), pp 155-169.

Sinden, John A., and Albert C. Worrell. *Unpriced Values: Decisions without Market Prices*. United States of America: John Wiley & Sons, Inc., 1979.

Singelis, Theodore M., Harry C. Triandis, Dharm P. S. Bhawuk, and Michele J. Gelfand. “Horizontal and Vertical Dimensions of Individualism and Collectivism: A Theoretical and Measurement Refinement”. *Cross-Cultural Research*, Vol. 29, No. 3 (August 1995), pp 240-275.

Skocpol, Theda. *States and Social Revolutions: A Comparative Analysis of France, Russia, and China*. Cambridge: Cambridge University Press, 1979.

Slavíková, Lenka, Tatiana Kluvánková-Oravská and Jiřina Jílková. “Bridging theories on environmental governance: Insights from free-market approaches and institutional ecological economics perspectives”. *Ecological Economics,* Vol. 69, No. 7 (15 May 2010), pp 1368-1372.

Small, N., M. Munday, and I. Durance. “The challenge of valuing ecosystem services that have no material benefits”. *Global Environmental Change*, Vol. 44 (May 2017), pp 57-67.

Smith, Vernon. “Theory and experiment: What are the questions?”. *Journal of Economic Behavior & Organization,* Vol. 73, No. 1 (January 2010), pp 3-15.

Söderbaum, Peter. “Values, ideology and politics in ecological economics”. *Ecological Economics,* Vol. 28, No. 2 (February 1999), pp 161-170.

Solt, Frederick. “The Standardized World Income Inequality Database”. *Harvard Dataverse,* V15, 2009 [cited 26 August 2016]. Available from: hdl:1902.1/11992.

Soma, Katrine. “Natura economica in Environmental Valuation”. *Environmental Values*, Vol. 15, No. 1 (February 2006), pp 31-50.

Spangenberg, Joachim H., and Josef Settele. “Value pluralism and economic valuation – defendable if well done”. *Ecosystem Services*, Vol. 18 (April 2016), pp 100-109.

Spash, Clive L. “Deliberative monetary valuation (DMV): Issues in combining economic and political processes to value environmental change”. *Ecological Economics*, Vol. 63 (15 September 2007), pp 690-699.

———. “Informing and forming preferences in environmental valuation: Coral reef biodiversity”. *Journal of Economic Psychology*, Vol. 23, No. 5 (October 2002), pp 665-687.

———. “Social Ecological Economics: Understanding the Past to See the Future”. *The American Journal of Economics and Sociology*, Vol. 70, No. 2, Social, Methods, and Microeconomics: Contributions to Doing Better Economics (April, 2011), pp 340-375.

———. *The Concerted Action on Environmental Valuation in Europe (EVE): An Introduction*. Environmental Valuation in Europe, Policy Research Brief, No. 1. Cambridge: Cambridge Research for the Environment, 2000.

Spash, Clive L., and Nick Hanley. “Preferences, information and biodiversity preservation”. *Ecological Economics*, Vol. 12, No. 3 (March 1995), pp 191-208.

Spash, Clive L., Kevin Urama, Rob Burton, Wendy Kenyon, Peter Shannon and Gary Hill. “Motives behind willingness to pay for improving biodiversity in a water ecosystem: Economics, ethics and social psychology”. *Ecological Economics*, Vol. 68, No. 4 (15 February 2009), pp 955-964.

Stagl, Sigrid. “Value Articulating Institutions and Changing Social Preferences”. In *Reflexive Governance for Global Public Goods*, eds. Eric Brousseau, Tom Dedeurwaerdere and Bern Siebenhüner. Cambridge, MA: MIT Press, 2012, pp 225-240.

Stern, Nicholas. *Why Are We Waiting?: The Logic, Urgency, and Promise of Tackling Climate Change*. United States of America: MIT Press, 2015.

Stigler, George J., and Gary S. Becker. “De Gustibus Non Est Disputandum”. *The American Economic Review*, Vol. 67, No. 2 (Mar., 1977), pp 76-90.

Stikvoort, Britt, Therese Lindahl and Tim M. Daw. “Thou shalt not sell nature: How taboo trade-offs can make us act pro-environmentally, to clear our conscience”. *Ecological Economics*, Vol. 129 (September 2016), pp 252-259.

Stithou, Mavra, and Riccardo Scarpa. “Collective versus voluntary payment in contingent valuation for the conservation of marine biodiversity: An exploratory study from Zakynthos, Greece”. *Ocean & Coastal Management*, Vol. 56 (February 2012), pp 1-9.

Suh, Eunkook, Ed Diener, Shigehiro Oishi, and Harry C. Triandis. “The Shifting Basis of Life Satisfaction Judgments Across Cultures: Emotions Versus Norms”. *Journal of Personality and Social Psychology*, Vol. 74, No. 2 (1998), pp 482-493.

Sunstein, Cass. “Endogenous Preferences, Environmental Law”. *The Journal of Legal Studies*, Vol. 22, No. 2 (Jun., 1993), pp 217-254.

———. “Incommensurability and Valuation in Law”. *Michigan Law Review*, Vol. 92, No. 4 (Feb., 1994), pp 779-861.

Sunstein, Cass, Reid Hastie, John W. Payne, David A. Schkade and W. Kip Viscusi. *Punitive Damages: How Juries Decide*. Chicago: University of Chicago Press, 2002. In Marion Fourcade. “Cents and Sensibility: Economic Valuation and the Nature of “Nature””. *American Journal of Sociology*, Vol. 116, No. 6 (May 2011), pp 1721-1777.

Sutton, Paul C., and Sharolyn J. Anderson. “Holistic valuation of urban ecosystem services in New York City’s Central Park”. *Ecosystem Services*, Vol. 19 (June 2016), pp 87-91.

Sypnowich, Christine. *Equality Renewed: Justice, Flourishing and the Egalitarian Ideal*. New York: Routledge, 2016.

Taras, Vas, Piers Steel, and Bradley L. Kirkman. “Improving national cultural indices using a longitudinal meta-analysis of Hofstede’s dimensions”. *Journal of World Business*, Vol. 47, No. 3 (July 2012), pp 329-341.

Tay, Thiam Chye. “Tolerance for Income Inequality and Redistributive Preferences: Cross-nation and Multilevel Perspectives”. Doctoral dissertation, University of California, Los Angeles, 2013.

Tetlock, Philip. “Thinking the unthinkable: sacred values and taboo cognitions”. *Trends in Cognitive Sciences*, Vol. 7, No. 7 (2003), pp 320-324.

Tietenberg, Tom, and Lynne Lewis. *Environmental & Natural Resource Economics*. 9th ed. United States of America: Pearson Education, Inc., 2012.

Toman, Michael. “Why not to calculate the value of the world’s ecosystem services and natural capital”. *Ecological Economics*, Vol. 25, No. 1 (April 1998), pp 57-60.

Torgler, Benno, and María A. García-Valiñas. “The determinants of individuals’ attitudes towards preventing environmental damage”. *Ecological Economics*, Vol. 63, No. 2-3 (1 August 2007), pp 536-552.

Triandis, Harry C. “Collectivism and Individualism as Cultural Syndromes”. *Cross-Cultural Research*, Vol. 27, No. 3-4 (August & November 1993), pp 155-180.

———. “Individualism-Collectivism and Personality”. *Journal of Personality*, Vol. 69, No. 6 (December 2001), pp 907-924.

———. “The Many Dimensions of Culture”. *The Academy of Management Executive (1993-2005)*, Vol. 18, No. 1 (Feb., 2004), pp 88-93.

———. “The Psychological Measurement of Cultural Syndromes”. *American Psychologist*, Vol. 51, No. 4 (April 1996), pp 407-415.

———. “The Self and Social Behavior in Differing Cultural Contexts”. *Psychological Review*, Vol. 96, No. 3 (1989), pp 506-520.

———. “Theoretical and Methodological Approaches to the Study of Collectivism and Individualism.” In *Individualism and Collectivism: Theory, Method, and Applications*, ed. U. Kim, H. C. Triandis, Ç. Kâgitçibasi, S.-C. Choi and G. Yoon. Thousand Oaks, Calif.: Sage Publications, 1994, pp 41-51.

———. *Culture and Social Behavior*. USA: McGraw-Hill, Inc., 1994.

———. *Individualism and Collectivism*. Boulder: Westview Press, 1995.

Triandis, Harry C., and Eunkook M. Suh. “Cultural Influences on Personality”. *Annual Review of Psychology*, Vol. 53 (2002), pp 133-160.

Triandis, Harry C., and Michele J. Gelfand. “A Theory of Individualism and Collectivism”. In *Handbook of Theories of Social Psychology*, Vol. 2, eds. Paul A. M. van Lange, Arie W. Kruglanski and E. Tory Higgins. London; California; New Delhi; Singapore: SAGE Publications, 2012, pp 498-520.

———. “Converging Measurement of Horizontal and Vertical Individualism and Collectivism”. *Journal of Personality and Social Psychology*, Vol. 74, No. 1 (1998), pp 118-128.

Triandis, Harry C., Kwok Leung, Marcelo J. Villareal, and Felicia I. Clack. “Allocentric Versus Idiocentric Tendencies: Convergent and Discriminant Validation”. *Journal of Research in Personality*, Vol. 19, No. 4 (December 1985), pp 395-415.

Triandis, Harry C., Robert Bontempo, and Marcelo J. Villareal. “Individualism and Collectivism: Cross-Cultural Perspectives on Self-Ingroup Relationships”. *Journal of Personality and Social Psychology*, Vol. 54, No. 2 (1988), pp 323-338.

Tricomi, Elizabeth, Antonio Rangel, Colin F. Camerer and John P. O’Doherty., “Neural evidence for inequality-averse social preferences”. *Nature*, Vol. 463 (25 February 2010), pp 1089-1091. In Engelmann, Jan B., and Grit Hein. “Contextual and social influences on valuation and choice”. *Progress in Brain Research*, Vol. 202 (2013), pp 215-237.

Trump, Thomas M. “Value Formation and Postmaterialism: Inglehart’s Theory of Value Change Reconsidered”. *Comparative Political Studies*, Vol. 24, No. 3 (October 1991), pp 365-390.

Tunstall, Sylvia M., and Annabel Coker. “Survey-based valuation methods”. In *Valuing the Environment: Economic Approaches to Environmental Evaluation*, Proceedings of a Workshop held at Ludgrove Hall, Middlesex Polytechnic on 13 and 14 June 1980, eds. Annabel Coker and Cathy Richards. Great Britain: Belhaven Press, 1992, pp 104-126.

Turkyilmaz, Ceyda Aysuna, Aypar Uslu and Beril Durmus. “Antecedents and Outcomes of Consumers’ Inward and Outward Environmental Attitudes: Evidence From Turkey”. *Procedia – Social and Behavioral Sciences*, Vol. 175 (12 February 2015), pp 90-97.

Turner, R. Kerry, David Pearce and Ian Bateman. *Environmental economics: An elementary introduction*, Great Britain: Harvester Wheatsheaf, 1994.

Turner, R. Kerry, W. N. Adger and R. Brouwer. “Ecosystem services value, research needs, and policy relevance: a commentary”. *Ecological Economics*, Vol. 25, No. 1 (April 1998), pp 61-65.

United Nations Environment Programme. “Ecosystem Services”. *The Economics of Ecosystems & Biodiversity* [cited 17 April 2018]. Available from: www.teebweb.org/resources/ecosystem-services/.

United Nations Framework Convention on Climate Change. “The Paris Agreement”. *United Nations Framework Convention on Climate Change*, 2018 [cited 15 May 2018]. Available from: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

Uskul, Ayse K., and Daphna Oyserman. “Question Comprehension and Response: Implications of Individualism and Collectivism”. *National Culture and Groups*, Research on Managing Groups and Teams, Vol. 9 (2006), pp 173-201.

van den Bergh, Jeroen C. J. M., Ada Ferrer-i-Carbonell and Giuseppe Munda. “Alternative models of individual behaviour and implications for environmental policy”. *Ecological Economics*, Vol. 32, No. 1 (January 2000), pp 43-61.

VanWey, Leah K., Elinor Ostrom, and Vicky Meretsky. “Theories Underlying the Study of Human-Environment Interactions”. In *Seeing the Forest and the Trees: Human-environment Interactions in Forest Ecosystems*, eds. Emilio F. Moran and Elinor Ostrom. Cambridge, MA: MIT Press, 2014, pp 23-56.

Varughese, George, and Elinor Ostrom. “The Contested Role of Heterogeneity in Collective Action: Some Evidence from Community Forestry in Nepal”. *World Development*, Vol. 29, No. 5 (May 2001), pp 747-765.

Vatn, Arild. “Environmental Valuation and Rationality”. *Land Economics*, Vol. 80, No. 1 (Feb., 2004), pp 1-18.

———. “Rationality, institutions and environmental policy”. *Ecological Economics*, Vol. 55, No. 2 (1 November 2005a), pp 203-217.

———. *Institutions and the Environment*. Cheltenham, UK: Edward Elgar, 2005b.

Vatn, Arild, and Daniel W. Bromley. “Choices without Prices without Apologies”. *Journal of Environmental Economics and Management*, Vol. 26, No. 2 (March 1994), pp 129-148.

Veblen, Thorstein. *The Theory of the Leisure Class*. New York: Macmillan, 1899.

Veisten, Knut. “Contingent valuation controversies: Philosophic debates about economic theory”. *The Journal of Socio-Economics*, Vol. 36, No. 2 (April 2007), pp 204-232.

Venkatachalam, L. “The contingent valuation method: a review”. *Environmental Impact Assessment Review*, Vol. 24, No. 1 (January 2004), pp 89-124.

Vincent, Jeffrey R. “Valuing the Environment as a Production Input”. In *Environmental Valuation in South Asia*, eds. A. K. Enamul Haque, M. N. Murty and Priya Shyamsundar. Cambridge; New York: Cambridge University Press, 2011, pp 36-78.

Vriend, Nicolaas J. “Rational behavior and economic theory”. *Journal of Economic Behavior and Organization*, Vol. 29, No. 2 (March 1996), pp 263-285.

Walker, James, and Elinor Ostrom. “Trust and Reciprocity as Foundations for Cooperation”. In *Trust and Reciprocity: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker. New York, NY: Russell Sage Foundation, 2003, pp 91-124.

Walzer, Michael. *Spheres of Justice: A Defense of Pluralism and Equality*. New York: Basic Books, Inc., 1983. In Cohen, I. Glenn. “The Price of Everything, the Value of Nothing: Reframing the Commodification Debate”. *Harvard Law Review*, Vol. 117, No. 689 (2003), pp 689-710.

Wang, Lanlan, and Peter Gordon. “Trust and institutions: A multilevel analysis”. *The Journal of Socio-Economics*, Vol. 40, No. 5 (October 2011), pp 583-593.

WAVES Secretariat, World Bank. “China”. *Wealth Accounting and the Valuation of Ecosystem Services (WAVES)* [cited 12 April 2018]. Available from: www.wavespartnership.org/en/blog-tags/china.

Weber, Max. *The Protestant ethic and the spirit of capitalism*. New York: Scribners, 1958. In Shalom H. Schwartz, “Culture Matters: National Value Cultures, Sources and Consequences”, in *Understanding Culture: Theory, Research and Application*, eds. C.-Y. Chiu, Y. Y. Hong, S. Shavitt and R. S. Wyer, Jr. New York: Psychology Press, 2009b, pp 127-150.

Welzel, Christian, and Ronald Inglehart. “Mass Beliefs and Democratic Institutions”. In *The Oxford Handbook of Comparative Politics*¸ eds. Carles Boix and Susan C. Stokes. Oxford: Oxford

University Press, 2007, pp 297-316. In Kwang-Il Yoon, "Political Culture of Individualism and Collectivism", Doctoral dissertation, University of Michigan, 2010.

Welzel, Christian, Ronald Inglehart and Franziska Deutsch. "Social capital, voluntary associations and collective action: Which aspects of social capital have the greatest 'civic' payoff?". *Journal of Civil Society*, Vol. 1, No. 2 (2005), pp 121-146.

Williams, Richard. "Using the margins command to estimate and interpret adjusted predictions and marginal effects". *The Stata Journal*, Vol. 12, No. 2 (2012), pp 308-331.

Williamson, Oliver E. "The New Institutional economics: Taking Stock, Looking Ahead". *Journal of Economic Literature*, Vol. 37, No. 3 (Sep., 2000), pp 595-613. In Baarsma, Barbara E., and Jan G. Lambooy. "Valuation of externalities through neo-classical methods by including institutional variables". *Transportation Research Part D: Transport and Environment*, Vol. 10, No. 6 (November 2005), pp 459-475.

———. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. New York: Free Press, 1985. In Elinor Ostrom. "Challenges and growth: the development of the interdisciplinary field of institutional analysis". *Journal of Institutional Analysis*, Vol. 3, No. 3 (2007), pp 239-264.

———. *The Institutions of Capitalism*. New York: Free Press, 1985. In Baarsma, Barbara E., and Jan G. Lambooy. "Valuation of externalities through neo-classical methods by including institutional variables". *Transportation Research Part D: Transport and Environment*, Vol. 10, No. 6 (November 2005), pp 459-475.

Willis, K. G., G. D. Garrod, J. F. Benson and M. Carter. "Benefits and Costs of the Wildlife Enhancement Scheme: A Case Study of the Pevensey Levels". *Journal of Environmental Planning and Management*, Vol. 39, No. 3 (1996), pp 387-402.

Winthrop, Robert H. "The strange case of cultural services: Limits of the ecosystem services paradigm". *Ecological Economics*, Vol. 108 (December 2014), pp 208-214.

Wiser, Ryan H. "Using contingent valuation to explore willingness to pay for renewable energy: a comparison of collective and voluntary payment vehicles". *Ecological Economics*, Vol. 62, No. 3-4 (15 May 2007), pp 419-432. In Stithou, Mavra, and Riccardo Scarpa. "Collective versus voluntary payment in contingent valuation for the conservation of marine biodiversity: An exploratory study from Zakynthos, Greece". *Ocean & Coastal Management*, Vol. 56 (February 2012), pp 1-9.

Wittmer, Heidi, and Gundimeda Haripaya. *The Economics of Ecosystems and Biodiversity in Local and Regional Policy and Management*. United Kingdom: Earthscan, 2012.

World Bank Group, The. "GDP per capita (constant 2010 US$)". *The World Bank*, 2016a [cited 26 August 2016]. Available from: http://data.worldbank.org/indicator/NY.GDP.PCAP.KD.

———. “Population, total”. *The World Bank*, 2016b [cited 26 August 2016]. Available from: http://data.worldbank.org/indicator/SP.POP.TOTL.

———. “Total greenhouse gas emissions (kt of CO2 equivalent)”. *The World Bank*, 2016c [cited 17 February 2017]. Available from: http://data.worldbank.org/indicator/EN.ATM.GHGT.KT.CE.

World Values Survey Association. “Data & Documentation”. *World Values Survey* [cited 12 April 2018]. Available from: www.worldvaluessurvey.org/WVSDocumentationWV5.jsp.

———. “Fieldwork and Sampling”. *World Values Survey*, 1981 [cited 22 August 2015]. Available from: www.worldvaluessurvey.org/WVSContents.jsp.

———. “Longitudinal Aggregate”. *World Values Survey*, 2015 [cited 22 August 2015]. Available from: http://www.worldvaluessurvey.org/WVSDocumentationWVL.jsp.

———. “WVS Wave 5 (2005-2009)”. *World Values Survey*, 2014 [cited 22 August 2015]. Available from: www.worldvaluessurvey.org/WVSDocumentationWV5.jsp.

Wu, Lang. *Mixed Effects Models for Complex Data*. Boca Raton: Chapman and Hall/CRC Press, 2010.

Yale Center for Environmental Law and Policy, and Center for International Earth Science Information Network. “Downloads”. *Environmental Performance Index*, 2016 [cited 26 August 2016]. Available from: http://epi.yale.edu/downloads.

Yamagishi, Toshio. “An Institutional Approach to Culture”. In *Thus Spake Evolutionary Psychologists*, eds. Xiao-Tian Wang and Yan-Jie Su. People’s Republic of China: Peking University Press, 2011a, pp 253-257.

———. “Cross-Societal Experimentation on Trust: A Comparison of the United States and Japan”. In *Trust and Reciprocity: Interdisciplinary Lessons from Experimental Research*, eds. Elinor Ostrom and James Walker. New York, NY: Russell Sage Foundation, 2003, pp 352-370.

———. “Exit from the Group as an Individualistic Solution to the Free Rider Problem in the United States and Japan”. *Journal of Experimental Social Psychology*, Vol. 24, No. 6 (1988a), pp 530-542.

———. “From a Measurement Model to a Dynamic Causal Model: Commentary on Schwartz”. *Journal of Cross-Cultural Psychology*, Vol. 45, No. 1 (2014), pp 30-36.

———. “Placing the action-outcome contingency at the core of the situation”. *Asian Journal of Social Psychology*, Vol. 16, No. 1 (March 2013), pp 22-25.

———. “The Provision of a Sanctioning System as a Public Good”. *Journal of Personality and Social Psychology*, Vol. 51, No. 1 (1986), pp 110-116.

———. “The Provision of a Sanctioning System in the United States and Japan”. *Social Psychology Quarterly*, Vol. 51, No. 3 (Sep., 1988b), pp 265-271.

———. *Trust: The Evolutionary Game of Mind and Society*. Tokyo: Springer, 2011b.

Yamagishi, Toshio, and Kaori Sato. “Motivational Bases of the Public Goods Problem”. *Journal of Personality and Social Psychology*, Vol. 50, No. 1 (1986), pp 67-73.

Yamagishi, Toshio, and Karen S. Cook. “Generalized Exchange and Social Dilemmas”. *Social Psychology Quarterly*, Vol. 56, No. 4 (Dec., 1993), pp 235-248.

Yamagishi, Toshio, and Midori Yamagishi. “Trust and Commitment in the United States and Japan”. *Motivation and Emotion*, Vol. 18, No. 2 (1994), pp 129-166.

Yamagishi, Toshio, and Naoto Suzuki. “An Institutional Approach to Culture”. In *Evolution, Culture, and the Human Mind*, eds. Mark Schaller, Ara Norenzayan, Steven J. Heine, Toshio Yamagishi and Tatsuya Kameda. New York: Psychology Press, 2010, pp 185-203.

Yamagishi, Toshio, and Nobuhiro Mifune. “Does Shared Group Membership Promote Altruism?: Fear, Greed, and Reputation”. *Rationality and Society*, Vol. 20, No. 1 (February 2008), pp 5-30.

Yamagishi, Toshio, and Toko Kiyonari. “The Group as the Container of Generalized Reciprocity”. *Social Psychology Quarterly*, Vol. 63, No. 2 (Jun., 2000), pp 116-132.

Yamagishi, Toshio, Hirofumi Hashimoto, and Joanna Schug. “Preferences Versus Strategies as Explanations for Culture-Specific Behavior”. *Psychological Science*, Vol. 19, No. 6 (June 2008), pp 579-584.

Yamagishi, Toshio, Hirofumi Hashimoto, Karen S. Cook, Toko Kiyonari, Mizuho Shinada, Nobuhiro Mifune, Keigo Inukai, Haruto Takagishi, Yutaka Horita, and Yang Li. “Modesty in self-presentation: A comparison between the USA and Japan”. *Asian Journal of Social Psychology*, Vol. 15, No. 1 (March 2012), pp 60-68.

Yamagishi, Toshio, Karen S. Cook, and Motoki Watabe. “Uncertainty, Trust, and Commitment Formation in the United States and Japan”. *American Journal of Sociology*, Vol. 104, No. 1 (July 1998a), pp 165-194.

Yamagishi, Toshio, Nobuhiro Mifune, James H. Liu and Joel Pauling. “Exchanges of group-based favours: Ingroup bias in the prisoner’s dilemma game with minimal groups in Japan and New Zealand”. *Asian Journal of Social Psychology*, Vol. 11, No. 3 (September 2008), pp 196-207.

Yamagishi, Toshio, Nobuhito Jin, and Allan S. Miller. “In-group bias and culture of collectivism”. *Asian Journal of Social Psychology*, Vol. 1, No. 3 (December 1998b), pp 315-328.

Yamagishi, Toshio, Satoshi Akutsu, Kisuk Cho, Yumi Inoue, Yang Li, and Yoshie Matsumoto. "Two-Component Model of General Trust: Predicting Behavioral Trust from Attitudinal Trust". *Social Cognition*, Vol. 33, No. 5 (2015), pp 436-458.

Yamagishi, Toshio, Satoshi Kanazawa, Rie Mashima, and Shigeru Terai. "Separating Trust from Cooperation in a Dynamic Relationship: Prisoner's Dilemma with Variable Dependence". *Rationality and Society*, Vol. 17, No. 3 (2005a), pp 275-308.

Yamagishi, Toshio, Yosuke Makimura, Margaret Foddy, Masafumi Matsuda, Toko Kiyonari, and Michael J. Platow. "Comparisons of Australians and Japanese on group-based cooperation". *Asian Journal of Social Psychology*, Vol. 8, No. 2 (August 2005b), pp 173-190.

Yogo, Urbain Thierry. "Trust and the willingness to contribute to environmental goods in selected African countries". *Environment and Development Economics*, Vol. 20, No. 5 (October 2015), pp 650-672.

Yoon, Kwang-Il. "Political Culture of Individualism and Collectivism". Doctoral dissertation, University of Michigan, 2010.

Zafirovski, Milan. "Classical and neoclassical conceptions of rationality—Findings of an exploratory survey". *The Journal of Socio-Economics*, Vol. 37, No. 2 (April 2008), pp 789-820.

Zamagni, Stefano. "Towards an Economics of Human Relations: on the Role of Psychology in Economics". *The Journal of Group-Analytic Psychotherapy*, Vol. 37, No. 1 (March 2004), pp 17-32. In Kumar, Manasi, and Pushpam Kumar. "Valuation of the ecosystem services: A psycho-cultural perspective". *Ecological Economics*, Vol. 64, No. 4 (1 February 2008), pp 808-819.

Zsolnai, Laszlo. "Rational Choice and the Diversity of Choices". *Journal of Socio-Economics*, Vol. 27, No. 5 (1998), pp 613-622.