

UNRAVELLING THE PACIFIC PARADOX

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Abstract

The performance of the Pacific Island countries (PICs) over the past two decades has been characterized by economic growth rates that are low on average yet extremely volatile. This has been so despite favorable levels of natural and human resources, high levels of public investment and aid, and reasonably prudent economic management – a phenomenon that has been labeled the “Pacific Paradox”. Questions may be posed therefore as to what accounts for this poor performance of the PICs, especially when countries elsewhere of the same size and characteristics have registered impressive growth performance during the same period? Although the inherent structural constraints characterizing the PIC economies have a direct impact on the performance of these economies, one cannot dismiss the more fundamental constraints imposed by the institutional environment in which these countries operate.

The purpose of this study was to critically review the economic performance of the PICs with a view to evaluating the possible explanations for the “Pacific Paradox”. The proposition evaluated is that it is not the lack of capital or good policies that constrains the economic growth and development of these island economies, but rather the *lack of appropriate institutions and incentives* to accumulate and acquire human and physical capital and to make policies effective. Early tests of this proposition across several Pacific island countries indicate that ineffective institutions, leading to contract insecurity, as well as corrupt practices and bureaucratic ineffectiveness account for large reductions in the average rate of growth of national income in these countries.

Unless the PICs undertake appropriate institution-building measures with a view to putting in place the conditions necessary for broad-based, sustained economic growth, these island economies will continue to live out the “Pacific Paradox”.

* The author is grateful for the helpful comments by Professor Ronald Duncan on the earlier draft of this paper.

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Introduction

While the performance of the East Asian Economies (EAEs) over recent decades may be considered ‘miraculous’, that of the Pacific Island countries (PICs) can only be described in terms of a ‘paradox’. The term ‘Pacific Paradox’ has become a popular way of describing the PICs’ economic performance – the existence of slow growth despite favorable levels of natural and human resources, high levels of public investment and aid, and reasonably prudent economic management. Paradoxical or not, the question remains as to what accounts for this dismal performance, especially when countries elsewhere of the same size and characteristics have registered impressive growth performance during the same period? Although the inherent structural constraints characterizing the PIC economies have a direct impact on their performance, one cannot dismiss the more fundamental constraints imposed by the institutional environment in which these countries operate.

The objective of this paper is to examine critically this ‘Pacific Paradox’ with a view to unraveling its causes. The approach adopted is to tackle the question from an institutional perspective. That is, the basic hypothesis of the paper is that the economic performance of the PICs is fundamentally related to the level and quality of the institutions in these countries. Subjecting this proposition to empirical analysis is, however, not an easy task. Firstly, it requires an understanding of the determinants of, and their relative contributions to, economic growth, and how institutions fit into the

whole process. Secondly, it presupposes a generally accepted definition of the term ‘institutions’ and the ability to identify components of it that are most crucial to economic growth and development. Finally, and more importantly, is the issue of how to quantify the level and quality of institutions in order to make empirical testing possible.

II. Explaining the Growth Performances of the PICs

The performance of the PICs over the past two decades has been characterized by economic growth rates that are low on average yet extremely volatile. In the 1990s, per capita real GDP growth was much lower than in other island economies in the Caribbean, African, or Indian Oceans. Although, on average, the PICs invested about 29 percent of GDP during the 1980s, economic growth averaged only around 2 percent per annum.¹ Average GDP growth improved slightly to 3.1 percent in the 1990s, but the overall return to investment remained low. The intriguing question is what accounts for this unjustifiably disappointing economic performance of the PICs?

In unravelling the factors accounting for the growth performance of the PICs over recent decades, there are three approaches that can be adopted to assist in this task: (1) the neoclassical approach; (2) the policy approach; and (3) the institutional approach. The neoclassical approach ascribes cross-country differences in economic performance to differences in the contributions of factor inputs, namely, physical capital, human capital, and technology. This differs with the policy approach which emphasizes the role of policies in promoting economic growth and development. The last approach – the

¹ The East Asian Economies invested about the same proportion but achieved a growth rate double that registered by the PICs during the period.

institutional approach - contends that good economic performance is fundamentally related to the quality of the institutional environment in which an economy operates.

One other approach that is not included here is the *fatalist* approach. The essence of this approach is that the PICs are doomed to perform poorly because of the unfortunate reality of their being small and the severe physical and resource constraints they face. This argument lacks substance as testified by the empirical research of Easterly and Kraay (1999) and others that has found no significant relationships between a country's size and its growth potential. Moreover, as Duncan *et al* (1999) argue, whatever the role of physical wealth and whatever the wealth of the PICs, such things as size, location, and climate are facts of life – they are the “pot” in which alterable ingredients of growth (i.e., physical capital, good policy, human capital, and institutions) are mixed. The PICs must make the absolute best of these facts of life and not resign to poor economic performance because of them. The success stories of other small states, notably Hongkong and Singapore, and some small island countries such as the Maldives in the Indian Ocean, have demonstrated that small countries are more adept at surviving economically and performing more successfully provided they get the fundamentals right.

Implicit in both the neoclassical and policy approaches is the proposition that the PICs perform poorly because they lack the capital (including technology) and effective policies that are essential for vigorous growth. However, as argued in an earlier paper of the present author (Toatu 2001), this proposition does not square well with reality. Firstly, as underlined by the World Bank in its 1991 country study on the Pacific Island Economies, macroeconomic management has largely been sound in the PICs. Secondly, it is not true that the PICs lack the capital and technology required for vigorous growth,

considering the high levels of foreign aid and domestic savings with which most of these economies are blessed, and the fact that technologies are highly transferable across countries. On the basis of these two counter-arguments, there appears to be nothing about being poor or small that should deny the PICs access to resources essential for their growth and development. The fact that the PICs may still lack these resources is mainly because of the lack of incentives for residents to invest in socially productive assets, and for foreign investors to transfer capital, technology and managerial skills into these economies.

It is the fundamental proposition of this study, therefore, that it is not the lack of natural or other resources and good policies that constrain the growth and development of the PICs, but rather the *lack of incentives* to accumulate and acquire those resources. This brings to bear the important role that institutions play in the provision of such incentives. This is not to say that resources and policies are not significant factors in the growth process. The point is that in the absence of workable and effective institutions, the potential contribution of these resources and policy reforms to growth may be severely hampered. More specifically, in the absence of secure property rights, enforceable contracts, and a relatively honest and competent bureaucracy, the full benefits and potential of these resources and policies may not be realized. The structure of incentives depends, therefore, not only on what economic policies are chosen, but also on the institutional arrangements: on the legal systems that enforce contracts and protect property rights, on an uncorrupt bureaucracy implementing these policies, and on political structures and constitutional provisions.

If institutions are indeed key to development, the logical and intriguing questions to raise are: what components of institutions are relevant to economic growth and development, and how would they be measured to enable empirical analysis of their growth effects? These questions are addressed in the remainder of this paper, beginning with the development of a theoretical framework in Section III below.

III. The Theoretical Framework

From the standpoint of both the theoretical and empirical analysis, the greatest challenge in a study of institution-growth relationships is the question of how to measure the level and quality of institutions. As mentioned earlier, this problem is compounded by the difficulty in identifying those components of institutions that are most crucial to economic growth and development. For the purpose of this exercise, the study uses the level of corruption, property rights security and civil liberty as key indicators of the effectiveness of public institutions. That is, the basic argument is that where public institutions are weak, corruption is likely to be prevalent, property rights security low, and expression of freedom very low also. This is not to say that all issues of governance and institutions boil down to these three variables/factors. Indeed, institutional quality encompasses a broad set of concerns including the rule of law, risks of expropriation, bureaucratic quality and effectiveness. The focus on these three factors, in particular corruption, underlines their relative importance and pervasiveness in these island economies, as well as the lack of data on those other variables. For ease of analysis and to

render tractable the formulation of a theoretical model capturing the institution-growth relationships, it is appropriate to focus on one key indicator of institutional quality. In this context and for the reasons explained below, corruption has been chosen.

The Model

While the various empirical studies on the subject have provided useful insights into the relationship between corruption and economic growth, they lack a rigorous theoretical framework capable of generating testable predictions relating to the variables under consideration. The few researchers whose analysis is based on a formal theoretical model include Ram (1993), Ades and Di Tella (1997), Johnson, Kaufmann and Zoido-Lobaton (1998), and Leite and Weidmann (1999).

The model used in this study is largely drawn from the Leite-Weidemann (LW) model, which is an open-economy version of the infinite-horizon growth model. Central to the working of the model is the assumption that all investment projects need administrative approval which can only be granted after firms pay a bribe, or some form of commission, to the authorizing agent. The other assumptions of the model basically follow those in the standard infinite-horizon growth models. As in these growth models, the key players in the economy are households (which include the government) and firms.

(a) Households

There are two types of households in this model: government employees ($L_g(t)$) and private sector employees ($L_p(t)$). The government employees comprise proportion s

of the total population $L(t)$ at time t . Assuming a constant population growth rate of n forever and normalizing the number of adults at time 0 to unity, the total population in the economy at time t is $L(t) = e^{nt}$, and the total number of public employees is $L_g(t) = se^{nt}$, referred to hereafter as simply households for notational simplicity.

Suppose the households' intertemporal utility is represented by:

$$U = \int_0^{\infty} u(c_t) e^{-(r-n)t} dt \quad (1)$$

where $u(c_t)$ is utility at time t and is increasing and concave in c , and satisfies the Inada conditions, ($u'(c) \rightarrow \infty$ as $c \rightarrow 0$, and $u'(c) \rightarrow 0$ as $c \rightarrow \infty$). The rate of time preference (the household's discount rate) r is positive, constant and greater than the constant population growth rate n . This condition is imposed to ensure that the household's intertemporal U is bounded.

Both types of households earn wages and interest income from their labor and investment at the exogenous market rates w_t and r_t , respectively. Since each household works one unit of labor services per unit of time, the wage income per household equals $w(t)$. Total income received by a household is the sum of labor income, $w(t)$, and interest income $ra(t)$. Government employees, however, have an additional source of income, namely, the bribe payments which they impose on the investing firms.

To make the analysis tractable, it is assumed that the bribe payment is a fraction f of gross investment $I = \dot{K} + dK$, where \dot{K} is the change in capital stock K over time, and d is the constant rate of depreciation on capital stock. Assume also that the corrupt government employee would be penalized by an amount z in the event of being caught.

The probability of the corrupt bureaucrat being detected and punished is \bar{P} , which is increasing with the extent of corruption \mathbf{f} and the monitoring technology of society M . That is, $\bar{P} = \bar{P}(\mathbf{f}, M)$, $\partial \bar{P} / \partial \mathbf{f} > 0$, $\partial \bar{P} / \partial M > 0$. If \bar{P} is a linear function of the extent of corruption \mathbf{f} , we can rewrite the expression as $\bar{P} = \bar{P}(1, M) \mathbf{f}$ so that $\partial \bar{P} / \partial \mathbf{f} = \bar{P}(1, M)$ which is independent of \mathbf{f} . For use in the ensuing analysis, let $P \equiv 1 - \bar{P}$ denote the likelihood of not being detected.

To express gross investment in per government employee terms, recall that the number of government employees $L_g(t)$ at time t is a fraction s of the total population $L(t)$ i.e., $L_g(t) = sL(t)$. Gross investment per government employee is thus:

$$\frac{\dot{K} + \mathbf{d}K}{L_g(t)} = \frac{\dot{K}}{sL(t)} + \frac{\mathbf{d}K}{sL(t)} = \frac{\dot{K}}{sL(t)} + \frac{\mathbf{d}k}{s} = \frac{\dot{k} + (n + \mathbf{d})k}{s}$$

since $\frac{\dot{K}}{L(t)} = \dot{k} + nk$.

Putting all these together, the expected flow budget constraint facing the government employee is thus

$$\dot{a} = w + ra + \frac{\mathbf{f}P(\mathbf{f}, M)}{s} [\dot{k} + (n + \mathbf{d})k] - [1 - P(\mathbf{f}, M)]z - c - na \quad (2)$$

where a denotes the household's total assets, domestic and foreign. Equation (2) says that the increase in the per capita asset equals the sum of the three income types *less* the expected penalty in the event of being caught, per capita consumption and an adjustment term for population growth.

To eliminate the possibility of government employees choosing a path along which $a \rightarrow -\infty$, the following transversality condition is imposed:

$$\lim_{t \rightarrow \infty} \left\{ a(t) \exp \left[- \int_0^t (r(v) - n) dv \right] \right\} \geq 0 \quad (3)$$

This condition simply says that households cannot borrow forever to finance their consumption such that $a(t)$ becomes negative.

The objective of the household is to maximize its objective function in (1) subject to (2) and (3) above. Forming the present-value Hamiltonian function, we have

$$H = u(c)e^{-(r-n)t} + v \left[w + ra + \mathbf{f}P \left(\dot{k} + [n + \mathbf{d}]k \right) - (1-P)z - c - na \right] \quad (4)$$

The necessary first-order conditions for a maximum are as follows:²

$$\frac{\partial H}{\partial c} = 0 \Rightarrow v = u'(c)e^{-(r-n)t} \quad (5)$$

$$\dot{v} = -\frac{\partial H}{\partial a} = -(r-n)v \quad (6)$$

$$\frac{\partial H}{\partial \mathbf{f}} = 0 \Rightarrow \mathbf{f}^* = \frac{1}{2\bar{P}(1, M)} - \frac{zs}{2(\dot{k} + (n + \mathbf{d})k)} \quad (7)$$

The first two equations are the standard results for the optimal consumption path.

Equation (5) says that the marginal utility of consumption is equal to the shadow value of

² Setting $P = 1 - \bar{P}$ where $\bar{P} = \bar{P}(1, M) \mathbf{f}$ and substituting into (4) yields

$$H = u(c)e^{-(r-n)t} + v \left[w + ra + (\mathbf{f} - \mathbf{f}^* \bar{P}(1, M)) \left(\frac{\dot{k} + [n + \mathbf{d}]k}{s} \right) - (\bar{P}(1, M) \mathbf{f})z - c - na \right]$$

Differentiating this with respect to \mathbf{f} yields Equation (7)

investment - the extra utility that would be created by a marginal unit of capital. Equation (6) is the standard Euler equation.³

Equation (7) gives the optimal extent of corruption f^* for the government employee. The equation shows that an increase in the penalty z , or in the monitoring effort M , or a reduction in the concentration of power $1-s$ reduces the utility maximizing extent of corruption for the bureaucrat. On the other hand, an increase in capital accumulation has the opposite effect of increasing the extent of corruption.

(b) Firms

On the production side, it is assumed that firms produce the economy's single good Y with a typical neoclassical production function characterized by diminishing marginal products, constant returns to scale, and satisfying the Inada conditions.

$$Y = F(K, L) \tag{9}$$

The change in capital stock over time is given by the following expression

$$\dot{K} = I - dK \tag{10}$$

The firm's net cash flow is defined as the sale proceeds net of wage payments and investment costs:

$$\Pi = F(K, L) - wL - CI \tag{11}$$

³ If we were to assume a constant intertemporal elasticity of substitution (CIES) functional form for the household's utility function, i.e., by letting $u(c) = \frac{c^{1-q} - 1}{1-q}$ where $q > 0$, then, from equations (5) and (6), the following standard results for the optimal consumption growth path (the Euler equation) is obtained: $\frac{\dot{c}}{c} = \frac{1}{\alpha} (r - r)$

where CI equals the physical cost of investment plus the “unavoidable” bribe payment, i.e.,

$$CI = I(1 + \mathbf{f}) \quad (12)$$

The firm’s objective is to maximize the present value of the net cash flows in (11) between time 0 and infinity subject to (10) and the initial capital stock $K > 0$. Forming the present value Hamiltonian function, we have

$$J = e^{-\bar{r}(t)} \{F(K, L) - wL - I(1 + \mathbf{f})\} + v(I - \mathbf{d}K) \quad (13)$$

where $\bar{r}(t) = \left(\frac{1}{t}\right) \int_0^{\infty} r(v) dv$, i.e., the average world interest rate between time 0 and

infinity. v is the shadow price associated with installed capital in units of time 0 utils, i.e., the present-value shadow price of installed capital. The current-value form of (13) is

$$\hat{H} = \{F(K, L) - wL - I(1 + \mathbf{f})\} + q(I - \mathbf{d}K) \quad (14)$$

where $q = v e^{\bar{r}(t)}$ is the current-value shadow price of installed capital at time t in units of time- t utils, i.e., q is the price of capital in terms of current utility.

The first-order conditions, using (14), are as follows:

$$\frac{\partial \hat{H}}{\partial L} = 0 \Rightarrow F_L(K, L) = f(k) - kf'(k) = w \quad (15)$$

$$\frac{\partial \hat{H}}{\partial I} = 0 \Rightarrow q = (1 + \mathbf{f}) \quad (16)$$

$$\dot{q} = -\frac{\partial \hat{H}}{\partial K} + q\bar{r}(t) = -\{f'(k) - \mathbf{d}q\} + q\bar{r}(t) \Rightarrow \dot{q} = (r + \mathbf{d})q - f'(k) \quad (17)$$

Equation (14) is the standard result equating the marginal product of labor to the wage rate, which holds since it is assumed that corruption does not affect the productivity

of labor. Equation (16) is an interesting result. Recall that when $q = 1$, it implies that the market value of the investment equals its replacement cost, or, equivalently, that the shadow price of capital is equal to its unit cost. With the presence of corruption, this equality no longer holds with $q > 1$ since $\mathbf{f} > 0$. We can rearrange equation (17) to yield $r = f'(k)/q - \mathbf{d} + \dot{q}/q$, which differs from the conventional result $r = f'(k) - \mathbf{d}$ by the terms in q . This implies that the steady-state capital stock will be lower in the presence of corruption. If corruption were absent so that $q = 1$, this expression would reduce to the conventional result above.

From equations (7) and (16), the equation of motion for k can be derived as a function of the model's parameters and the shadow price q :

$$\dot{k} = \frac{zs\bar{P}(1, M)}{2\bar{P}(1, M)(1 - q) + 1} - (n + \mathbf{d})k \quad (18)$$

Equations (17) and (18) form a system of two differential equations in q and k . Together with the initial condition $k(0) > 0$ and the transversality condition in (3), it determines the time path of q and k . At steady state $\dot{k} = 0$ which, from equation (18) above, implies a steady-state value for q as follows:

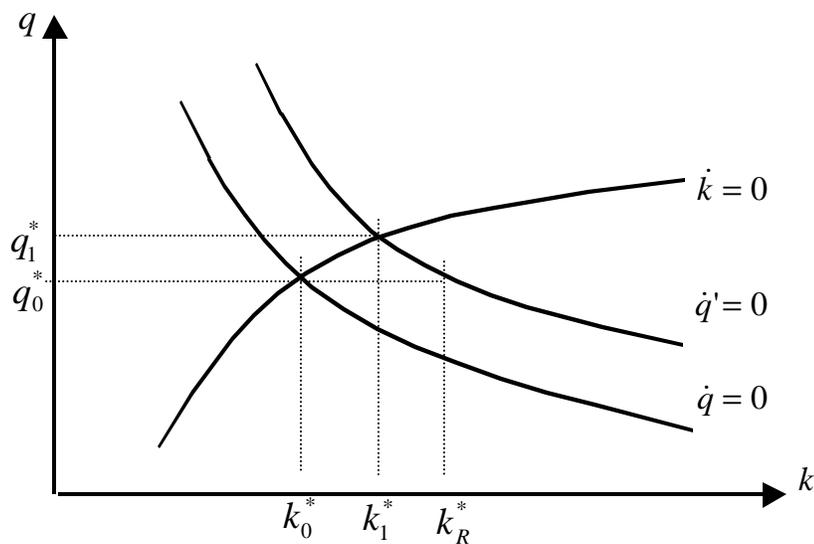
$$q^* = 1 + \frac{1}{2\bar{P}(1, M)} - \frac{zs}{2(n + \mathbf{d})k} \quad (19)$$

Thus, the value of q exceeds 1 for $k > zs\bar{P}(1, M)/(n + \mathbf{d})$. A higher q^* is tantamount to a lower steady-state capital stock k^* .

(c) The Dynamics

It is interesting to demonstrate graphically the economic effect of increased public investment in a corrupt environment. This is shown in Figure 1 below. Since the increase in government expenditure can be viewed in this model as having the same effect as a positive technology shock (Barro and Sala-I-Martin, 1995), it causes the $\dot{q} = 0$ curve to shift outwards.⁴

Figure 1: Corruption and Public Investment



The outward shift in the $\dot{q} = 0$ curve results in the increase in the steady-state values of k and q , from k_0^* to k_1^* and from q_0^* to q_1^* , respectively. Because of the

⁴ Note that the $\dot{k} = 0$ isocline is no longer horizontal through q^* and thus shifts in the $\dot{q} = 0$ curve would no longer leave the q^* unaffected. This non-linearity follows from equations (7) and (19) where it is shown that the increase in k leads to higher levels of corruption and hence higher q .

presence of corruption, the effect of such an increase in the level of public investment is lower than when corruption is absent. As already explained, without corruption the $\dot{k} = 0$ curve would be a horizontal line through q_0^* and the outward shift of the $\dot{q} = 0$ curve would leave q^* unaffected, and the steady-state per capita capital stock would have increased to k_R^* instead of k_1^* . Due to the curvature of the $\dot{k} = 0$ curve, the negative impact of corruption differs depending on the initial steady state with the effect being more pronounced in less capitalised economies (i.e., the developing economies).

IV. Empirical Implications and Measurement Issues

As stated above, measuring the level and quality of institutions is a very difficult task. The fact that we may be able to identify the key indicators of the quality of institutions – such as the level of corruption, property rights security, and civil liberty - does not make this task any easier. This is because of the abstract nature of these proxy variables, which still leaves unresolved the problems of measurement. Given this difficulty, however, the study attempts to develop its own measure for these chosen proxy variables, focusing on corruption.

While the perception measures/indices for corruption and other institutional variables provided by private rating firms and international organizations, such as Transparency International and the World Bank, have been very helpful in providing “data” on these variables, they are limited in their country coverage; which means that a study of corruption in countries other than those covered by these indices (including the

Pacific Islands) cannot be easily undertaken. The challenging question therefore is: can we develop alternative measures of corruption based on hard data for these missing countries?

There are two options available for the purposes of determining alternative measures of corruption based on hard data. The first option is to consider the fundamental and measurable determinants of corruption and use these determining variables as proxies for corruption in the regressions. This, in effect, is equivalent to endogenising corruption, as in Leite and Weidemann (1999) study. This approach is called here the *determinant-based approach*. The second option is to consider the most likely outcomes of corruption and use these variables as measures of corruption. This approach is designated the *outcome-based approach*. Both approaches have strengths and weaknesses.

The choice between these two approaches is a function of the assumptions made about the genesis of corruption and the particular context in which corruption is viewed. If, for instance, there are strong grounds to link particular events directly to corruption, then the *outcome* approach may be employed. On the other hand, if such direct links are lacking or blurred, then the *determinant* approach may be the more appropriate to use. This ambivalence, however, may disappear in the event that the variables under the two approaches are highly correlated to each other, in which case it does not matter which approach to use, except to the extent that the necessary data are available. In the presence of high correlations between the variables, it may be appropriate to merge the two approaches and construct a “composite” corruption index. The use of a composite index, rather than the separate regressing of each of the variables, has the advantage of helping

to mitigate the effects of potential measurement errors and the possibility of multicollinearity between the variables which could distort the estimated results.

The Corruption-Outcome Indicators

Due to lack of adequate data for most of the countries, the approach to be adopted in the empirical part of the study is based on the outcome-based approach only. For this purpose, the variables considered are: the ratio of government consumption to GDP (*GOVTC*), the ratio of subsidy to GDP (*SUBGDP*) (and also the ratio of expenditure on subsidies to total government expenditure (*SUBTE*)), the ratio of government GDP to private GDP (*ECSGDP*) (and also the ratio of government expenditure on economic services to GDP (*ECONTE*)), the ratio of external debt to GDP (*DEBT*), and the variability of public capital expenditure as measured by its coefficient of variation (*CAPCV*).

The *GOVTC* variable is regarded as an outcome of corrupt or rent-seeking practices to the extent that the components of this government expenditure item are highly susceptible to manipulation or appropriation by the policy-makers in pursuit of their private interests. Such components include overseas travel expenses, ministerial allowances, land rents, and other recurrent expenditure items, most of which are straight consumption expenditures with substantial pay-offs to the “beneficiaries”. For instance, the budgetary provision for overseas travels often constitutes a major proportion of the recurrent budget in most of the Pacific island countries. This is not because more overseas travel is required in a given year by more people but simply because more travel is required by the same people. (In some countries like Kiribati, there are close linkages

between owning a private home and the number of overseas trips a person (an employee) has in a year). The presumption, therefore, is that the high level of expenditure on this variable implies a high level of corruption and/or rent-seeking activities amongst government officials or politicians, especially where this expenditure is dominated by these *rent-prone* components.⁵

While a number of studies (e.g., Barro 1990) have provided concrete evidence of the negative impact of government consumption expenditure and its components on economic growth, what remains unclear is the proposition that this expenditure item and its components are the product of corrupt motives on the part of government officials. This is the strong presumption pursued in the present analysis. It must be emphasized, however, that not all government consumption expenditures are inimical to growth. For instance, government consumption (recurrent) expenditures on maintenance of infrastructure, health and education have the potential to improve productivity and hence are growth-enhancing.

The *SUBGDP* (or the *SUBTE*) variable is regarded as the possible outcome of corrupt and rent-seeking practices in so far as this expenditure item is vulnerable to abuse by politicians and senior government officials for private gain. For instance, a subsidy may be granted to a company or industry not on grounds of social need but because of the pecuniary gains that the policy maker expects to derive from such resource transfer. This action may be motivated by the fact that the senior official or minister responsible owns shares in the company concerned, or perhaps the subsidized industry would benefit the politician's constituency and hence such a subsidy could work to consolidate his or her

⁵ This argument does not necessarily contradict the proposition pertaining to the public investment/corruption relationship since the *GOVTC* variable is only one of the components of the

power base in the electorate. In these circumstances, the redistributive role of the government suffers because program benefits or subsidies do not go to the most needy and most essential but to the best-connected. This has the potential to lower overall domestic investment in the economy. The study by Ales and Di Tella (1997) has shown a statistically significant and positive relationship between the levels of corruption and subsidy.

The *ECSGDP* (or *ECONTE*) variable is used as a proxy for the degree of government intervention in what would otherwise be private sector activities. The proposition is that such intervention is largely motivated by the rent-seeking opportunities that such activities present to the decision-makers. This is particularly true in the case of most of the Pacific countries where the government is the sole supplier of goods and services. By engaging in the provision of goods and services such as retailing, transportation and communications, agriculture, mining and commerce, which are normally within the province of the private sector, the politicians and/or senior government officials often have vested interests or direct involvement in the design and distribution of these activities. The latter includes decisions regarding sub-contracting and award of tenders on projects relating to these activities from which they obtain “commissions”. It also includes indirect benefits such as opportunities to employ one’s relatives in the government-run companies.

The engagement of government in these activities tends to have a crowding-out effect on private investment and supplants rather than complements private activities. This is not to say that government’s involvement in these activities is always a bad thing. In some cases, government’s involvement in these activities is a matter of necessity,

corruption index.

triggered by market failure or the lack of private initiatives to take up these activities. However given the generally uncompetitive nature of government operations, the production of these goods and services by the government is often found wanting. The hypothesis put forward, therefore, is that the *ECSGDP* and *ECONTE* variables will have a negative effect on economic growth.

The use of the *DEBT* variable as one of the corruption indicators is predicated on the premise that countries that have high levels of public debt are often those whose governments are unstable and corrupt. The Mobuto regime in the former Zaire is a good illustration of this point. Under his regime, Mobuto systematically plundered Zaire of its rich mineral assets to finance his palatial consumption and, in the process, accumulated public debt to finance the operations of government. The term Mobuto Equivalence was thus coined to describe this state of affairs, highlighting the close linkages between the level of indebtedness and corruption. While public debt is not a major issue for the smaller island nations of the Pacific, it is certainly an issue for the bigger island nations such as Papua New Guinea and Fiji. It is important to note, however, that the point is not that debt is bad for growth but it is how that debt is applied that is the main issue. As long as the uses to which public borrowings are put are poorly managed and motivated by corrupt elements, it could not be expected that they would make a significant contribution to economic growth.

Finally, the *CAPCV* variable represents the variability of public investment or capital expenditure as measured by its coefficient of variation. The argument is that the variability of public investment denotes the discretionary manner in which politicians or senior government officials make decisions on the nation's capital budget or public

investment program. The greater the variability of public investment the greater are the chances that politicians are indulging in *ad hoc* allocation of public investment to suit their personal agendas. It implies lack of direction, including an informed expenditure plan based on an integrated developmental framework. Under these circumstances the allocation of public investment is not based strictly on economic criteria, and thus the quality and productivity of public investment programs are adversely affected. The prediction of the model, therefore, is that the *CAPCV* variable is negatively correlated with economic growth.

Admittedly, these chosen public finance variables need not always be regarded as the outcome of corrupt or rent-seeking motives on the part of politicians or bureaucrats. They could be the result of well-meant policies. However, as explained below in relation to each variable, it is not unreasonable to relate these variables to either corrupt or rent-seeking policies within the public sector, given their susceptibility to manipulation and appropriation by the policymakers. Support for this proposition may be obtained by resorting to factor analysis and by studying the levels of these public finance variables in countries in which corruption is believed to be prevalent. For instance, factor analysis could reveal the tendency of these variables to cluster around one common factor – whatever that common factor is, whether it be corruption or otherwise. On the other hand, the tendency for the levels of these variables to be high in countries where corruption is rampant could well underline the important linkages between the level of corruption and the decisions giving rise to these variables.

The results of a factor analysis carried out on the variables based on data from the selected PICs for the period 1983-92 are provided in Table 1 below. It is an attempt to

provide one piece of evidence in support of the hypothesis that these variables could be more appropriately categorized as a general indicator of corrupt or rent-seeking practices rather than as being economically motivated. The analysis is conducted with two factors identified.

Table 1: Factor Analysis

FACTOR MATRIX		
Variable	Factor 1	Factor 2
ECSGDP	0.906	0.298
GOVTC	0.796	0.246
CAPCV	0.687	0.307
ECONTE	0.531	0.487
DEBT	-0.729	-0.430
SUBGDP	-0.272	0.914
SUBTE	-0.445	0.839

As the table shows, the variables load most heavily on Factor 1. For instance, the absolute values of the Factor 1 loading of all of the corruption indicators, with the exception of the *SUBGDP* and *SUBTE* variables, are more than twice their Factor 2 loadings. These are the results one would expect if these variables were predominantly tied to one common factor which, as argued in the present analysis, has been designated as the corruption or rent-seeking factor.⁶ In addition, the fact that all these variables are statistically significant and negatively related to economic growth, as outlined in Section 4 below, tends to reinforce the argument about the corrupt nature of the decisions that gave rise to the size of these variables.

⁶ Note that factor analysis is a purely statistical technique indicating which, and to what degree, variables relate to the underlying and undefined factor. The substantive meaning of this factor is left to the researcher's informed judgement.

The second approach is to examine the levels of these variables in countries in which corruption is known to be rampant. For instance, it has been established that Fiji and PNG are two of the countries in the South Pacific where corruption is quite prevalent (Kaunamauri 2000, and Chand 2001). A comparison of the values of the corruption variables for each of these two countries with the average values for the whole group may provide some preliminary indications of the extent to which these variables are correlated with corrupt and rent-seeking practices. For both countries the mean values for *GOVTC*, *ECONTE*, *SUBGDP*, *DEBT* and *CAPCV* are in most cases above the group's averages. Whether this result reveals any important linkages between the levels of these variables and incidence of corruption remains an empirical question.

All in all, the propositions advanced in this study are that corrupt governments tend to have high levels of government consumption expenditure, subsidy, and public debt and experience a high degree of public investment variability and government intervention in private sector activities. To the extent that these corruption indicators are highly correlated with each other, implying that they contain approximately the same amount of information, it may be best to combine them to form a composite index for corruption. This is done below, using *principal component analysis* (PCA).

Constructing the Corruption Index

The corruption index (*CRRPT*) was derived by finding the best linear combination of the corruption variables referred to above. In PCA terms, the best linear combination is the one that has the highest variance. Since there are seven corruption indicators, the linear functions of these variables are as follows:

$$l_1 = a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + a_5x_5 + a_6x_6 + a_7x_7$$

$$l_2 = b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 \text{ etc.}$$

Note that the a 's (b 's) are chosen so that variance of l_1 (l_2) is maximized subject to the condition that $a_1^2 + a_2^2 + \dots + a_7^2 = 1$ (called the normalization condition). l_1 is said to be the first principal component. It is the linear function of the x 's that has the highest variance (the normalization is required, because otherwise this variance can be increased indefinitely). l_2 , which is uncorrelated with l_1 , is said to be the second principal component. Other linear combinations can be derived but, for most empirical work, the first two principal components suffice. The *Shazam* econometric package was used for the principal component analysis.

A word of caution on the limitations of the PCA is warranted at this point. First, though the first principal component l_1 , picks up the major portion of the variances of the x 's, it needs not necessarily be the one that is most correlated with the dependent variable. In fact, there is no necessary relationship between the order of the principal components and the degree of correlation with the dependent variable. Second, often the linear combinations have no meaningful economic interpretation.

The Property Rights and Civil Liberty Variables

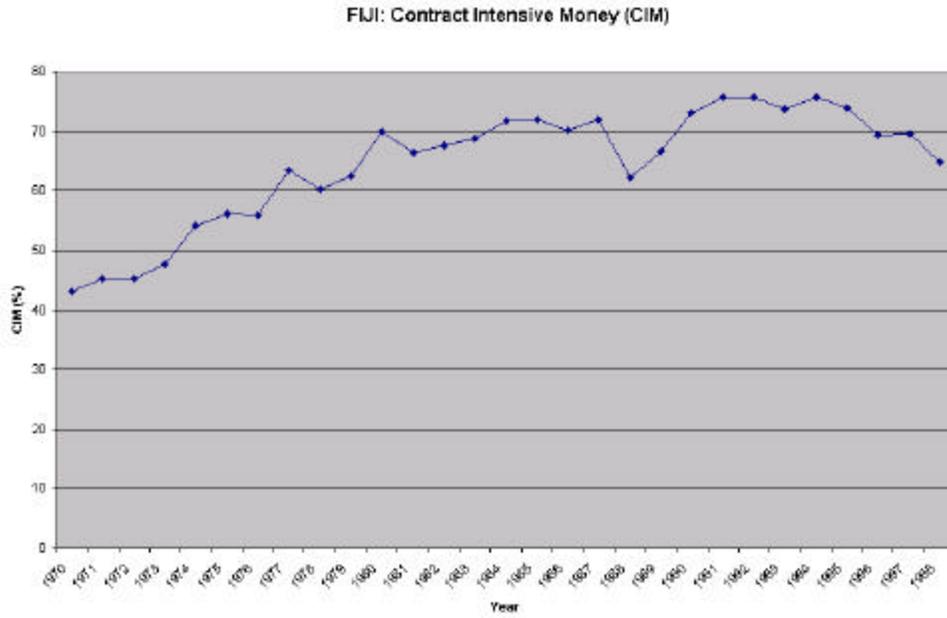
The other institutional variables used in the regression equations are those relating to security of property and contractual rights and the presence of civil liberty. With

regard to the former, this study uses the index developed by Clague *et al* (1999), the contract-intensive money (*CIM*) concept. The *CIM* index is defined as the ratio of non-currency money to total money supply (M_2). The authors view the financial portfolio holdings of nationals as being a good indicator of the effectiveness of institutions in protecting property and contractual rights. The rationale is that if institutions cannot provide assurance for the security of property rights (e.g., in terms of adequate third party enforcement), nationals would be less likely to allow other parties to hold their money in exchange for some compensation, and hence *CIM* would be correspondingly lower. That is, they would prefer to hold their financial assets in the form of cash (rather than depositing them, for example, with the banks). The higher the *CIM*, the greater the ability of firms to raise capital, the higher the rate of investment, and hence the faster the rate of economic growth.

To observe the relevance of the *CIM* index in the case of the PICs, it is of interest to illustrate the index graphically using data for Fiji and Papua New Guinea – the two countries in the Pacific with the most severe institutional problems.

As can be seen from the Fiji *CIM* ratio below (Figure 2), there is clearly a drop in the *CIM* index during the period of the coup and the year immediately after it (1987-1988). This squares well with the prediction that if *CIM* is a good measure of the security of contract and property rights, dramatic political events or changes of regime affecting these rights should change the *CIM* ratio.

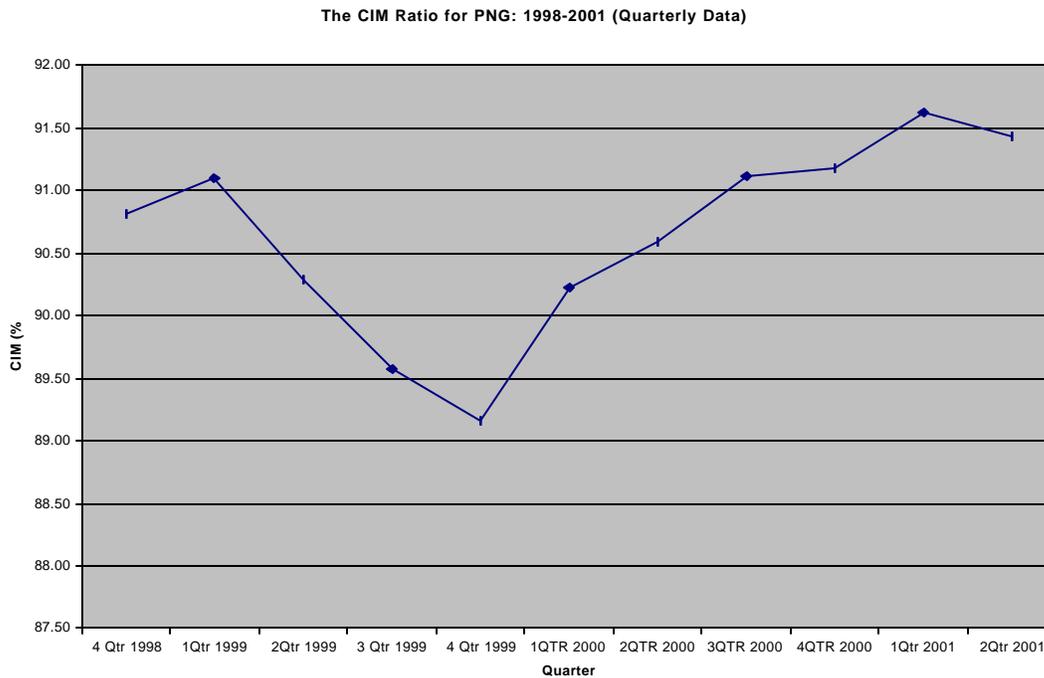
Figure 2: The CIM Ratio for Fiji (1970-98)



Source: ADB (1998b)

The CIM ratio for Papua New Guinea based on quarterly data covering the period 1998-2001 is shown in Figure 3:

Figure 3: The CIM Ratio for PNG 1998 –2001 (Quarterly Data)



$$\text{CIM} = (\text{M2-Currency})/\text{M2} * 100$$

Source: PBPNG *Quarterly Economic Bulletin* Vol.XXIX(1) March 2001

The quarterly data refers to the 3-month average for each quarter.

The hollow portion of the CIM ratio from the first quarter 1998 to end 1999 was the period when the Papua New Guinea economy was devastated by gross mismanagement and political instability under the Skate administration. These problems led to a record decline in the value of the kina against the major currencies, precipitating bank panics and a massive outflow of capital. The economy slowly recovered when the Mourata government took over in the third quarter of 1999, as reflected by improvement in the CIM ratio during the subsequent periods.

Thus, both the Fiji and Papua New Guinea data support the hypothesis that where there is increased political uncertainty, and the propensity to mount coups is high, the

security of property and contractual rights is hampered, leading to lower confidence by investors in the banking system and enforceability of contracts, and thereby giving rise to capital flight.

The index for civil liberty, denoted *FREE* in the regression equations, is based on the *Freedom House* evaluation of the civil and political freedom that the citizenry of countries enjoy. The index developed is ordinal, running from 1 (most free) to 7 (least free), and is derived from a subjective combination of factors such as freedom of expression, due processes in criminal procedures, absence of political prisoners, and independence of the judiciary. Two conflicting hypotheses have been espoused concerning the connection between economic growth and civil freedom. On the one hand, it has been argued that freedom should facilitate economic performance and hence growth (e.g. Friedman 1962, and Isham *et al* 1997). Alternatively, it has been argued that (as for countries in the South-east Asia region) for a country to grow rapidly requires autocratic control and reduced freedom. In order to test these alternative hypotheses, the basic model in equation R.1 (below) has to be augmented with some measure of political/civil freedom.

V. The Empirical Tests and Results

As outlined in Section I, the central hypothesis motivating the study is as follows:

- Hypothesis 1: *The economic performance of the South Pacific countries is fundamentally determined by the level and quality of public institutions operating in these countries.*

The critical empirical question relating to this main hypothesis is the issue of how to measure the level and quality of public institutions. As already mentioned, the study uses the level of corruption, property rights security and civil liberty as indicators of the effectiveness of public institutions. These variables are measured using the methods outlined above.

The basic econometric model, based on hypothesis 1, is as follows:

$$GDPL_{it} = \mathbf{a} + \mathbf{b}_1 I_{it} + \mathbf{b}_2 M_{it} + \mathbf{e}_{it} \quad (\text{R.1})$$

where $GDPL$ is the real growth rate of per capita GDP,⁷ I represents a set of standard conditioning variables as described in more detail in Section III below, and M represents a vector of variables of interest (i.e., the institutional variables – meaning the corruption, property rights and civil liberty variables). Specifically, for the purpose of the present analysis, the conditioning variables used include the population growth rate ($POPG$) to represent growth in the labor force, exports as a ratio of GDP ($EXPO$), and gross

domestic investment (*GDI*) – all of which play an important part in the growth processes of the South Pacific economies. Although exports have played a limited role in the growth performance of most of the Pacific countries (except for Fiji and Papua New Guinea), they have assumed an increasingly important role in the long-term economic development strategies of these economies - hence their inclusion in the equation (R.1). All variables are subscripted with i and t , denoting the i th cross-sectional unit (a country) and the n th observation, respectively, since the estimation is carried out using pooled data.

Data – Constraints, Sources and Nature

The major constraint facing the research is the availability and reliability of data relating to the South Pacific islands selected for the purpose of this study, namely, Fiji, Kiribati, Papua New Guinea, Samoa, Solomon Islands, Tonga and Vanuatu. Of these seven Pacific islands, only Fiji, and to some extent Papua New Guinea, has a long enough time series that could allow useful empirical analysis.

The bulk of the data was obtained from the World Bank, IMF, United Nations and the ADB published and online sources. (Refer to Appendix 1 for the complete list of the variables and their sources). For some of the countries, such as Kiribati, whose data cannot be accessed online or through the records available, data for these countries had to be collected in-country. The analysis was confined to the 10-year period 1983-92, since it is the most complete period for data.

⁷ Some researchers (e.g. Hall and Jones 1999) have used the *level* rather than the *growth rate* of GDP as the dependent variable in the equation and come up with equivalent results.

Apart from the population growth rate (*POPG*) and the *FREE* variable, all explanatory variables are expressed as ratios of current GDP. Real GDP is derived by converting current GDP into US dollar equivalents first and then deflated using 1995 prices.⁸ The 1995 prices were obtained from *World Outlook 2000*.

With the exception of the corruption index (*CRRPT*), *CAPCV* and *FREE* variables, all the variables are in logarithmic form. This is necessary as a way of mitigating the distorting effects of outlier influences and possible measurement error problems. As already mentioned, the *CAPCV* variable is derived by calculating the coefficient of variation of capital expenditure using a 3-year interval. The data for the *FREE* variable was obtained from Freedom House. To avoid ambiguity in interpretation, the original score values which range from 1 (most free) to 7 (least free) were re-scaled so that the grading was from high to low, i.e., 7 stands for most free and 1 for the least free.

The Estimating Methods

Because of the lack of data on most of the South Pacific countries, estimation of the above econometric models is severely constrained. This renders impractical the derivation of an efficient and consistent estimation of the relationships implied in the models. As a remedy for this data deficiency problem, the analysis resorts to some form of data-pooling technique that is capable of dealing effectively with the inevitably complex structure of pooled data, and that could also ensure efficient and consistent estimates of the parameters. The estimating method applied in this analysis is that

⁸ The 1995 prices were used because this was the only index (CPI) for which data was available for the seven Pacific islands, relative to the period of the study.

developed by Parks (1967) which has been further elaborated by Kmenta (1986) (hereafter called the PK pooling method).⁹ Jarayaman (1996) used this pooling method in his empirical work relating to the South Pacific countries. The chief advantage of pooling is that it could provide more efficient estimation, inference, and possibly prediction, provided the model is properly specified (Vinod and Ullah, 1981).

The Results

In estimating equation R.1, the analysis proceeds in two stages. First, it uses OLS to estimate the model. Then, it estimates the regression equation using the PK pooling method. The estimations are carried out in both levels and logarithmic values as part of the tests on the robustness of the results. Also, to gain further insight into how the individual variables comprising the corruption index correlate with the dependent variable (growth rate of real GDP per capita), these variables are regressed individually as well as aggregatively. As a means of testing the robustness of the estimated coefficient of the corruption index, different combinations of the constituent variables are tried, including the one derived via the PCA method. The latter is the preferred corruption index (*CRRPT*).

To conserve space, the results from the OLS estimate are not reported here,¹⁰ and only those from the PK pooling estimate are reported as summarized in Tables 2 and 3 below. Table 2 reports the results of the regressions in level forms, based on the constructed corruption indices.

⁹ For a detailed discussion of the advantages and disadvantages of pooling data, refer to Koutsoyiannis (1977).

TABLE 2: POOLED REGRESSIONS (IN LEVELS) – CORRUPTION INDICES
(Dependent Variable: Per Capita Real GDP Growth Rate in Percentage)

	1	2	3	4	5
CONST	-14.390** (-2.663)	-14.516*** (-2.740)	-15.764*** (-3.05)	-14.966*** (-2.910)	-11.811*** (-2.915)
POPG	1.160 (1.291)	0.972 (1.100)	0.397 (0.470)	0.378 (0.424)	2.237** (2.486)
GDI	0.045 (0.461)	0.019 (0.195)	0.084 (0.828)	0.067 (0.673)	-0.0554 (-0.783)
EXPO	0.226** (2.355)	0.238** (2.533)	0.235** (2.639)	0.227** (2.513)	0.104 (1.418)
CRRPT					-23.395*** (-6.927)
R-SQUARED	0.403	0.332	0.385	0.315	0.441
F-Statistics	10.988***	8.095***	10.155***	7.486***	12.606***
SER	0.723	0.723	0.728	0.727	0.719

The t-statistics are in parenthesis. (***), (**), and (*) denotes significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

As can be seen, the constructed corruption indices, which are derived from different combinations of the presumed corruption variables discussed in Section II and in the Data Appendix, are all of the expected sign and significant at all levels of the test. Note that the *CRRPT* variable is the corruption composite index derived via the PCA methodology.

As one of the means used to test the robustness of the results reported in Table 2, the regressions were re-run using the logarithmic values of the variables, i.e., using the logarithmic form of equation R.1. These results are reported in Table 3 below.

Table 3: Pooled Regression (using log values): Corruption Indices
(Dependent Variable: Per Capita Real GDP Growth Rate)

	1	2	3	4	5
CONST	0.082 (1.610)	0.068 (1.319)	0.0743 (1.392)	0.061 (1.165)	0.0075 (0.1775)
POPG	-0.019*** (-3.792)	-0.018*** (-3.305)	-0.0179*** (-3.081)	-0.0186*** (-3.122)	-0.018*** (-3.994)
GDI	0.049** (2.058)	-0.0384 (1.582)	0.0515** (2.024)	0.0462** (1.853)	0.0247 (1.190)
EXPO	0.120*** (3.922)	0.124*** (3.924)	0.114*** (3.711)	0.111*** (3.540)	0.102*** (4.064)

¹⁰ These results are available from the author. As expected, the estimated results from the OLS regressions are mostly statistically insignificant, due largely to the presence of both the autocorrelation and heteroskedasticity problems inherent in such cross-sectional time series data.

CRRPT					-0.195*** (-5.844)
R-SQUARED	0.606	0.564	0.576	0.524	0.551
F-Statistics	17.584***	14.166***	14.579***	11.675***	15.977***
SER	0.727	0.726	0.731	0.729	0.726

The t-statistics are in parenthesis. (***) (**), and (*) denotes significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Again, the corruption indices are all statistically significant at all levels of the test and are of the expected signs. Interpreted literally, the point estimate of the *CRRPT* variable implies that, *ceteris paribus*, an increase in the level of corruption of one standard deviation will result in an expected decrease in the per capita GDP growth rate of 0.3396 of its standard deviation (0.101), which is approximately 3 percentage points.

Extending the Corruption Tests

To deepen insights on the implications of the above results, it is necessary to extend the analysis and explore the different channels through which corruption affects economic growth. The two channels that the study identifies are public investment and the size of the public sector, as measured by the level of government expenditure on public administration. That is, it is argued that, because of its susceptibility to corrupt and rent-seeking practices, public investment in most of the Pacific islands is prone to corrupt practices, hindering its quality and productivity. Likewise, because of corrupt motives, the public sector in these countries tends to be over-sized either because of improper recruitment policies or because of the excessive intervention of government in what would otherwise be private sector activities. The following two subsidiary hypotheses

therefore warrant investigation and testing in conjunction with the main hypothesis above.¹¹

- Hypothesis 2: *Other things being equal, public investment is tied to the level of corruption. The corollary is that, because of the low productivity of public investment due to the presence of corruption, private investment tends to be negatively correlated with the level of public investment;*
- Hypothesis 3: *Other things being equal, the size of the public sector tends to be closely related to the level of corruption within the public sector.*

Hypothesis 2 seeks to capture the relationships between corruption and public investment to confirm the thesis that public investment is motivated more by corrupt and rent-seeking motives than by economic considerations (e.g. Tanzi and Davoodi, 1997). It also seeks to investigate the relationship between public investment and private investment to confirm the results of a study by Jayaraman (1996) on the same countries (except for PNG) which found a significant and negative relationship between these two variables. The relevant econometric model is as follows:

$$GI_{it} = \mathbf{a} + \mathbf{b}_1 POPG_{it} + \mathbf{b}_2 PI_{it} + \mathbf{b}_3 EXPO_{it} + \mathbf{b}_4 CRRPT_{it} + \mathbf{e}_{it} \quad (\text{R.2})$$

¹¹ These are not the only channels through which corruption affects growth but it is believed that they are the two most relevant channels in the case of the Pacific countries.

where GI represents public investment as a ratio of current GDP, $POPG$ is the rate of population growth, PI is private investment's share in current GDP, $EXPO$ is the share of total exports in GDP, and $CRRPT$ is the composite corruption index. For the sake of consistency, this specification closely follows the format of equation R.1 in terms of the right-hand-side variables. The $POPG$ variable is included on the premise that the population growth rate has a direct influence on the level of public investment that the government would undertake, such as the number of hospitals, schools and roads to be built. Private investment (PI) is expected to have a negative relationship with public investment. That is, the higher the level of private investment, the lesser the role that the government would play in the economy, and hence the lower the level of public investment. Finally, exports are included as these could also influence the level of public investment, especially given the export-led growth strategies of most of the South Pacific countries. As long as public investment is conducive to export-led development, it is expected that the export variable ($EXPO$) will be positively related to the level of public investment. The main focus in estimating this equation is on the relationship between the corruption variable ($CRRPT$) and public investment (GI) which is expected to be positive given the possible corrupt decision-making processes connected with the design and allocation of public investment.

With respect to hypothesis 3, the test focuses on the extent to which corruption influences the size of the public service as measured by the total expenditure on public administration. The focus on public administration may be justified on the grounds that in most of the South Pacific countries, the public sector plays a dominant role, accounting for between 60 percent and 80 percent of GDP as in Kiribati and the Cook Islands,

respectively. The intriguing question that will be investigated here is whether this phenomenon is related to corrupt or rent-seeking objectives on the part of politicians or government officials. The econometric specification for this hypothesis is as follows:

$$PUBADMIN_{it} = \mathbf{a} + \mathbf{b}_1 POPG_{it} + \mathbf{b}_2 PI_{it} + \mathbf{b}_3 CIM_{it} + \mathbf{b}_4 CRRPT_{it} + \mathbf{e}_{it} \quad (\text{R.3})$$

where *PUBADMIN* is the share of total expenditure on public administration in current GDP, and all the other explanatory variables are as explained already. The primary focus of the test is on the validity of the proposition that the size of the public service in most of the developing countries, including the South Pacific countries under review, is positively associated with the level of corruption in the public sector. The *POPG* variable is included because of its direct effect on the size of the public service and hence the cost of public administration. That is, with the government being the major employer and supplier of goods and services in the Pacific Islands, the size of the population is likely to have a direct, positive relationship with the size of the public sector. Private investment (*PI*) is included on the assumption that the higher the level of private investment in the economy, the lesser is the role that the government plays and, hence the smaller is the size of the public sector. The *CIM* variable is included to highlight the importance of strong and effective public institutions in determining the size of the public sector. That is, with strong public institutions, there will be proper checks and balances in place to prevent arbitrary policies, especially in relation to recruitment of personnel into the public service, thereby preventing a costly and over-sized public service. Thus, it is expected that *CIM* will be negatively correlated with *PUBADMIN*.

The following table (Table 4) summarizes the results of the test on hypotheses 2 and 3.

Table 4: Pooled Regressions - The Public Investment and Public Sector

	1: PUBLIC INVESTMENT	2: PUBADMIN
CONST	-2.481*** (-12.31)	-0.225*** (-14.45)
POPG	0.0325* (1.665)	0.186*** (28.99)
PI	-0.108*** (-4.297)	0.201*** (16.19)
EXPO	-0.479*** (-2.747)	
CIM		-0.0423 (-0.551)
CRRPT	0.784*** (3.355)	0.916*** (14.98)
R-SQD	0.916	0.999
F-Statistics	11.602***	8027.832***
SER	0.718	0.693

The t-statistics are in parenthesis. (***) , (**), and (*) denotes significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

As can be seen from regression 1 in table 4, the South Pacific data support the proposition that public investment is positively and significantly associated with the level of corruption and/or rent-seeking practices. The point estimate (standardized coefficient) suggests that a one-standard deviation increase in the level of corruption is expected to cause an increase of 0.254 of the standard deviation of public investment (0.644), which is approximately 16 percentage points. This is a rather large figure but not necessarily suspect given the preponderance of the government sector in the economies of these countries. This result may help explain why public investment in most of the countries in the South Pacific tends to have a neutral, if not negative, effect on growth. That is, the corrupt and rent-seeking elements tend to distort the composition and quality of public investment.

Another notable feature of regression 1 above is the relationship between public investment and private investment. As argued by Aschauer (1989) and others, not all public investment is inimical to private investment and hence to economic growth. That

is, while higher public investment can raise the national rate of capital accumulation above the optimal level and crowd out private investment, some forms of public capital – such as highways, communications, water systems, sewers and airports – are likely to bear a complementary relationship with private investment. In this latter case, higher public investment may raise the marginal productivity of private capital and, thereby, crowd-in private investment. Depending on their relative potency, the interaction of these two forces could result in either a decrease or increase in private investment and hence in the income growth rate. For the South Pacific countries - at least for the seven countries selected for this study - the data tends to support the former scenario. This result may reflect the fact that, in the aggregate, public investment in these Pacific countries during the period 19983/92 has been in low-return areas such as buildings and much may have been managed ineffectively. The investments in public enterprises engaged in loss-making commercial activities have also contributed greatly to this outcome (World Bank, 1995).

The final hypothesis to be tested is Hypothesis 3 which states that corruption tends to distort the allocation of government expenditure, with a tendency to allocate more resources to those areas over which government officials and politicians have direct control. Because of data constraints, the test on this hypothesis is focused on the relationship between the level of corruption and the size of the public administration (civil service). This emphasis on the relationship between public administration, as a dependent variable, and corruption is well justified given the preponderance of the public sector in these economies. This particular feature of these economies has been the subject of continuing criticisms by aid donors including the World Bank and the IMF. The

proposition advanced is that corruption plays a major part in the allocation of resources to this sector, and hence is considered as one of the key factors accounting for the bloated cost of public administration in these economies.

Regression 2 in Table 4 summarizes the results of the estimation of the public administration regression. There is a very strong, positive relationship between the size of public administration and the level of corruption. Taken literally, the point estimate on the corruption variable suggests that a one standard deviation increase in the level of corruption is likely to lead to an increase in the size of the public service of 0.268 of its standard deviation (0.244), which is approximately 6 percentage points. This is a rather large figure, but if it were realistic it would underpin the earlier results about the unrelenting grip of the government on those activities that could be more effectively handled by the private sector. The privatization or corporatization of those activities that could be more effectively carried out by the private sector, such as transportation, manufacturing, and public works, could greatly reduce the size of, and hence expenditure, on public administration. This could, in turn, effectively reduce the scope for corruption by public officials and politicians. But the results also show that without effective property and contractual rights, there would not be much benefit from trying to privatize what are now public enterprises.

Alternative Specification

The foregoing analysis uses the standard conditioning variables in the regression equations to estimate the magnitude of the impact of the corruption and other institutional

variables on the dependent variable – the per capita real GDP growth rate, *GDPL*. Since the prime objective of this study is to investigate empirically the role of institutions (as proxied by corruption, property rights security and the presence of political/civil freedom) in the growth processes of these island economies, it may be more appropriate to consider an alternative specification of the basic model that is more closely aligned with this objective. In this connection, the following alternative specification is proposed:

$$GDPL_{it} = \mathbf{b}_0 + \mathbf{b}_1 CIM_{it} + \mathbf{b}_2 FREE_{it} + \mathbf{b}_3 CRRPT_{it} + \mathbf{e}_{it}$$

where the variables are as already described. This is a parsimonious specification focusing specifically on the relationship between the institutional variables and the economic growth rate, where the institutional variables are represented by the *CIM*, *FREE* and *CRRPT* variables. This parsimonious equation, which is the preferred model of analysis for the remainder of this chapter, has the advantage of simplicity and of being institutionally-oriented and focusing on the primary, fundamental determinants of economic growth (Hall and Jones 1999). An argument for leaving out the standard controlling variables of capital and labor is that, given the right policies and institutions, a country can get all the capital and labor that it needs.

In testing this alternative model, the analysis proceeds by considering first the very basic version of this model, regressing the per capita GDP growth rate on the corruption index, before estimating the complete model which includes the other

institutional variables: the *CIM* and *FREE* variables. The estimation results on this alternative model are summarized in Table 5 below.

Table 5: POOLED REGRESSIONS (IN LOGS) – THE GROWTH EQUATION – ALTERNATIVE SPECIFICATION

(Dependent variable is Log of real GDP per capita growth rate)

	1	2	3
CONST	-0.04** (-2.689)	-0.06** (-2.620)	-.073*** (-2.896)
POPG		-.01*** (-3.01)	-.012*** (-3.324)
CIM		.22*** (7.873)	0.23*** (7.534)
FREE		.02*** (3.122)	.023*** (3.342)
CRRPT	-0.06*** (-3.025)	-.10*** (-4.39)	-0.12*** (-3.799)
RESCPT			-0.00429 (0.455)
R-SQD	0.135	0.643	0.663
F-Stat		21.7***	17.6***
SER	0.898	0.720	0.633

@The instruments used to carry out the Hausman test include all the right-hand side variables (exogenous) in the model plus the *Open* variable following Wei (2000). RESCPT is the residual obtained after regressing the corrupt index (CRRPT), as derived using the Principal Component Analysis methodology, on these instruments. The t-statistics are in parenthesis. (***), (**), and (*) denotes significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

As can be seen from this table, the coefficient on the corruption variable still has the expected negative signs and is highly significant. In relation to regression 1, corruption explains about 14 percent of the per capita GDP variation in growth rates. The estimation of the complete model (regression 2) also yields good results.¹² The estimated coefficient on the corruption index carries the expected sign and is highly significant. Likewise, the coefficients on the other institutional variables – the *CIM* and *FREE* variables – carry the expected signs (positive) and are highly significant. In the context of regression 3 (the preferred model), the model explains about 64 percent of the total variation in per capita GDP growth rates. All the variables are significant at the 1 percent

¹² The exclusion of the population growth rate variable (*POPG*) from regression 10 does not affect the significance and signs of the estimated parameters for the institutional variables (*CIM*, *FREE*, and *CRRPT*).

significance level of the test, implying the highly significant role that institutional factors play in the economic performance of these countries.

Taking the point estimates literally, a one standard deviation increase in the level of security over property and contractual rights produces an increase in income growth rates of 0.363 of its standard deviation (0.101), i.e., an increase of approximately 3 percentage points, holding the other variables constant. Likewise, holding the other variables constant, a one standard deviation increase in the amount of freedom that the citizens enjoy is expected to cause an increase in economic growth rate of 0.211 of its standard deviation, which is approximately 2 percentage points. Finally, other things being equal, an increase of one standard deviation of the level of corruption produces a reduction in the per capita GDP growth rate of 0.212 of its standard deviation, which is approximately 2 percentage points.

Note that the results obtained under the alternative specification above are not very different from those obtained under the standard model (Equation R.1). They are also not very different from the results for other countries (e.g. Mauro 1994, Tanzi and Davoodi, 1997, and Clague *et al* 1999). Save for the questions about the reliability of the data used in this research, these results provide, for the first time, empirical evidence of the important role that institutional factors play in the growth processes of these Pacific island economies. The most important feature of these results is the robustness of the estimated parameters of these institutional variables with respect to both data transformation and the change in the specification of the estimated model.

The remaining issue to be addressed is the question of endogeneity or simultaneity bias with respect to the corruption variable under this alternative

specification.¹³ That is, it is highly likely that the level of corruption may be influenced to a great degree by the level of income such that it can no longer be regarded as a truly exogenous variable in the model. If this is the case, then the estimated coefficient on the corruption index (*CRRPT*) could be biased and inconsistent. To check, therefore, for this possible simultaneity problem, the Hausman test is carried out on the corruption variable using appropriate instruments. The instruments used are all the right-hand side variables in the alternative model above, which are assumed to be exogenous, but also including the openness variable (*Open*) as this has been found to be instrumental to the incidence of corruption (Wei 2000). The result of this test is set out in column 3 of Table 5. As can be seen, the residual variable (*RESCPT*), which is obtained by regressing the corruption index on these instruments, is not significantly different from zero at the 1 percent test level. This means that the null hypothesis of simultaneity is rejected, implying a lack of association between the level of corruption and income. (Note, however, that in terms of the F-statistics, the null hypothesis cannot be rejected at all levels of the test).¹⁴¹⁵

One major concern that may be raised about the above results is that they may be driven disproportionately by a few “outlier” countries in the group, or that the data used for the analysis are of dubious value and that the results produced are therefore suspect. In order to address both these concerns, the estimating models were re-run (using again lead values for the dependent variable) excluding countries that could be considered “outliers” in terms of their effects on the data for the group. For this purpose, Fiji and Kiribati are singled out – Fiji, because of its dominant role in the economy of the South

¹³ It is assumed here that *CIM* and *FREE* are both exogenous variables.

¹⁴ Further checks on this causality problem were carried out by re-running the regressions using lead values of the dependent variable (GDPL). The results still cannot reject the null hypothesis.

¹⁵

Pacific region (apart from PNG) plus the fact that it is a country with the most unstable political environment; and Kiribati because it is a country with the least developed statistical bureau and hence with the most unreliable data. Again the results (not shown) are resilient in that the coefficients of the key institutional variables remain highly significant and of the expected signs.

VI Summary and Conclusions

The foregoing analysis investigates empirically the extent to which the quality of public institutions affects the level of economic performance (as measured by per capita real GDP growth rate) of the South Pacific island economies. The key indicators used as a measure of the quality of public institutions are corruption, property rights, and political freedom or freedom of expression. While it would be desirable to include other hard-data based measures of institutional quality such as revenue arrears, level of expenditure on regulations, the differentials in the wage rates between the public and private sectors, or expenditure on infrastructural maintenance, the lack of data on these variables has made this impossible.

The greatest challenge facing the analysis was the task of developing a measure for corruption in the context of the South Pacific countries. This is because none of the countries in the South Pacific are included in the worldwide survey-based rankings carried out by the various risk-rating international organizations relating to corruption and other institutional indicators. Therefore, the study developed its own measures for corruption based on hard data and using an *outcome-based* approach. It identifies those

public finance variables that are most likely to be the outcome of corrupt and/or rent-seeking policies on the part of politicians and bureaucrats, and uses these variables to construct a composite index for corruption. The public finance variables selected for this purpose are government consumption expenditure, the level of government intervention in the private sector economy, the level of subsidy provided to corporations and companies, public debt, and the variability of capital expenditure as measured by its coefficient of variation.

The strong presumption of the study is that a corrupt government is one that: (a) spends more on unproductive activities as characterized by the ratio of government consumption expenditure to GDP; (b) suppresses private sector activities or the operation of efficient market forces; (c) has a tendency to transfer public resources towards unproductive ends; (d) has a greater degree of discretionary powers in the design and allocation of public investment; and (e) carries high levels of public debt. On the other hand, a government is seen to be supportive of the strengthening of institutions if it seeks to protect the security of property and contractual rights through adequate third party enforcement and freedom of expression. The latter are proxied by the *CIM* and the *FREE* indices, respectively.

The results for the seven Pacific island countries lend significant support to the proposition that the quality of public institutions plays a crucial role in the growth performances of these countries. This is evident not only in the high statistical significance of the estimated parameters for the institutional variables but also in their resilience and robustness to data transformation and changes in model specifications. The

most important findings of the study based on the data for the 10-year period 1983-1992, can be summarized as follows:

- Corruption has a deleterious effect on the per capita real GDP growth performance of these economies, with the potential to reduce the growth rate by between 2 and 3 percentage points for a one standard deviation increase in corruption.
- On the other hand, protection of property and contractual rights and freedom of expression contributes positively to income growth performance. Their contributions are estimated to be around 3 and 2 percentage points, respectively, for a one standard deviation improvement in these variables.
- Corruption also adversely affects the level of private investment, reducing it by 8 percentage points. On the other hand, security of property and contractual rights boosts private investment by approximately 0.72 percentage.
- Public investment in these countries tends to be highly associated with the level of corruption. It is estimated that a one-standard deviation increase in the level of corruption increases public investment by 16 percentage points.
- Private investment is inversely related to the level of public investment, due to the unproductive nature of the latter, although the magnitude of this relationship is not very significant.
- Finally, there appears to be a close association between the level of corruption and the size of the public sector. It is estimated that a one standard deviation increase

in the level of corruption is likely to cause an increase in the size of the public sector by 6 percentage points.

It must be emphasized that these results provide only preliminary and suggestive evidence of the role of corruption and other institutional factors in the growth processes of the South Pacific island economies. Definitive conclusions about the validity of these results depend to a great extent on the efficacy of the corruption measures employed and how those public finance variables chosen as indicators for corruption actually relate to corruption within the public sector. Also, the nature and reliability of the data, together with the estimating method used in the analysis, must be taken into account when drawing inferences from these results.¹⁶ Notwithstanding these possible shortcomings, one thing is beyond doubt: corruption and other institutional weaknesses do play a major part in the economic performance of these island economies. This conclusion poses a major challenge to the authorities of these countries, calling for the need to identify appropriate reform measures that they should undertake in order to strengthen their institutions and thereby reduce the level of corruption and its corrosive effects on their economic performance.

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¹⁶ These results were based on the 10-year period 1983-92. The fact that the PICs performed poorly in the subsequent years (1993-99), with an average real GDP growth rate of 1.8 percent per annum, suggests that the institutional environment in these countries was still inadequate.

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APPENDIX 1

DEFINITION OF VARIABLES AND DATA SOURCES

Variable	Number of countries	Variable Description	Source	Date Range
<i>GDPL</i>	7	Log of real GDP per capita growth rate calculated by converting current GDP into US dollar equivalent first and then applying the 1995 CPI	WEO/World Bank/ADB	1983-1992
<i>ECSGDP</i>	7	Log of the ratio of those activities carried out by government but supposed to be carried out by the private sector to private sector GDP. These include manufacturing, mining, electricity and transportation	WEO/World Bank/ADB	1983-1992
<i>GOVTC</i>	7	Log of the ratio of government consumption expenditure to current GDP	WEO/World Bank/ADB	1983-1992
<i>SUBGDP</i>	7	Log of ratio of subsidy by government to current GDP	WEO/World Bank/ADB	1983-1992
<i>CAPCV</i>	7	Coefficient of variation of capital expenditure using a 3-year period	WEO/World Bank/ADB	1983-1992
<i>ECONTE</i>	7	Log of ratio of government expenditure on economic services to total expenditure	WEO/World Bank/ADB	1983-1992
<i>SUBTE</i>	7	Log of expenditure on subsidies to total expenditure	WEO/World Bank/ADB	1983-1992
<i>DEBT</i>	7	Log of public debt to current GDP	WEO/World Bank/ADB	1983-1992
<i>CRRPT</i>	7	The Corruption Index based on the first principal component of the corruption variables: <i>ECSGDP</i> , <i>GOVTC</i> , <i>SUBGDP</i> , <i>CAPCV</i> , <i>SUBTE</i> , <i>ECONTE</i> , and <i>DEBT</i> . The standardized values of the variables are used.	WEO/World Bank/ADB	1983-1992
<i>CIM</i>	7	Log of ratio of non-currency M2 to total M2. [The figures for Kiribati are based on the Kiribati Government (Ministry of Finance) estimate].	WEO/World Bank/ADB	1983-1992
<i>FREE</i>	7	The average of the scores for political rights and civil liberty as re-scaled. See text.	Freedom House	1983-1992
<i>POPG</i>	7	Log of annual mean of population growth rate	WEO/World Bank/ADB	1983-1992
<i>GDI</i>	7	Log of ratio of gross domestic investment to current GDP	IFC/NCDS database/ADB	1983-1992
<i>PI</i>	7	(Unless otherwise specified), Log of ratio of private investment to current GDP	IFC/NCDS database/ADB	1983-1992
<i>EXPO</i>	7	Log of ratio of total export to current GDP	WEO/World Bank/ADB	1983-1992
<i>OPEN</i>	7	Log of ratio of export plus import to current GDP	WEO/World Bank/ADB	1983-1992

WEO = World Economic Outlook database accessible online:
<http://www.imf.org/external/pubs/ft/weo/1999/02/data/index.htm>