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**THE DETERMINANTS OF REGIONAL POVERTY
IN INDONESIA 1984-2002**

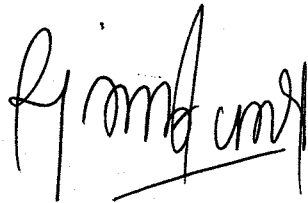
RIYANA MIRANTI

A thesis submitted for the degree of
Doctor of Philosophy
of The Australian National University

April 2007

DECLARATION

Unless otherwise indicated this thesis is my own work

A handwritten signature in black ink, appearing to read 'Riyana Miranti', with a horizontal line drawn underneath the name.

Riyana Miranti

April 2007

Acknowledgments

This thesis marks the end of a long and wonderful journey which had given me so many experiences. I have learned that writing a thesis is both a joyful and a painful process. At the end, I am indebted to so many people without whom I could not have completed my work.

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Abstract

The objective of this thesis is to examine the determinants of regional poverty and of poverty decline in Indonesia over the past 18 years (1984-2002). The thesis utilises a consistent provincial dataset for selected indicators of 26 provinces collected from 1984-2002.

This thesis begins with an analysis of the growth elasticity of poverty across different growth episodes: (i) the first period of liberalisation (1984-1990); (ii) the second period liberalisation (1990-1996); and (iii) the recovery period (1999-2002). The findings show that the growth elasticity of poverty was the strongest during the second period of liberalisation, and that there was a possible lag of impact of liberalisation policies on poverty.

The analysis then examines the growth elasticity of poverty across groups of provinces. It is found that growth elasticity of poverty was high in Java-Bali, thereby confirming that better infrastructure and human capital enable a greater transmission of growth impact to poverty reduction. In contrast, the growth elasticity of poverty was low both in the isolated provinces of Nusa Tenggara and in the resource rich provinces. For the resource rich provinces, this finding is attributed to the fact that mining, oil and gas based growth have a low impact on poverty since growth is likely to be less labour intensive. In addition, most of the revenue from growth went back to the central government rather than to the producing provinces prior to the 2001 decentralisation.

Then other determinants of poverty in addition to growth are analysed: (i) natural resources, (ii) openness, (iii) human capital, (iv) inequality, and (v) infrastructure. A special focus is given to the role of two new determinants which are usually ignored in the literature, which are the role of recent interprovincial migration (assisted and non-assisted in-migration and out-migration) and also the intergovernmental transfers of the Regional Development Grants in 1984-2002. Both the direct channel to poverty and the indirect channel through growth and then associated with poverty are investigated. Through regression analysis, it is

found that interprovincial migration only affects regional poverty indirectly through economic growth. Non-assisted in-migration and out-migration are growth enhancing strategies, but this is not true for the assisted in-migration (transmigration). In contrast, surprisingly, intergovernmental transfers are neither growth-enhancing nor poverty reducing. On the role of other determinants, only growth, low inequality and infrastructure are found to be direct poverty reduction strategies in Indonesia.

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Glossary

BOTABEK	: Bogor, Tangerang and Bekasi
CBS	: Central Board of Statistics of Indonesia
CPI	: Consumer Price Index
DAK	: Special Allocation Funds (<i>Dana Alokasi Khusus</i>)
DAU	: General Allocation Funds (<i>Dana Alokasi Umum</i>)
FD	: First Difference
FE	: Fixed Effects
FGT	: Foster, Greer and Thorbecke Poverty Measures
GDP	: Gross Domestic Product
GEP	: Growth Elasticity of Poverty
GMM	: Generalized Method of Moments
IDT	: Less Developed Villages Presidential Instruction (<i>Inpres Desa Tertinggal</i>)
INPRES	: Presidential Instruction (<i>Instruksi Presiden</i>)
NRGDP	: Non Oil and Gas Regional Gross Domestic Product
OLS	: Ordinary Least Squares
REPELITA	: Five Year Development Plan (<i>Rencana Pembangunan Lima Tahun</i>)
RGDP	: Regional Gross Domestic Product
SAKERNAS	: National Labour Force Survey (<i>Survei Tenaga Kerja Nasional</i>)
SDO	: Autonomous Regional Subsidy (<i>Subsidi Daerah Otonom</i>)
SENSUS	: Population Census
SPPKD	: Basic Commodity Basket Survey (<i>Survei Paket Komoditi Kebutuhan Dasar</i>)
SUPAS	: Intercensal Population Survey
SUSENAS	: National Socioeconomic Survey (<i>Survei Sosial Ekonomi Nasional</i>)
2 SLS	: Two Stage Least Squares

Chapter One

Introduction

1.1. Significance of Issues

How might economists best observe poverty in Indonesia? What are the determinants of poverty? To what extent does growth reduce poverty? What are the other determinants aside from growth which contribute to reducing poverty? These questions guide the analysis presented in this thesis.

At least two initial observations can be made in relation to Indonesia's poverty. First, Indonesia's poverty reduction record has been impressive. Thirty years of rapid economic growth during the New Order has been associated with much lower poverty (Papanek, 2004). With an average annual growth of 7 per cent (1967-1996), there was a significant reduction in the percentage of the Indonesian population under the poverty line, from more than 55 % in mid 1960s (Booth, 1992), then 40.1 % in 1976 to around 11.3% in 1996, according to the official estimate, just before the crisis. The absolute number of poor people declined from 54.2 million in 1976 to 34.5 million in 1996. This steady decline in the percentage of population living below poverty line occurred in both urban and rural areas.

Second, however, regional data show a heterogeneous picture. There are significant disparities in provincial poverty rates, with provinces in the Eastern Indonesia such as East Nusa Tenggara, Papua and Maluku persistently among provinces with highest poverty incidence. Sumatra and several provinces in Java recorded lower poverty rates, and Jakarta as the capital of this country has always had the lowest poverty incidence during the same period.

Yet poverty and regional economic progress do not appear to be necessarily closely correlated. For example, the province of Papua (formerly Irian Jaya), where poverty incidence is high, was among the top six provinces in terms of income per capita during 1990-2002.

This highlights the fact that provincial poverty figures may not be consistent with economic indicators; high regional Gross Domestic Product may not necessarily translate into the increasing welfare of the respective provincial population.¹ On the other hand, some provinces such as East Nusa Tenggara and West Nusa Tenggara have both high poverty figures and also low income per capita.

So when, nationally, economic growth in Indonesia reduced poverty, why are there still such differences across provinces? What are the fundamental determinants of regional poverty? The overall objective of this thesis is to examine the determinants of provincial poverty and of poverty decline in Indonesia over the past 18 years (1984-2002). The remainder of this chapter is organised as follows. Section two raises research questions and discusses the contribution of the proposed thesis to the general field of enquiry. Section three discusses the scope of the study. Section four discusses approaches and hypotheses. And, finally, section five presents an outline of how this thesis is organised.

1.2. Research Questions and the Contribution of the Thesis

1.2.1. Research Questions

Based on previous literature on the incidence of poverty, two clear findings emerge from the empirical literature on determinants of poverty in Indonesia: the growth elasticity of poverty varies across island groups in Indonesia (Friedman, 2001) and across Eastern and Western Indonesia (Miranti and Resosudarmo, 2005);² and there are specific local factors which are important in explaining the regional differences in poverty (Friedman, 2001 and Balisacan, Pernia and Asra, 2003).³

In general, three potential areas require further investigation. First, different development episodes may have varying impacts in relation to regional poverty.

¹ One of the reasons is that the natural resources extraction revenue was transferred directly to the central government.

² Western Indonesia covers Java, Bali and Sumatra, the rest are Eastern Indonesia

Second, there are direct and indirect channels in which determinants of poverty can have an impact. Direct channels trace the determinants that work directly on the welfare of the poor besides possible impacts on poverty through growth. Indirect channels track if the determinants work indirectly through creating or enhancing economic growth. Third, there are determinants which can be considered pro-poor that have not been identified in the previous studies. Specifically, previous studies failed to include interprovincial migration and intergovernmental transfers.

1.2.2. Thesis Contributions

Hence, this thesis is intended to extend the existing work on regional poverty in Indonesia. The level of region used for this thesis is the province. There are four main contributions that this thesis can claim to make to the understanding of regional poverty in Indonesia and the wider development literature.

First, this thesis takes account of several development episodes as it covers quite a long time period from 1984-2002. None of the earlier literature has tried to take account of development episodes in analysing poverty reduction, in either the cross country or the single country literature, including studies on Indonesia. In terms of time coverage, this time span is an improvement over Friedman (2005)³ who limited his analysis to 1984-1999, Suryahadi, Suryadarma and Sumarto (2006) who also analysed the period of 1984-1999 and also over Balisacan, Pernia and Asra (2003) who analysed the determinants of poverty reduction in Indonesia in the 1990s.

Second, this thesis will include careful analysis of the role of province-specific characteristics identified in other studies, such as natural resources and openness, and the structure of society and community such as human capital and inequality, and provision of infrastructure. In addition, the role of two hitherto unexplored determinants, interprovincial migration and intergovernmental transfers, is also examined. These two determinants have never been taken into account previously in either the single country or Indonesia literature.

³ The earlier version of Friedman (2005).

⁴ Friedman (2001) limited his study coverage from 1984-1996.

Third, this thesis will take into account of several provincial groupings which share common features which cut across geographical borders, in order to examine the determinants of poverty alleviation strategies across groups of provinces with similar characteristics.

Fourth, it is anticipated that by including the second and third factors in the analysis, this thesis will illuminate more direct effects of the explanatory variables on poverty reduction which have not been adequately discussed in the previous literature. It is therefore expected that a different picture will be found across provincial groupings.

This thesis will also contribute to provincial data availability since, for the purpose of this thesis, a consistent provincial database for selected indicators has been collected from 1984-2002.

1.3. Scope of the Study

1.3.1. Qualitative and Quantitative Analysis

Both quantitative and qualitative analyses are combined to provide a comprehensive analysis of determinants of regional poverty in Indonesia. The quantitative analysis is undertaken at provincial level to provide quantitative indicators of regional poverty determinants. The regional poverty analysis covers 26 provinces, spanning 1984-2002.

The analyses is also conducted by incorporating several common provincial groupings, from the simplest provincial groupings of Java-Bali versus the Outer Islands, by island groups, and using the Hill's (1989) regional classification which has already taken into account not only geographical location but also the structural characteristics of different provinces, especially population density and natural resource endowments.

The quantitative analysis of this thesis uses data that provide the ‘best and close’ proxies available for all the variables of interests. To check the robustness of certain variables, if available, alternative proxies are also used (for example, in the case of openness and human capital). Furthermore, econometric specifications are carried out to analyse the proposed empirical hypotheses. Technical issues arising during the econometric estimation, such as omitted variable bias and endogeneity, are also carefully addressed.

1.3.2. Beyond the Scope of the Thesis: Poverty Measurement

What lies beyond the scope of this thesis is poverty measurement, especially the issue of setting up a poverty line. Although several criticisms have been made of the official Central Board of Statistics (CBS) poverty line,⁵ this thesis uses the CBS 2002 current methodology as having a more consistent and comparable methodology across time regions than previous CBS methodologies (CBS, 2003), as discussed later in Appendix 3.A.

1.3.3. Quality of the Data

Constructing a time series consistent set of determinants is a big challenge, since this thesis focuses on the whole period 1984-2002. The author spent three months of fieldwork in Indonesia, interacted with relevant divisions in the CBS, the SMERU Research Institute, and the Institute of Demography, University of Indonesia to collect and construct a time series consistent provincial data set for the period 1984-2002.

Several limitations relate to data quality. First, the quantitative analysis in this thesis inevitably relies on the quality of the available data. Second, for several proxies, the years of data collection do not match with years covered by the National Socioeconomic Survey (SUSENAS) Consumption Modules. This relates closely to the fact that the main sources of absolute poverty measurement data (the dependent variable) used for this thesis come from the National Socioeconomic Survey especially the Consumption Module which is published every three years. However interprovincial migration data are published every five

⁵ See Bidani and Ravallion (1993), Ravallion and Bidani (1994), Alatas (1998), Pradhan et al. (2001) and Nashihin (2007) for further details.

years from either the Population Census (Sensus Penduduk) or the Intercensal Population Survey (SUPAS), so several adjustments are therefore necessary to match the data sets.⁶

1.4. Approaches and Hypotheses

Accordingly, four approaches are taken to test the hypotheses of this thesis which will be adopted in the empirical chapters. First, it examines the relationship between three growth episodes in Indonesia and their impact on poverty. The growth episodes are the first period of liberalisation when liberalisation was the strongest (1984-1990), the second period of liberalisation when liberalisation was slower (1990-1996), and the recovery period (1999-2002). Second, it examines the relationship between the regional dimensions and the growth elasticity of poverty. Third, it examines determinants of regional poverty. Fourth, it examines the specific role of interprovincial migration and intergovernmental transfers on poverty. For the last three approaches, “step by step” econometric estimations are made. These start from the simplest model in which only growth elasticity of poverty is analysed. This analysis is expanded by incorporating commonly used determinants of poverty, and then the two new determinants, which are interprovincial migration and intergovernmental transfers, are incorporated.

In dealing with the first approach, two principal hypotheses will be investigated in relation to the variations in growth elasticity of poverty across development episodes:

- (i) The growth elasticity of poverty during the first period of liberalisation (1984-1990) was higher than in the second period of liberalisation (1990-1996), as the pace of liberalisation was stronger.
- (ii) The growth elasticity of poverty during the recovery period (1999-2002) was lower than in the second period of liberalisation since the economy was still recovering from the economic crisis of 1997-1998.

⁶ The adjustment process of this interprovincial migration data is set out in Appendix 7.B.

For the second approach, the growth elasticity of poverty is expected to vary across groups of provinces, where the three tentative hypotheses are that

- (i) The growth elasticity of poverty was high in Java-Bali because growth is associated with greater integration of markets with better infrastructure and human capital.
- (ii) The growth elasticity of poverty was low in natural resource rich provinces since the revenue from this growth went to the Central Government rather than to the province of origin and so it is likely to provide fewer spillovers to the local economy.
- (iii) The growth elasticity of poverty is expected to be high in low income, relatively poor provinces because growth in these provincial groups is associated with the dominant agriculture sector which is labour intensive and also in general, there is tendency towards convergence.

For the third and fourth approach, four principal hypotheses will be investigated:

- (i) There is positive relationship between share of natural resources (oil and gas) and poverty and a negative relationship with openness.
- (ii) There is a negative relationship between human capital, infrastructure, and poverty, and a positive relationship with inequality and poverty.
- (iii) In relation to migration, the relationship between assisted in-migration and poverty is likely to be positive because the migrants are likely to have higher levels of poverty than the population in areas of destinations. Out-migration is expected to have a positive relationship with poverty because these out-migrants had higher educational levels than the population in areas of origin. There is expected to be a negative relationship between non-assisted in-migration and poverty, as these in-migrants had higher educational levels than the population in the destination regions.
- (iv) There is a negative relationship between the size of intergovernmental transfers and poverty.

1.5. Organisation of the Thesis

This thesis is composed of eight chapters. Chapter Two provides a literature review in order to examine the role of growth and other determinants of poverty reduction. Three steps are taken in developing this review: first, drawing lessons based on cross country literature; second, discussing single country literature, and also discussing examples of the kinds of adjustments that are necessary if the cross country framework is adapted to a single country framework; and third, drawing lessons based on Indonesia as a case study, as there are still limited studies on regional poverty in Indonesia.

There is a flourishing literature on the growth elasticity of poverty for a cross countries and for regions in a single country. The discussion of the growth elasticity of poverty focuses on growth determinants and the concept of pro-poor growth. This is considered as an indirect channel. For the direct channel, the single country analysis offers insights on different determinants which have usually a direct and significant impact on poverty.

Chapter Three discusses the general methodology and approach to be used. This thesis will adapt three absolute poverty measures (the poverty headcount index (P0), the poverty gap index (P1), and the poverty severity index (P2)), as identified by Foster, Greer, and Thorbecke (FGT) (1984). This approach is followed by discussions about the choice of income proxies and deflators. For example, there are arguments in the literature about whether income from the national or regional accounts is more suitable to use than income from the household surveys. In this chapter, the general empirical methodology and approach are discussed, based on panel data estimations which acknowledge the unobserved heterogeneity of the 26 provinces. In general, fixed effects and generalized method of moment estimations will be applied.

The empirical core of this thesis comprises the next four chapters. The main objective of Chapter Four is to examine the heterogeneity in the growth elasticity of poverty across growth episodes. This chapter focuses only on growth as the determinant of absolute poverty measures (for all the FGT measures). It is important to examine whether, when inequality is not controlled for the negative impact of growth on poverty measures is still found for all periods.

Chapter Five focuses on whether there is heterogeneity of growth elasticity of poverty across different groups of provinces. The growth elasticity of poverty is estimated for all FGT measures. In order to analyse the regional effects on growth elasticity of poverty, three classifications of provincial groups are used: that is Java-Bali and the Outer Islands, island groups, and the Hill (1989) classification, are used. As in Chapter Four, it is important to analyse whether the negative impact of growth on poverty measures is still found when inequality has not been controlled for.

In Chapter Six, the robustness of the growth elasticity of poverty estimated in the two previous chapters is tested, to determine whether a similar magnitude and rank of growth elasticity of poverty across growth episodes and groups of provinces is found. In Chapter Six, other common determinants, in addition to growth, are added to the analysis. These include natural resources, human capital, inequality, openness and infrastructure. The additional determinants need to be taken into account in order to examine whether there are possibly direct channels through which these determinants impact on poverty, besides the indirect effect through economic growth. However, in Chapter Six, the focus is only on the poverty headcount index.

Chapter Seven expands on Chapter Six by introducing two new poverty determinants : interprovincial migration and intergovernmental transfers. Both have been ignored in most previous analyses of poverty but are significant for any discussion of regional development in Indonesia and, more generally, in other developing countries. Interprovincial migration includes non-assisted immigration, out-migration and mobility through government assisted transmigration

program. Similar to the previous chapter, this chapter only focuses on the determinants of the poverty headcount index.

The final chapter summarises the conclusions that emerge from these analyses. It also draws policy lessons for Indonesia and other countries and makes suggestions for further research.

Chapter Two

Growth and Other Determinants of Poverty Reduction : A Literature Review

2.1. Introduction

When poverty is discussed, there are two important questions. The first issue to be established is who exactly are the poor? The poor are those who are especially lack of income and assets, do not have access to basic necessities such as food, shelter, and clothing, and are also without a certain standard of health and education levels (World Bank, 2000a).¹ These are the characteristics of the poor. Second, having identified these characteristics, what policies should be pursued to alleviate this poverty?

The World Bank (1990, p.51) identified some key strategies as follows:

Countries that have been most successful in attacking poverty have encouraged a pattern of growth that makes efficient use of labour and have invested in the human capital of the poor. Both elements are essential. The first provides the poor with opportunities to use their most abundant asset-labour. The second improves their immediate well being and increases their capacity to take advantage of the newly created possibilities. Together they can improve the lives of most of the world's poor.

These World Bank strategies in the 1980's were manifested in trade liberalisation, investment in infrastructure and provision of basic social services.

Providing opportunity was also discussed in World Bank (2000a) which expanded its previous strategy from the 1980s with two other additional strategies which were (i) supporting empowerment, and (ii) enhancing security. Empowerment was

¹ Assets include human (labour, education, health), natural (such as land), and physical (infrastructure).

actually carried out by increasing the accountability and the responsiveness of state institutions to their poor, and by strengthening the poor people themselves. Enhancing security basically involved strategies to reduce the vulnerability of the poor and help them to cope with shocks that may arise.

Departing from the World Bank strategy, most theoretical and empirical literature agrees that one of the key objectives for poverty analysis is to clarify those factors that may affect poverty. Starting with a general approach, there are at least three main issues which are highlighted in the literature. The first, and the most important, determinant is economic growth. Economic growth is closely related to 'providing opportunity', as discussed by the World Bank (2000a). It is widely believed that economic growth is a necessary condition for poverty reduction, although it is not in itself a sufficient condition.

The second issue highlights other determinants of poverty which also happen to be determinants of economic growth. This issue is strongly related to the term 'pro-poor growth' which refers to the kinds of policies that are poverty reducing. Other determinants of poverty reduction work indirectly through economic growth. This link has also been demonstrated in several empirical works which fail to prove any direct link between the other determinants to poverty.

There are other determinants in addition to growth which are classified into (i) economic structures (natural resources and openness), (ii) structure of the society and community (human capital, inequality), (iii) public services/policies (infrastructure, governance and fiscal decentralisation), and (iv) stabilisation (macroeconomic policies). The literature does not address in specific whether these determinants are also valid for poverty gap index (P1) and poverty severity index (P2), since the discussion is usually limited for headcount index (P0).

Finally, the third issue focuses on the direct links of other determinants to poverty reduction. Empirical evidence usually shows that price incentives which favour agriculture, demographic factors, and inequality as being three key determinants which have direct links to poverty.

The following section provides a broad literature review related to the discussion of the three main issues outlined above, as well as indicating what factors are currently missing from the literature and how one might fill that gap. Two approaches have been taken in developing this review. First, in section two, lessons are drawn from the cross country literature. Second, the review of single country literature in section three includes a discussion based on the Indonesia experience as a country specific study. And finally, section four draws conclusions from this review.

2.2. Cross Country Literature

2.2.1. The Concept of Pro-Poor Growth

There is no doubt that economic growth is a necessary condition for poverty reduction. The basic paper which strongly argues the role of economic growth in relation to poverty reduction is that by Dollar and Kraay (2002).²

In addition to the analysis of Dollar and Kraay (2002), two further definitions of growth which are “pro-poor” have been distinguished. The first definition is that of Ravallion and Chen (2003) who argued that the growth process is pro-poor only if poor people benefit in absolute terms, that is when there is reduction in the poverty headcount ratio between two periods for a one per cent growth in mean income. This is a definition which focuses on absolute poverty.

The second, more complex, definition of pro-poor growth focuses on the share of growth that accrues for the poor (Kakwani and Pernia, 2000; White and Anderson, 2001; Bhalla, 2002; Klasen, 2004). This is an approach which focuses on the relative definition of poverty. For example, it is claimed that pro-poor growth occurs when the growth rate of income of the poor is greater than the average growth rate (White and Anderson, 2001). In reality the relative definition possibly gives sub optimal outcomes both for the poor and non poor. For example, in the first scenario, the average income grows by 4 per cent and the incomes of the poor

² Although in their paper, Dollar and Kraay (2002) do mention that one to one elasticity does not mean that growth is all that is needed to improve the lives of the poor, however they argue that growth enhancing policies should be at the center of any effective poverty reduction strategy.

grows by 7 per cent. This first scenario will be preferred rather than a second scenario when the average income grows by 6 per cent but the incomes of the poor grow only by 5 per cent. The first scenario shows that the distribution favours the poor, although in fact in the second scenario both poor and non poor are better off. This relative definition focuses more in reducing inequality rather than on poverty itself regardless of economic growth.

In this thesis, the pro-poor growth refers to the first definition (Ravallion and Chen, 2003).

2.2.2. The Growth Elasticity of Poverty.

One productive approach which can be used to identify the strength of the relationship between growth and poverty, or to describe pro-poor growth, is the concept of growth elasticity of poverty. The following section discusses both the analytical and empirical literature on growth elasticity of poverty.

2.2.2.1. Analytical framework of the growth elasticity of poverty³

There are various theoretical analytical frameworks developed for measuring the growth elasticity of poverty. This analytical relationship is usually based on some strong assumptions: for example (i) that inequality does not change, or (ii) that inequality follows a specific shape of distribution. In this section, the three theoretical analytical frameworks of growth elasticity of poverty developed by Datt and Ravallion (1992), Kakwani (1993) and Bourguignon (2003) are presented.

Datt and Ravallion (1992) showed how change in poverty measures can be decomposed into growth and redistribution effects with applications to Brazil and India in the 1980s.

$$\text{Suppose } P_t \text{ at date } t, P_t = P\left(\frac{z}{\mu_t}, L_t\right) \quad (2.1)$$

³ For this sub-section, the discussion also covers single country literature.

Where z is the poverty line, μ_t is the mean income at date t , and L_t is a Lorenz curve at time t .

Poverty measure changes over time, for example between date of t and date $t+k$, where G represents growth, D represents distribution and R the residual, is decomposed as follows :

$$P_{t+k} - P_t = G(t, t+k; r) + D(t, t+k; r) + R(t, t+k; r), \quad (2.2)$$

Where in addition to the previous notation, r is the reference point which can also be considered as the starting point.

$$\text{The growth effect is given by } G(t, t+k; r) \equiv P\left(\frac{z}{\mu_{t+k}}, L_r\right) - P\left(\frac{z}{\mu_t}, L_r\right) \quad (2.3)$$

This is the change in poverty due to a change in the mean with the Lorenz curve held constant as some level of L_r which is similar to L_t .

$$\text{The redistribution effect is given by } D(t, t+k; r) \equiv P\left(\frac{z}{\mu_r}, L_{t+k}\right) - P\left(\frac{z}{\mu_r}, L_t\right) \quad (2.4)$$

This is the change in poverty due to a change in the Lorenz curve, given some level of μ_r which is similar to μ_t .

$$\text{and, the residual is given by } R(t, t+k; r) \quad (2.5)$$

The residual will disappear if either mean income or the Lorenz curve does not change over the decomposition period.

Wodon (2002) argued that the Datt and Ravallion (1992) decomposition is more suitable to decompose the poverty change across time since it can be applied to multiple periods. However, this decomposition does not provide a clear picture on the long-term relationship between growth, poverty and inequality. For example, it cannot provide an explanation whether there is an alternative growth process with different distributional implications which possibly matters for poverty reduction.

Kakwani (1993) also argued that it is important to measure separately the impact of the changes in average income and income inequality on poverty by decomposing a change in poverty rate into (i) the impact of growth when the distribution of income does not change (pure growth effect), and (ii) the impact of income redistribution when total income of society remains constant (pure inequality effect). Therefore, Kakwani (1993) derived the growth elasticity of poverty by assuming the growth process follows the Lorenz curve of distribution, which shifts in a constant proportion.

In order to derive the growth elasticity based on Kakwani (1993), to begin with, Foster, Greer and Thorbecke (1984) class of poverty measures are presented as follow,

$$P_{\alpha} = \int_0^z \left(\frac{z-x}{z} \right)^{\alpha} f(x) dx \quad (2.6)$$

Where α is the inequality of aversion parameter, that $\alpha=0$ for P0 (Headcount Index), $\alpha=1$ for P1 (Poverty Gap Index) and $\alpha=2$ for P2 (Poverty Severity Index). z is the poverty line, x is individual income, and $f(x)$ is the distribution function of individual income.

Following the FGT poverty measures, the Kakwani (1993) growth elasticity is given by the following formula,

$$\eta_{\theta} = \frac{1}{\theta} \int_0^z x \frac{\partial P}{\partial x} f(x) dx, \text{ which is always negative since } \frac{\partial P}{\partial x} < 0 \quad (2.7)$$

or in more simple format the elasticity is given by

$$\eta_{P_{\alpha}} = \frac{\partial P_{\alpha}}{\partial \mu} \frac{\mu}{P_{\alpha}} = - \frac{\alpha [P_{\alpha-1} - P_{\alpha}]}{P_{\alpha}}, \text{ where } \mu \text{ is the average income.} \quad (2.8)$$

For $\alpha \neq 0$, the elasticity will be always negative since P_{α} is monotonically decreasing function of α .

There are several implications of this computation of growth elasticity of poverty which may not always be applicable in reality. First, the growth elasticity of poverty always increases with α .

Therefore P2 growth elasticity of poverty (P2 GEP) > P1 GEP > P0 GEP, even though the impact of growth on poverty should depend on the location of the poverty line and where the poor are located (the shape of the distribution). For example, growth can be expected to have a higher impact on poverty if the consumption of the poor, on average, is closer to the poverty line (Heltberg, 2004). Second, empirically, this theoretical elasticity also does not acknowledge that there is a more complex relationship, for example, between inequality and growth (Wodon, 2002).⁴

The latest theoretical model is given by Bourguignon (2003) who assumes that distribution of income is log-normal. Therefore he developed an identity which links the growth in mean income and the change in the distribution with the change in poverty rate. Its decomposition actually follows equation 2.2 from Datt and Ravallion (1992) with an additional assumption of specific log normal distribution. Therefore, the growth elasticity of poverty ε is defined as the relative change in the poverty headcount for one per cent growth in mean income holding a constant relative inequality of σ , as presented in the following formula:

$$\varepsilon = -\frac{\Delta P0}{\Delta \text{Log}(\bar{y})P0_i} = \frac{1}{\sigma} \lambda \left[\frac{\text{Log}(z/\bar{y})}{\sigma} + \frac{1}{2} \sigma \right] \quad (2.9)$$

⁴ As in the case of Bangladesh which is the main focus of Wodon (2002), Kakwani (1993) failed to explain the growth elasticity of poverty in this country. Because of its missing link on measuring the relationship between growth and inequality, Kakwani's (1993) decomposition found that urban growth was more pro-poor than rural growth, as poverty should have declined more in urban areas. Nevertheless the reality was the reverse.

Where P_0 is the headcount index, z is the poverty line and $\Delta \text{Log}(\bar{y})$ is the growth rate of mean income, σ is the standard deviation of the log of income, and $(\bar{y}_t/z)$ is a level of development measured by level of mean income, which is expressed as the proportion of the poverty line, and λ is the ratio of the density of the cumulative function (hazard rate) of the standard normal distribution.

The equation 2.9 shows that the growth elasticity of poverty is positively associated with the level of development as stated by the inverse of the ratio $(z/\bar{y}_t)$ and also is negatively associated with the degree of income inequality of σ . The advantage of Bourguignon's decomposition (2003) over that of Kakwani (1993) and Datt and Ravallion (1992) is that this elasticity is allowed to depend on the inverse level of development and on the initial level of inequality. In addition, the basic identity indicates that the income redistribution has two important roles in poverty reduction: (i) a distribution effect in which redistribution of income reduces poverty, and (ii) an acceleration of poverty reduction for a given rate of economic growth.

2.2.2.2. Empirical dimensions of the growth elasticity of poverty

In reality, it is hard to impose restrictive assumptions, as specified in the previous theoretical frameworks since, for example, inequality does change in numerous ways. How responsive poverty is to growth in mean income is more an empirical question, and estimates of empirical growth elasticity of poverty are presented below. In discussing the empirical growth elasticity of poverty, there is a range of issues highlighted in the cross country literature, which include the assumptions that:

- a) The growth elasticity of poverty depends on measurement, sample size and time period⁵

⁵ Caution also needs to be taken regarding the issue of the different indicators of the growth elasticity of poverty which use absolute poverty and relative poverty. The growth elasticity of poverty which uses absolute poverty gives a negative sign when growth is pro-poor, which makes sense since the interpretation taken will be, say, that x per cent increase in mean income decreases poverty rate by y per cent. On the other hand, the growth elasticity of poverty which uses relative poverty has a positive sign. This uses per capita income of individuals in the first quintile of distribution as a proxy of welfare of the poor. The positive sign can be interpreted as x per cent increase in mean income of the total population, increases y per cent of mean per capita income or expenditure of the bottom 20% of income distribution.

Caution needs to be taken when data on growth elasticity of poverty results are presented since the number given really depends on measurement, sample size and time period. In terms of measurement, first, a relative concept of poverty is used by estimating the growth elasticity of per capita income of the individuals in the first quintile of the distribution (the poorest 20 per cent).

With this relative definition, Dollar and Kraay (2002) argued that the elasticity is practically one (as do Roemer and Gugerty, 1997).

However this concept has an important shortcoming that all the individuals in the first quintile will be classified as poor regardless of their absolute standard of living. In cross country literature, this problem is significant as the same weight will be given to an individual in the bottom 20% of distribution regardless of their country and standard of living.

Conversely, the growth elasticity of poverty can be estimated with poverty measured in absolute terms. Thus Bruno, Ravallion and Squire (1996), Ravallion and Chen (1997) and Ravallion (2001) found that the elasticity is higher than two in absolute numbers; that means that when the average income increases by 10 per cent then the proportion of the poor declines more than 20 per cent. In addition, Smolensky et al. (1994) and De Janvry and Sadoulet (2000) found a smaller elasticity of around one in absolute terms, but this proposition is suspect due to the small sample size used.⁶

b) The growth elasticity of poverty of cross country studies is too aggregate. This is a major limitation of the cross country study literature, for the following reasons:

- (i) The growth elasticity of poverty is, in fact, also different across groups of countries. Although cross country studies do support the general proposition that growth is good for the poor, however it is clear that there is heterogeneity across groups of countries. For example, based

⁶ De Janvry and Sadoulet (2000) drew on a sample of only 12 Latin American countries between 1970-1994, while Ravallion and Chen (1997) used a larger sample size of 67 developing and transnational economies spanning the period 1981-1994.

on log-log regression between the consumption of the poor and the non poor, Bhalla (2002) calculated a world growth elasticity of poverty of 2.4 between 1980 and 2000. However, the Sub-Saharan African growth elasticity was only 0.77, while that of East Asia was 1.17. The same phenomenon could be seen in the work of Ravallion and Chen (1997). When they calculated growth elasticity of poverty of developing and transitional countries in the 1990s, they found the elasticity was – 2.6; however in Eastern Europe and Central Asia, the growth elasticity of poverty was only – 1.9.⁷

- (ii) International comparisons use cross sectional data, and not time series or a combination of cross sectional and time series data, although for some countries the data may be derived from more than two observations (more than one spell of growth). Thus these data may tell us little about each individual country's national policy, as cross country studies can only indicate average trends although individual country experiences differ quite significantly. In fact, the relationship between growth and poverty is strongly related to the development of each respective country over time. Consequently, the responsiveness of poverty to growth varies according to specific structural characteristics that can be influenced by policy (Weisbrot et al., 2000 and Bigsten and Levin, 2001).

The question then arises why, apart from different methodologies, time periods, and sample sizes, those groups of countries' growth elasticity of poverty differ so much?

At the most basic level, the growth elasticity of poverty varies because different countries have distinct characteristics and experiences which contribute to differences in performance, influenced by diverse policy choices (Lal and Myint, 1996). But then it becomes important to analyse what these different characteristics and policies are, and which ones are pro-poor. Those questions in

⁷ The poverty line was set at 50 per cent of the initial survey mean income for each country.

turn imply that there could be identifiable characteristics leading to a policy package which focuses on the determinants of growth in average incomes as pro-poor growth strategies.

Those determinants mostly work through two stages: (i) through their effect on economic growth, and (ii) then on to poverty reduction. However, direct links between those determinants and poverty can possibly be found. These direct links work to affect welfare of the poor (for example, increasing income and employment of the poor) besides other possible impacts on poverty through growth. They usually cover policies which affect the poor more than the non poor, for example education intervention specifically directed to the poor.

Variables that are strongly associated with economic growth and poverty are referred to here as other common determinants of poverty (in addition to growth) and are listed below:⁸

Structures of economy:

- (i) natural resources
- (ii) openness

Structures of society and community:

- (iii) human capital
- (iv) inequality

Public Services (policies):

- (v) infrastructure (from single country studies)
- (vi) fiscal decentralisation
- (vii) governance

Stabilisation policies

2.2.3. Other Common Determinants of Poverty

This sub-section presents a general discussion on the common determinants of poverty and of poverty reduction which includes discussion of definition, while a more detailed analysis of the separate direct and indirect effects will be discussed later in the relevant chapters.

⁸ These variables are based on the modified Miranti and Resosudarmo's (2005) list of determinants of poverty.

2.2.3.1. Structures of the economy

Natural resources

What are these crucial natural resources ? Natural resources represent endowment of an economy. Sachs and Warner (1995, 2001) categorised natural resource based exports into agriculture, minerals and fuel exports.

Roemer and Gugerty (1997) argued that the impact of these different natural resource based exports on poverty is different. They argued that countries which are strongly based on agricultural exports will benefit the poor people more, mainly through the labour market, than countries where exports are strongly based on mineral exports (such as oil and gas) where income distribution is usually heavily concentrated. The 'natural resource curse' is a common phrase used to explain the negative impact of these mineral resources, as will be discussed in detail in Chapter Six.

Openness

What is the definition of openness? According to Berg and Krueger (2003, p.5)

the openness of an economy is the degree to which nationals and foreigners can transact without artificial (that is, governmentally imposed) costs (including delays and uncertainty) that are not imposed on transactions among domestic citizens.

Berg and Krueger's (2003) definition of openness fits the fact that, for a country, openness is influenced by trade policies and other factors such as exogenous declines in transport costs or increasing demand from other countries (Rodriguez and Rodrik, 2000), although in reality, openness may be more related with the trade policies. This relationship between trade policies and openness becomes relevant when the relationship between trade policy, growth and poverty is discussed later. Much depends on what kind of trade policy a country pursues. In the earlier days of the industrialisation period, most countries dealt with inward-looking import substitution (Bhagwati and Srinivasan, 1999). However, this kind of industrialisation is more capital intensive and so it has less impact on wages and the types of jobs which employs many of the poor. When trade barriers are

removed and the country pursues outward export-led growth, the trade policy is then can be pro-poor growth since it enhances labour intensive manufacturing, as apparently what happened during the 1980s in many LDCs. So it is argued that trade liberalisation are important for growth and poverty reduction (Berg and Krueger, 2003).

2.2.3.2. Structure of society and community

Human capital

Human capital is a different kind of asset since it is embodied in humans. Romer (1996) defined human capital as a process of enlarging people's choices by expanding human capabilities and functionings. It covers abilities, skills and knowledge which, apart from inherited talents and skills, people can develop by investing in themselves. Schooling and training are amongst investments in human capital activities that can raise earnings over a lifetime (Becker, 1993). Therefore it is necessary to increase the stock of human capital to alleviate poverty, as human capital is in fact also the main asset of most poor people (World Bank, 2000b). Klasen (2004) has argued that pro-poor growth will rely on how much human capital the poor have. However most literature in this field has focused on the education component of human capital whereas health, another significant component, is usually ignored.

Inequality

There are many and heated discussions of the impact of inequality on poverty. Theoretically, as argued by World Bank (2000a), for a given rate of growth, the decline in poverty rate depends on (i) how income distribution changes with growth (contemporaneous inequality), and on (ii) the initial level of inequality in order to develop opportunities which allow the poor to participate.

The discussion on the relationship between inequality and poverty becomes more complex as inequality can affect poverty through economic growth. Moreover the literature has established two way causalities between these two factors which is then is tested in empirical literature. Inequality has an impact on growth (Alesina and Rodrik, 1994; Deininger and Squire, 1996; Aghion, Caroli and Garcia-Penalosa, 1999 and Forbes, 2000). Whereas for the reverse causality, the argument

is based on Kuznet (1955) who predicted increases in inequality during early periods of growth and reduction in inequality during the subsequent periods, therefore producing an inverted U curve.

2.2.3.3. Public services/policies

Governance

Good governance and institutions have received increasing attention in relation to growth determinants and poverty reduction. However, the empirical literature on this issue is still very limited.

A UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific) definition of governance is the process of decision-making and the process by which decisions are implemented (or not implemented).⁹ Several characteristics of good governance have been presented. Among them, there are eight major criteria of good governance: it should be (i) participatory, (ii) consensus oriented, (iii) accountable, (iv) transparent, (v) responsive, (vi) effective and efficient, (vii) equitable and inclusive, and (viii) following the rule of law.

The link between governance and poverty was established by Kaufmann, Kraay and Zoido-Lobaton (1999).¹⁰ Their study shows that governance has a positive association with improved development outcomes as measured by income per capita in 173 countries.

Later Kaufmann and Kraay (2002) updated their governance indicators following an empirical study on the role of governance in Latin American and Caribbean countries. Their results suggest that:

- (i) better governance tends increase per capita income;

⁹ <http://www.unescap.org/huset/gg/governance.htm>

¹⁰ They build six basic concepts of good governance using 300 indicators of governance including the existence of violence and accountability, political instability and violence, government effectiveness, regulatory burden, rule of law and graft.

- (ii) however, higher income leads to reduction in governance capacity because corruption interferes with the expected relationship between economic growth and better governance.

In relation to governance, corruption has to be recognised as an important factor that has an impact on poverty level through two main conduits; the economic channel and the governance channel. Corruption alone does not produce poverty but it has a direct effect on economic growth and governance factors that then subsequently produce poverty (Chetwynd, Chetwynd and Spector, 2003).

Through the economic channel, corruption reduces investment, lowers government revenues, distorts markets, hurts competition, brings inefficiencies, and creates high costs of doing business, which then reduce growth and contribute to higher income inequalities, and accordingly has an impact on poverty (Tanzi and Davoodi, 1997; Mauro, 2002).

The governance model proposes that corruption reduces governance capacity by, for example, reducing the capacity of government to provide good quality public services and lowering the compliance with safety and health regulation. Reduced governance capacity then increases poverty (Kaufmann, Kraay and Zoido-Lobaton, 1999).

Sumarto, Suryahadi and Arifianto (2003) provided evidence for Indonesia, that there is a negative impact of bad governance on the poor. Both bivariate and multivariate analysis (with two dummy variables for conducive and very conducive bureaucratic culture) found that regions with good governance experienced faster poverty reduction and vice versa. Districts/cities that have conducive bureaucratic culture will reduce the poverty rates at rates 6.5% higher than the base category, which is less conducive bureaucratic culture.

Fiscal decentralisation

Over the past decade there has been increasing concern about decentralisation, especially for developing countries. Decentralisation means transfer of political,

fiscal and administrative powers to lower units of government (World Bank, 1999).

While the literature still focuses much on the link between decentralisation and economic growth, in their conceptual framework von Braun and Grote (2000) argued that there are two approaches through which decentralisation can be seen to impact on poverty. The first approach is from the political economy perspective in which decentralisation is linked very closely with the 'empowerment' strategy, as is discussed in World Bank (2000a). The second approach is from the economic management perspective in which decentralisation can help to provide a certain standard of public services, for example by targeting and by increasing efficiency. von Braun and Grote (2000) claimed these two channels are independent, although actually they overlap.

Empirically, there are still only few studies on the impact of decentralisation on growth or poverty. Davoodi and Zou (1998) are among the few researchers who investigated the link between decentralisation and growth empirically and they found a negative relationship between fiscal decentralisation and growth in developing countries but not in developed countries.

2.2.3.4. Stabilisation policies - macroeconomic policies

The macroeconomic framework can be described as stable when inflation is low and predictable, interest rates are also low, fiscal policy is stable and sustainable, the real exchange rate is competitive and predictable, and the balance of payments situation is perceived as viable (World Bank, 1990).

Easterly and Fischer (2001) found that high inflation is directly and negatively associated with income of the poor. When there is inflation, the poor cannot protect the real value of their incomes and assets (as poor people tend to hold most of their financial assets in the form of cash rather than in interest bearing assets).¹¹

¹¹ However, inflation also affects the non-poor through their wages that are more likely to be fixed in nominal terms.

Monetary and exchange rate policies can affect the poor primarily through three channels which are inflation, output and the real exchange rate, as discussed below:

- (i) Inflation, as previously discussed, affects the poor.
- (ii) Changes in the money supply have a short run effect on real variables such as the real interest rate, which in turn will affect output.
- (iii) The real exchange rate can affect the poor in two ways: direct impact, such as in the case of devaluation and indirect impact, by influencing a country's external competitiveness and, consequently, the growth rate.

2.2.4. Lessons from the Cross Country Literature

In the cross country literature, there is an attempt to connect poverty reduction to determinants of pro-poor growth. It is necessary in reading this literature to pay attention to several points of contention.

First, most cross country literature puts more emphasis on discussing the growth elasticity of poverty and what factors make growth more pro-poor, rather than discussing the direct channel through which the determinants may impact on poverty. Second, caution is needed in interpreting the growth elasticity of poverty since the number given is an aggregate number which really depends on its measurement, sample and the time period used. Third, the cross country literature is also often negligent in incorporating a time series framework which is relevant for any discussion of development episodes.

Consequently, Kraay (2004) proposes that more micro level and case studies of individual countries over time may be useful in shedding light on the determinants of poverty reduction, by paying increased attention to the other ways that those pro-poor variables may affect poverty directly.

2.3. Single Country Literature

By following a similar framework to that of the cross country literature and by focusing on pro-poor growth, the single country literature confirms that economic

growth is a necessary but not a sufficient condition for poverty reduction. Others determinants are also significant.

The biggest advantage of the single country literature over cross country literature is that the growth elasticity of poverty and the role of other determinants of poverty reduction are country specific. These characteristics contribute to gaining more understanding of different countries' experiences and strategies which all lead to a similar outcome: pro-poor growth and poverty reduction.

The cross country framework can be easily adapted to an interregional framework within a single country. Nevertheless, there are several points that are important to be taken into account, especially if the determinants of poverty are decomposed into different regional impacts and particularly for those determinants which are related to economic strategy and policies. First, it is assumed that the national macroeconomic policy is given. Nevertheless, although the national macroeconomic policy is uniform for the whole country, the impacts can vary for different regions within a single country. For example, erratic monetary policy would adversely affect a region with a large financial sector. Second, there are other specific regional policies which are expected to provide a variety of responses from the regions. Third, there are variables which are important for a single country poverty analysis but not commonly discussed in cross country poverty analysis, such as the provision of physical infrastructure.

It is expected that a more detailed analysis of determinants of poverty will emerge by using single country literature. In the single country literature, the focus might be on regions which are considered as more open with higher interregional factor mobility especially labour, higher dependence on exogenous factors (related to geographical attributes) and lower trade barriers (Weiss, 2003).

2.3.1. Public services/ policies (Infrastructure)

The simplest measure of infrastructure is paved road length which measures physical infrastructure (Hill, 2000; Yao, 2003; Kwon, 2006; Warr, 2006).¹² The

¹² Other measures of infrastructure are in terms of investment or expenditure.

importance of infrastructure as one determinant of poverty is apparent in the single country study. This view is also supported by Jalan and Ravallion (2002) who found that geographic capital (in which one element of it, is infrastructure) can explain a significant proportion of household consumption in the poor areas in rural China.

The poor are usually concentrated in remote areas where they lack access to markets. Furthermore, inadequate infrastructure also prohibits the poor from taking advantage of opportunities created by the growth process (Yao, 2003; Kwon, 2006).

2.3.2. Experience of Selected Countries

Some of the key papers on country studies are presented below.

2.3.2.1. India

Ravallion and Datt, in a series of papers (1996, 1999, 2002), analysed the determinants of absolute poverty in India. In their most recent paper (2002), they estimated various measures of absolute consumption for poverty (headcount index, poverty gap index, and squared poverty gap index) for each of India's main states (urban and rural) using 20 rounds of National Sample Survey (NSS) spanning the period 1960-1961 to 1993-1994.

There are a number of conclusions that can be reached on the basis of their papers:

1. The growth elasticity of poverty (in absolute terms) ranged from a low of 0.26 in Bihar to a high of 1.08 in Kerala and 1.24 in West Bengal.
2. The role of other determinants, which were higher farm yields and higher development spending, decreased the three poverty measures, while inflation was poverty increasing. However, the elasticities of measured poverty to farm yields and development spending did not differ significantly across states.
3. When initial conditions were incorporated into the model, the long run differences between states' poverty reduction rates were mostly explained by differences in initial conditions.¹³ Non-farm growth was

¹³ Initial condition variables are the initial poverty rate, female literacy, urbanisation, urban-rural mean consumption ratio, landlessness (percentage rural households), the infant mortality rate, agricultural output per hectare, and non-farm product per person (Ravallion and Datt, 2002).

more pro-poor in states with higher initial rural development and human resources (higher initial farm yields, female literacy rates, lower infant mortality, lower urban-rural disparities, and lower initial landlessness). For example, almost 67 percent of the difference in growth of elasticity of poverty between Bihar and Kerala was attributed to higher initial human capital.

4. Aggregate poverty measures respond more to rural economic growth. This finding is also confirmed by the composition of sectoral growth. Sectoral growth, especially agricultural growth, as in the cross country literature, was significant for poverty reduction in India.
5. Furthermore, the sectoral composition of growth was clearly more important to poverty reduction with poor initial conditions.

2.3.2.2. Thailand

Deolalikar (2002) used five household surveys of the Thai Socioeconomic Survey (1992, 1994, 1996, 1998 and 1999) to estimate the relationship between economic growth, the poverty headcount ratio, and income inequality at the provincial level. He also included selected demographic variables as control variables (household size, proportion of children age 0-15 years in the population, and proportion of elderly aged 60 years and over) and socioeconomic variables (e.g. average schooling of adults, proportion of population residing in female-headed households, and proportion of population that is urban).

The main contribution of this paper is that Deolalikar took account of inequality which worked through two channels: (i) inequality increases poverty, after controlling for economic growth, where growth and inequality independently influence poverty; and (ii) high levels of inequality reduce future growth rates.

When growth and inequality were independently tested for influence on poverty, Deolalikar (2002) found that 'level' regression produced a growth elasticity of poverty of -2.2; a one percent increase in mean per capita income was associated with more than a two percent decrease in the percentage of population that was poor. However, the distributional elasticity of poverty was 3.2, which means that a one per cent increase in gini inequality was associated with more than a three per

cent increase in the percentage of population that was poor. However, Ordinary Least Squares (OLS) level regression has a weakness in that there is no control for unobserved provincial heterogeneity, but Fixed Effect panel data regressions can be used to address this problem. The two stage least squares (2SLS) fixed effects estimate of growth elasticity of poverty was -2.1 while the Gini elasticity of poverty was slightly smaller (3). These estimates did not significantly change when other control variables were incorporated to the regression.

When growth and inequality jointly influence poverty, initial inequality reduces the growth effect on poverty. In fact, the initial level of the Gini coefficient was associated with a 0.5 per cent decline in the subsequent growth in real income per capita.

Analysis of other determinants showed that (i) human capital (education) reduced poverty through growth; (ii) the age composition of the population in which the population share of the 15 years and below was significantly associated with higher poverty and the share of the elderly associated with lower poverty; and (iii) a female household head is positively associated with poverty (that is the more female household heads, the more poverty).

2.3.2.3. The Philippines

Balisacan and Pernia (2002) focused on the importance of the initial condition for the Philippines. Accessing panel data for the Philippines spanning the 1980s and 1990s, they included as initial conditions specific human capital endowment, farm and land characteristics, social capital, geographic attributes, and political economy characteristics by provinces.¹⁴ Using the relative measure of poverty (income of the bottom 20 per cent of the population), they found that the growth elasticity of poverty was only slightly higher than 0.5. Interestingly, all initial condition variables except human capital endowment and farm size were significant.

¹⁴ Geographic attributes capture geographic "poverty traps", which are represented by a dummy, such as whether a province is landlocked and the average frequency of typhoons experienced by the province.

This article is different from other single country studies as it considered governance as a determinant of growth and income of the poor. Governance is proxied by two variables: (i) local political dynasty which is the percentage of local government officials who are related to each other either by blood or affinity to the total number of elective positions, as a measure to capture the degree of collusion; and (ii) with a dummy, whether the governors of the provinces are of the President's political party. The local political dynasty had a significant negative direct link to the income of the poor; it was lower in provinces where the government has a political dynasty. However, political party affiliation had a significant positive direct effect on the income of the poor, which meant that a poverty alleviation strategy worked better if the local government was from the same party as the President.

Certain other time varying policy variables are also included: agricultural terms of trade, electricity access (the proportion of households with electricity), road density, and Comprehensive Agrarian Reform Program (CARP) implementation. All these variables, except for electricity, are found to be significant.

Another important finding is the specification by Balisacan and Pernia (2002) of the importance of complementarity of variables in reducing poverty, that is the interactive power. Interestingly, in this paper, human capital endowment, measured by average years of schooling of household heads, was not significant. However, when schooling was interacted with a road variable, which was the proxy for the ease of access to markets and social services, the coefficient was positive and significant in all specifications. This finding provides further evidence that the returns from schooling depend on other variables.

In their most current paper, Balisacan and Fuwa (2004) followed the cross country literature on pro-poor growth determinants very closely. They built a poverty determinants model in a similar way to the growth determinants model of provinces in the Philippines between 1988 and 1997. Similar to Balisacan and Pernia (2002), Balisacan and Fuwa (2004) especially focused on initial conditions which are proxied by (a) initial poverty incidence; (b) initial human capital stock (mortality rate per 1000 children age 0-5, adult literacy rate, and the average years

of schooling of household head); (c) proportion of irrigated farm area to total farm area; and (d) the Gini ratio of farm distribution which is considered the better measure of inequality.

This paper followed the previous approach of Balisacan and Pernia (2002) by also including political characteristics, which represent governance, and several time varying policy variables which indicate the difference between 1988 and 1997 and which include agricultural terms of trade, electricity access (the proportion of households with electricity), road density, and Comprehensive Agrarian Reform Program (CARP) implementation.¹⁵ Nevertheless, Balisacan and Fuwa (2004) developed a different econometric method to that used in Balisacan and Pernia (2002).

Their main conclusion was that they found the growth elasticity of poverty reduction in the Philippines was around - 1.63 based on the poverty headcount index, that is, smaller than in Thailand. Interestingly, the initial inequality of land was significantly positive in affecting growth. This was attributed to the difference in productivity between small and large farms in the Philippines in the 1990s. For example, large farms produced higher rice yields which might also be related to the fact that these farmers used pump irrigation. However, this difference might be a short term phenomenon, since there was also a positive correlation between CARP and growth where the reforms worked through direct income effects; land reform redistributed income from landowners to tenants who then invested their income in non-agricultural activities such as education.

In contrast to the findings in Balisacan and Pernia (2002), Balisacan and Fuwa (2004) only traced an indirect impact of political dynasty to poverty through economic growth; bad governance produced inefficiency and subsequently reduced growth.

When growth composition was used, the share of agricultural income was associated with higher growth elasticities, which was consistent with the findings

¹⁵ Ravallion and Datt (2002) have also included several time varying policies such as inflation and government spending (although they do not mention them explicitly).

of Ravallion and Datt (1996). Balisacan and Fuwa (2004) suggest the weak labour absorptive capacity of the industrial sector growth as the reason for the larger effects of agricultural sector growth.

In terms of policy, those which reduce the child mortality rate and expand the coverage of the Comprehensive Agrarian Reform Program (CARP) are effective in both enhancing growth and reducing poverty, while policy reform to eliminate price distortions that depress the relative price of agricultural products (for instance, trade policies protecting industrial growth) also work directly to alleviate poverty.

In a more limited study, Pernia and Quising (2003) focused on the importance of openness and poverty reduction in the Philippines. Since their inclusion of other variables was limited, they found a very low growth elasticity of poverty (0.2) when using the income of the bottom 20 per cent of population as the poverty measure.

Their empirical results also show that openness was good for poverty reduction at a regional level. However, as predicted, the influence did not seem to be direct. Trade openness indirectly benefited the poor through regional economic growth. Also consistent with the cross country literature, they found that trade was good for growth and then subsequently for poverty alleviation.

Pernia and Quising (2003) also specified the importance of dummy variables for primacy to capture the advantage of Metro Manila, as the national capital, over other regions.

2.3.2.4. China

Weiss (2003) examined poverty in China across time and provinces. Using provincial rural poverty estimates from the State Statistical Bureau for the period 1988-1996, he found the growth (growth of grain crops) elasticity of poverty was 1.3. It was lower in the Western provinces (0.8) than the rest of the country (1.5). The low elasticity in these provinces was because in the West there are pockets of rural poverty. He found that specific characteristics of the Western provinces

(topography, education levels, infrastructure, etc) contributed to a lower impact of economic variables, such as the lower impact of grain production on poverty reduction.

Weiss (2003) also tried to analyse the effect of agricultural growth, proxied by an index of grain production per province in volume terms. He found that this variable was a significant factor in rural poverty reduction.

Other key determinants included terms of trade for farmers, agricultural procurement, the price index (to measure the direct income effect of higher producer prices), provincial infrastructure, human capital, and the effect of geography (proxied by the proportion of mountainous counties in total counties in each province).

One significant point in this paper is that he suggested the need to incorporate labour mobility (migration) to avoid bias in estimating growth elasticity of poverty, although he himself could not do this since he could not get information on inter-provincial migration. A rise in income in province K may induce migration from L to K and could have an impact on poverty in L, independent of L's income, although migration to L has been picked up by income per capita of L. This migration effect to reduce poverty in the sending region, with an impact of growth in the destination region, could not be captured. Any general impact of macro economic conditions that promote inter-regional migration is captured by time period constants. This gap in the data is considered by Weiss (2003) as a source of bias.

However, Weiss' (2003) argument had one limitation. The above conjecture is only valid on the assumption that the persons who migrate are poor, whereas evidence from developing countries shows that the persons who migrate are often the better-off (Hugo, 1982). It is, therefore, proposed that labour mobility (migration) be incorporated in this research by building a link between migration and growth and then to poverty reduction, as will be discussed below later on in Chapter Seven.

An earlier study by Fan, Zhang and Zhang (2002) investigated the effects of government expenditure on rural poverty in China. Using provincial level data spanning 1970 to 1997, their study developed a simultaneous equations model to estimate the effects of various government expenditures on growth, regional inequality, and rural poverty in China. Their results showed that government expenditure on education had the largest impact on poverty reduction.

Fan, Zhang and Zhang (2002) also emphasised the important role of infrastructure. The existence of better infrastructure in regions lowered transaction costs and gave the people easier access to assets or capital. Infrastructure here included roads, electricity, and irrigation. Where the location was distant from the commercial centre, the existence of roads and good communications played an important role in stimulating economic activity and providing better access to schools, hospitals or other public services. Promoting infrastructure was thus found to be important for growth and then poverty alleviation.

2.3.2.5. Bangladesh

Similar to the work of Deolalikar (2002), Wodon (2002) particularly concentrated on the relationship between growth, poverty and inequality in Bangladesh. He constructed a regional panel data for fourteen geographic areas in Bangladesh with data for five points in time between 1983 and 1996.

Constructing a lower and upper poverty line, he found that for the lower poverty line the growth elasticity of poverty was - 2.4 for fixed effects estimator and - 2.6 for random effects estimator, while the Gini elasticity was 1.3 and 1.4 respectively.

In contrast by using an upper poverty line, he found a lower growth and a lower Gini elasticity of poverty, which were 1.43-1.63 for growth elasticity and 0.52-0.53 for the Gini elasticity. This means that the effect of a change in Gini was larger on higher order poverty measures, so when inequality increased then more of the poorest of the poor were also affected, and not only those close to the poverty line.

2.3.2.6. Vietnam

Using similar methodology for Vietnam to that of Balisacan and Pernia (2002) for their Philippines study, Balisacan, Pernia and Estrada (2003) found a high growth elasticity of poverty of 1.37 (used a relative poverty measure). This was higher than found in Balisacan, Pernia and Asra (2003) of 0.7 for Indonesia 1993-1999, 0.5 for the Philippines (Balisacan and Pernia, 2002) and also higher than found by Dollar and Kraay (2002) in cross country literature. This finding confirmed that growth was an important determinant of poverty reduction in Vietnam.

Other determinants, such as human capital (schooling) and interaction effects between growth and regional classification, were not statistically significant, except for South Central Coast and Mekong Delta.

Demographic factors did show significant effects: age of the household head had a positive and significant effect on the income of the bottom 20 per cent income whereas male-headed households had a positive relationship with average income of the poor. This is contrast with the female-headed households in Thailand which had a positive relationship with poverty headcount index (Deolalikar, 2002). However, the impacts of household size and number of dependents were negative.

2.3.3. The Indonesian Experience

As set out in Table 2.1 for a summary, the published work on regional poverty in Indonesia was pioneered by Bidani and Ravallion (1993), who found that regional differences in poverty are explained by mean consumption (representing income) and the Gini index (representing inequality). Mean consumption had a negative relationship with poverty but the Gini index contributed positively to poverty. However, their research was limited to income and inequality without consideration of other factors.

Friedman (2005), using an almost similar framework to that of Bidani and Ravallion (1993), investigated the relationship between provincial poverty and provincial changes in inequality. His advantage over the earlier study by Bidani and Ravallion is that he extended the period of analysis using six National Socioeconomic Surveys, from 1984 to 1999, to find that poverty change was highly responsive to overall growth. Friedman used panel data estimation and

found that growth had an estimated elasticity of between -2.6 and - 3.1 which depends on the poverty line used. These findings were higher to those Deolalikar (2002) found for Thailand.

Table 2.1. Previous Empirical Work on Regional Poverty in Indonesia

Authors	Level	Source of Data and Year	Results
Bidani and Ravallion (1993)	Province	National Socioeconomic Survey 1990	Poverty is explained by mean consumption and inequality
Friedman (2001, 2005)	Province	National Socioeconomic Survey 1984, 1987, 1990, 1993, 1996, 1999	Poverty is explained by mean income growth and inequality
Balisacan, Pernia and Asra (2003)	District/ kabupaten	National Socioeconomic Survey 1993, 1996, 1999	Welfare of the poor is directly influenced by mean income growth, agricultural price incentives, and access to technology. In addition, welfare of the poor is indirectly influenced by human capital, roads, and oil and gas through their positive effects on economic growth
Miranti and Resosudarmo (2005)	Province	Various CBS publications 1993, 1994, 1995 and 1996	Poverty is explained by economic growth and inequality

Source: Author's compilation

However, although Friedman (2001) specified the important role of spatial factors, he did not extend his discussion to explaining what these factors were. He also did not explain why there were disparities on growth elasticity across islands in Indonesia.

Nevertheless, he did specify that these regional differences in poverty could be analysed with the inclusion of further provincial information, such as economic activity and market integration.

The most comprehensive work on poverty determinants in Indonesia is found in Balisacan, Pernia and Asra (2003) who constructed a panel data from the 1993, 1996 and 1999 National Socioeconomic Surveys for the country's 285 districts (*kotamadya/kabupaten*). They used panel data estimation to identify the impact of growth (using overall average per capita income as the proxy) on the welfare of the poor (using the mean per capita expenditure of the poorest 20 per cent) exclusively, and then they proceeded to estimate the determinants of the welfare of the poor

In terms of approach, Balisacan, Pernia and Asra (2003) extended the work of Friedman (2001, 2005) by including specific factors for the regions.¹⁶ Unlike Friedman (2005), Balisacan, Pernia and Asra (2003) used district level data. Instead of using only a direct approach to poverty, as in Balisacan and Pernia (2002) for the Philippines, and Balisacan, Pernia and Estrada (2003) for Vietnam, here Balisacan, Pernia and Asra (2003) clarified direct and indirect channels to poverty through economic growth.

Their main conclusion is that the growth elasticity of income of the poor was on average only 0.7 (in absolute terms), suggesting the relationship between income growth and poverty reduction is weak but still positive. The evidence of other determinants was as follows. The effect of human capital was mixed. When the proxy used was mean years of schooling, the effect of human capital was not significant. However, when the proxy used was adult literacy, it was significant only for growth, confirming that human capital worked indirectly on poverty reduction through economic growth, as was found in the cross country literature. Along with human capital, the roads variable, which represents infrastructure, and oil and gas, which represent the natural resources variable, worked via a growth effect. As in the Philippines, price incentives (the proxy was a terms of trade variable) did directly influence the welfare of the poor. Access to technology was also directly significant for the welfare of the poor.

¹⁶ For example, Balisacan, Pernia and Asra (2003) are the first who have included a natural resources variable, as proxied by oil and gas, while none of the other studies of single countries do that.

Miranti and Resosudarmo (2005) followed Friedman (2001, 2005) and Balisacan, Pernia and Asra (2003) by also analysing what are the determinants of regional poverty in the provincial level. They categorised the determinants into (i) structure of the economy (provincial role of agriculture and mining sectors); (ii) structure of the society (population, levels of education, dependency ratio and income inequality) and (iii) quality of public services (the level of financial decentralisation). Miranti and Resosudarmo (2005) modified Balisacan, Pernia and Asra (2003) framework by also specifying direct and indirect channels through economic growth, with absolute FGT poverty measures as the dependent variables. They found that mining sector and human capital are not significant in explaining poverty in all specifications, to support Balisacan, Pernia and Asra (2003). Miranti and Resosudarmo (2005) concluded that at least in the case of P0, the effects of these variables have been captured by the provincial economic growth.

Apart from the work in regional poverty, Suryahadi, Suryadarma and Sumarto (2006) investigated the relationship of sectoral growth to national poverty in urban and rural Indonesia for the years 1984-1999 using Gross Domestic Product (GDP) measures. Their findings suggested that agricultural growth had more potential as a factor in reducing poverty in the rural sector where most poor are located (with a low growth elasticity of -0.09). They also found that the impact of urban and rural services growth reduced poverty.

Summing up, these four studies all support the conclusions of the general growth-poverty literature that growth contributes to poverty reduction. Different results are a function of different methodologies, econometric techniques, and different time periods. However, the finding that growth was pro-poor nationally but not always regionally (Friedman, 2005) indicated that the impact of economic growth varies across regions. These findings have provided a stimulus for the approach taken in this study.

2.3.4. Lessons from Single Country Literature

At least five important lessons can be derived from the single country literature:

First, similar to findings in the cross country literature, the single country literature affirms that growth is necessary for poverty reduction but the growth elasticity of poverty varies across countries and within countries. The growth elasticity of poverty as measured by headcount index usually ranges from around zero to around two, indicating that there are more variations found in the single country literature compared with cross country growth elasticity of poverty, which is often more than two in absolute numbers. The growth elasticity of poverty measured by income of the bottom 20 per cent of population is also less than one (0.7 for Indonesia and 0.5 for the Philippines), except in the case of Vietnam. Apart from the fact that the high elasticity of the cross country literature is really subject to the characteristics of the sample countries, the slightly lower growth elasticity of poverty in single country analysis may arise because other variables which are country (region) specific are neglected but may be also important for pro-poor growth, such as interprovincial migration and intergovernmental transfers.

Second, in terms of determinants, the literature provides evidence that other determinants still work through growth. Some researchers have tried to decompose that effect through direct and indirect channels but they fail to find a direct effect. Among those relevant variables are: (i) natural resources; (ii) initial condition including initial distribution; (iii) openness; (iv) government spending; and (v) human capital, which can also work through interaction with other variables. As also found in the cross country literature, the human capital variable tends not to be significant in explaining poverty directly.

Mixed findings resulted from looking at indirect and direct effects in relation to infrastructure (i.e. roads, electricity, and irrigation). The result depends on the kind of measurement used. Nevertheless, the usual variables which are always found directly as pro-poor are commodity's price which favors the agricultural sector (terms of trade of agricultural to non-agricultural products), inequality (not as an initial condition), and demographic variables such as household head and age composition of population. This provides evidence that only a limited number

of variables work directly on poverty reduction; most of them work indirectly through economic growth.

Third, in the cross country literature it is argued that the impact of development episodes on poverty cannot be analysed because the analysis is too aggregate. Unfortunately, it is also true in the single country literature that attention to the role of development episodes is still limited.

Fourth, there is still limited literature examining the impact of migration on poverty, although Weiss (2003) suggested the need to incorporate this variable to estimate the growth elasticity of poverty. Ignoring the presence of migration may possibly underestimate the impact of growth on poverty (de Haan, 2006). In addition, the inclusion of migration should help to explain the link between the labour markets and employment, and their links to poverty (Islam, 2004).

Fifth, it is also surprising that the empirical literature on the role of fiscal decentralisation on growth and poverty is still limited, especially on the role of intergovernmental transfers which is expected to have both direct and indirect impacts on poverty.

However, there is at least one significant finding from the single country literature that cannot be captured in cross country literature. By studying single country literature, the existence of pockets of poverty can be recognised, which identifies specific regions within a country. Such regions are usually where the growth elasticity of poverty is found the lowest, such as for Bihar in India, the Western provinces in China, and Eastern Indonesia.

2.4. Conclusions : Filling the Gaps in the Literature

To conclude, there are at least three significant gaps in the literature on the relationship between growth, other determinants, and poverty reductions. These are: (i) the role of development episodes; (ii) the role of migration; and (iii) the role of intergovernmental transfers. The objective of this thesis is to fill in these gaps.

2.4.1. The Role of Development Episodes

Each individual country or region will experience development episodes with different time varying economic characteristics and policies. These policies can be expected to vary in their influence on the poor. Policies such as openness to trade (trade liberalisation policies) and other macroeconomic policies have impacts on poverty. Consequently, the responsiveness of poverty to various determinants varies according to specific structural characteristics that can be influenced by policy. For example, as discussed earlier, Weisbrot et al. (2000) concluded that the relationship between economic growth and income of the poor could vary over time as a result of policy changes. As undertaking a single country study is necessarily a country specific exercise, it offers the advantage that development episodes can more easily be incorporated to examine their impact on poverty.

2.4.2. The Role of Migration

Openness in the region means that the mobile factors of production are able to move across regions, that people can migrate, that physical capital is easily transported, and that financial markets allow for borrowing and lending across regions (Barro and Sala-i-Martin, 1992). Moreover, while data on mobility of factors, especially labour, across countries are not easy to collect, the data on mobility across regions are more accessible.

In this study, one type of mobility factor, labour mobility or migration, is discussed in detail. Despite a proliferation of migration studies, findings especially on the impact of migration on poverty are rare. Surprisingly, migration is commonly neglected in discussions of poverty, although currently the impact of international migration, measured in terms of remittances, is more frequently discussed as a determinant of poverty reduction in the cross country literature (Adams and Page, 2003, 2005). In terms of economic growth, the literature focuses a lot on whether migration creates income convergence. This focus is also related to 'the brain drain' phenomenon which is popular in discussing international migration.

2.4.3. The Role of Intergovernmental Transfers

Intergovernmental transfers from the central government are important if revenue that is collected locally is very much lower than local expenditures (the vertical balance problem) and is distributed differently across regions (Bird, Litvack and Rao, 1995). The transfer is also intended to ensure that even the poor localities can provide the basic packages for the poor (Rao, Bird and Litvack, 1998). Intergovernmental transfers, as an important element of decentralisation, are also expected to improve efficiency in public expenditure.

Chapter Three

General Empirical Methodology and Approach

3.1. Introduction

This chapter describes the general methodology and approach taken in the empirical chapters of this thesis. There are four empirical chapters, Chapters Four to Seven, which start with two chapters on growth elasticity on poverty.

As discussed in Chapter Two, the determinants of poverty can work through two channels: (i) the direct links between these determinants and poverty which affect the welfare of the poor directly, and (ii) the indirect channel in which the determinants affect poverty indirectly through increasing output or growth affecting everyone in the country and then flowing to poverty reduction. Therefore, econometric estimations are needed to capture these direct and indirect channels.

Therefore in this thesis there are (i) poverty estimations with their variants (Chapters Four to Seven), and (ii) growth estimations which are supplementary to the poverty estimations (Chapters Six and Seven). The Fixed Effects estimation is applied to estimate the impact of the direct channel on poverty, whereas the Generalized Method of Moments estimation is applied to estimate the indirect channel through growth. Although the focus here is on an analysis of determinants of regional poverty in Indonesia, the issue of measurement of a poverty line is beyond the scope of this thesis. It is also important to refer to specific chapters for data and measurement and for details of the methodology and approach employed.

The remainder of this chapter is organised as follows. Section two presents information on definition and measurement of absolute poverty. Section three discusses issues in measurement of income. Section four presents models of poverty. Section five presents the empirical econometric estimation. And finally, section six presents the specific methodology and approach for each chapter.

3.2. Definition and Measurement of Absolute Poverty

There are three absolute poverty measures used in this chapter which have been identified by Foster-Greer-Thorbecke (FGT) (Foster, Greer and Thorbecke, 1984).

- P0 or the *headcount index or incidence of poverty*, which is the fraction of poor people in the total population in a province in a certain year. A person is poor when consumption is below a certain threshold, referred to as the poverty line. In defining this poverty line, Central Board of Statistics of Indonesia (CBS) adopted the basic need approach, i.e. 2,100 calories per person per day plus a given share for non food requirements. The formula to calculate the headcount index (P0) is as follows (Deaton, 1997).

$$P0 = \frac{1}{N} \sum_{i=1}^N f(y_i \leq z) \quad (3.1)$$

Where :

$f(.)$ = an indicator function, that is 1 if $y_i \leq z$ and 0 if $y_i > z$

N = total population

z = poverty line

y_i = income (consumption or expenditure) of person i ¹

i = person

This index ignores differences amongst the poor (for example, defining extreme poverty amongst the poor), as it assumes all poor are in the same situation.

- P1 or *poverty gap index*, which is the mean distance of individual income below the poverty line in a province in a certain year expressed as a proportion of the poverty line and is derived from the entire population, counting non-poor as having a zero distance. See the following formula:

$$P1 = \frac{1}{N} \sum_{i=1}^N \left(\frac{z - y_i}{z} \right) f(y_i \leq z) \quad (3.2)$$

Or equation (3.2) can be rewritten as

¹ Consumption or expenditure is used interchangeably.

$$P1 = \frac{1}{N} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right) \quad (3.3)$$

Where in addition to the previous notations,

q is the poor person with the highest income or consumption per capita (this is when income (consumption) per capita of the population has been ranked from the lowest to the highest, and a person is categorised poor if $y_i \leq z$).

Therefore q also refers to the total number of the poor in the population.

The relationship between $P0$ and $P1$ is calculated as follows:

Equation 3.3 is multiplied by $\frac{q}{q}$, to get

$$P1 = \frac{1}{N} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right) * \frac{q}{q} \quad (3.4)$$

rearranging equation (3.4)

$$P1 = \frac{q}{N} \frac{1}{q} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right) \quad (3.5)$$

or,

$$P1 = \frac{q}{N} \frac{1}{q} \left(\frac{zq - \sum_{i=1}^q y_i}{z} \right) \quad (3.6)$$

then finally,

$$P1 = \frac{q}{N} \left[\frac{z - \frac{1}{q} \sum_{i=1}^q y_i}{z} \right] = \frac{q}{N} \left[\frac{z - y_q}{z} \right] = P0 * I \quad (3.7)$$

Where $I = \frac{z - y_q}{z}$ and $y_q = \frac{1}{q} \sum_{i=1}^q y_i$

I is an income (consumption) gap ratio which is the difference between the poverty line (z) and average income (consumption) of poor (y_q), expressed as a proportion of the poverty line. For example, an income gap ratio of 10% means the average income or consumption of the poor is 90%

of the poverty line. If the headcount ratio is 20%, then the P1 is 2%.

- P2 or *squared poverty gap* or *poverty severity index*. This measurement takes into account not only how far the poor are from the poverty line but also considers inequality amongst them by giving greater weight to those furthest from the poverty line in a province in a certain year, as can be seen from the following formula,

$$P2 = \frac{1}{N} \sum_{i=1}^N \left(\frac{z - y_i}{z} \right)^2 f(y_i \leq z) \quad (3.8)$$

This measure is sensitive to distribution changes amongst the poor (Adams, 2004) or standard deviation of consumptions of the poor (Ravallion, 1995). Therefore, while transfer from a poor person to relatively poorer person will change the P2 measure, it is possible that this will not change the headcount index.

In contrast to Friedman (2005) who applied the methodology of Bidani and Ravallion (1993) and Ravallion (1994) in constructing their poverty lines, this thesis applied the current CBS methodology (CBS, 2003). CBS claim that their current methodology is more comparable and consistent across time than previously, as discussed in detail in Appendix 3.A. As CBS is the official institution publishing annual poverty figures for Indonesia, their current methodology is used for this thesis and also to recalculate back poverty incidence to 1984.

The poverty measure is calculated using the National Socioeconomic Survey (*Survei Sosial Ekonomi Nasional* or *SUSENAS*) Consumption Modules published every three years.² This study covers the period 1984-2002, which utilises the 1984, 1987, 1990, 1993, 1996, 1999 and 2002 consumption modules (seven waves). The data cover 26 provinces. For simplicity and data completeness, four

² The National Socioeconomic Survey data are categorised into core and module components. Prior to 1992, the core components initially only included demographic variables and educational characteristics. However since 1992, the new core contains some other basic information needed to generate yearly welfare indicators. The periodicity of a module is normally three years and it covers some additional specific topic (modules) such as the consumption module.

new provinces - Bangka Belitung, Banten, Gorontalo and North Maluku - which appear in the National Socioeconomic Survey 2002 as a result of decentralisation, have been combined back to their former provinces of South Sumatra, West Java, North Sulawesi and Maluku. Accordingly the estimation is based on the provincial level as a unit of analysis covering 1984-2002.

The consumption module of the National Socioeconomic Survey collects data on more than 300 items (quantities and values) for a representative household in all provinces in Indonesia. The sample size covers approximately 65,000 households for every three years (since the 1981 consumption module).

3.3. Measurement of Income

3.3.1. Proxies and Sources of Data

As discussed by Adams (2004), the most traditional empirical estimations of the growth elasticity of poverty use mean consumption from household surveys as a proxy for income. Nevertheless, most policymakers think of economic growth more in terms of Gross Domestic Product (GDP) from national accounts or Regional Gross Domestic Product (RGDP) from regional accounts.

It is common that growth recorded by the national or regional accounts diverges from growth taken from household surveys. As discussed in Deaton (2001), Karshenas (2003), Ravallion (2003), Adams (2004), and Ram (2006), the difference in growth is driven mainly by the difference in the level of income/consumption between these two sources, for the following reasons:

a) Different concepts and accounting methods

National income and household consumption accounting are based on different methods. The measurement of average consumption is based on the consumption of both cash and the imputed value of stock reported from household interviews, whereas the national accounts indicate total aggregate output, which includes private consumption. Private consumption from the national or regional accounts is not the same as household consumption as reported by household surveys. It is a residual

which also includes other institutional spending (unincorporated business and non profit organisations) which is not necessarily relevant for identifying either the poor households or the average households. As a residual, it is possible that any errors and omissions elsewhere are included in the private consumption figure.

b) Measurement errors

The household survey is typically underestimated for the rich, although the bias is greater for income rather than consumption. On the other hand, income from GDP or RGDP is not free from measurement errors. Errors in the national or regional accounts come from the measurement of illegal, informal, and household based outputs which are problematic.³

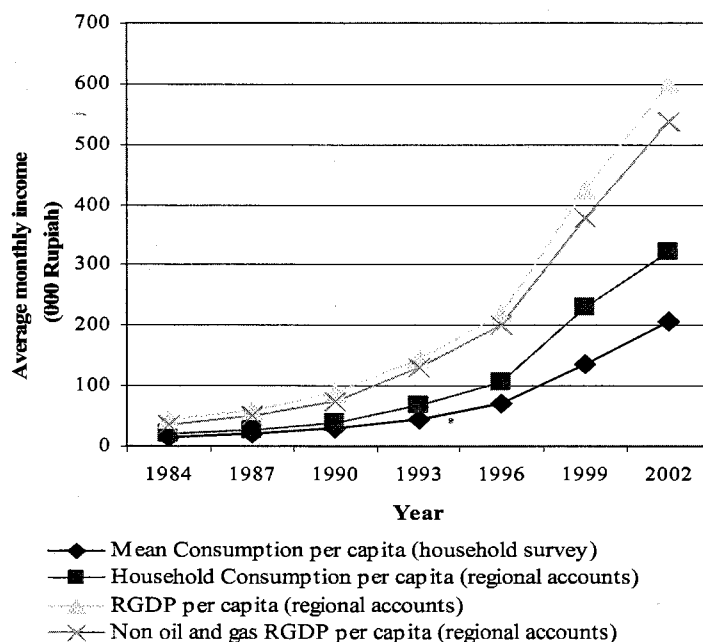
Figure 3.1 shows the average monthly income (consumption) per capita in nominal Rupiah price based on both data sources. It shows that the income per capita from the regional accounts is commonly higher than the mean consumption per capita from household surveys, which is not surprising due to its broader coverage.⁴ The trend also shows that mean consumption per capita also rose more quickly than others due to several reasons: (i) the incomes of the rich rose more quickly than incomes of the average household, (ii) errors and omissions have increased over time, and (iii) greater formalisation of the economy.

Which proxy is more appropriate in estimating the growth elasticity of poverty (GEP)? Adams (2004) found that the growth elasticity of poverty is sensitive to the measure of income use, and some researchers have criticised growth measured by national or regional accounts. Deaton (2001) tried to reconcile both measures, and argued that economic growth measured by the national accounts has at best a weak relationship with poverty, since they simply measure different things.

³ However, when the economy develops, these informal activities are increasingly formalised and then lead to bias the estimate of GDP from the national accounts.

⁴ These are Regional Gross Domestic Product (RGDP) per capita and Non oil and gas Regional Gross Domestic Product (NRGDP) per capita from regional accounts. NRGDP per capita is a better reflection of income of the population than RGDP per capita since, although some of the provinces have a high share of oil and gas in their RGDP. Prior to decentralisation a large share of

Figure 3.1. Average Monthly Income (Consumption) Per Capita of Various Indicators (Nominal Rupiah)⁵



Furthermore, it can be argued that using an income proxy (as the independent variable) from the regional accounts is less appropriate than mean consumption per capita, since it introduces a new error in matching the household survey data used to measure poverty (as the dependent variable) in addition to the existing errors in the regional accounts (Ravallion and Chen, 1997), and these two types of errors in the household survey and the regional accounts are not cancelled out (Ravallion, 2003).

Ravallion (2003) found that, in general, the growth rate of private consumption of GDP (which has a similar trend to growth in total GDP) only explained half of the growth in the mean household survey. He divided the growth episodes into

oil and gas receipts was retained by the central government.

⁵ For Indonesia, fortunately, there is a specific breakdown of household consumption per capita as a component of the regional accounts decomposition by consumption. There are separate sections on consumption of private business and non profit organisation, whereas the residual is absorbed in a section called 'change in stock'. However, differences in magnitude and growth between household consumption per capita from the regional accounts and mean consumption per capita from the household survey still hold.

periods of expansion and contraction. Thus, despite the differences in terms of magnitude, while the statistical test shows that the growth rate in consumption from the national accounts is an unbiased predictor of household survey consumption growth for expansion periods, it is not for periods of contraction. Taking into account these considerations, this thesis estimates the growth elasticity of poverty based on mean consumption per capita as the independent variable.

Compared to income, mean consumption per capita from household surveys is suggested to be more suitable as a reflection of welfare (Ravallion, 1995) as it is a better indication of 'life-cycle' or permanent income. Current consumption is a good approximation of permanent income as (i) the collected data on consumption is more accurate than income data, since there is a possibility that people hide their actual income (Ravallion, 2001), and (ii) it is less variable than measured income (Deaton 1997). Based on the previous argument, the general literature and previous literature on Indonesia have tended to chose mean consumption from household surveys.⁶

3.3.2. Choosing a Deflator

The next crucial decision in analysis of time series data is to select a deflator for mean consumption per capita. The deflator used in calculating the real mean consumption per capita is the implicit deflator of the weighted average of the urban and rural poverty line. Tarp et al. (2002) argued that the poverty line can serve as a deflator which converts the nominal value of welfare into real terms and establishes the comparability of the welfare measure across the population. In general, the poverty line deflator is chosen, following Friedman (2001) and Grimm and Gunther (2006). Instead of using the total poverty line, Friedman (2001) used the food poverty line as a deflator. However, while the food poverty line adequately represents the total number of calories in a specified basket of goods, the total poverty line has been chosen as the deflator for this thesis, in line

⁶ See Ravallion (1995, 2001); Ravallion and Chen (1997); Meng, Gregory and Wang (2005) (general literature) ; and Bidani and Ravallion (1993); Friedman (2001, 2005); Balisacan, Pernia and Asra (2003) (literature on Indonesia).

with Grimm and Gunter (2006), to guarantee the consistency of the price deflator of the poverty line and household consumption.

The poverty line deflator has been chosen in preference to the Consumer Price Index (CPI), since the CPI does not reflect the spending of the poor (Adams, 2004). The weight of food items amounts to only 40% of all items in the CPI, compared with more than 70% for the poverty line (CBS, 2003). Therefore using the implicit deflator based on the poverty line is already in the spirit of Friedman (2001) who used the food poverty line deflator since it is considered to matter more for the poor. Furthermore, in Indonesia, the CPI is only calculated for 44 urban areas in Indonesia and does not cover rural areas, even though price movements in urban areas may be different from those in rural areas. Using the CPI as the deflator could, thus, give a biased estimate of real consumption.

The deflator is not adjusted for the regional cost of living differences as estimated by Bidani and Ravallion (1993), Pradhan et al. (2000, 2001) and Nashihin (2007) who used a Laspeyres price index to calculate the regional cost of living index. Bidani and Ravallion (1993), Pradhan et al. (2000, 2001) and Nashihin (2007) estimated the regional cost of living index which is how much it costs for households in each region to consume the same standard of living or the same level of utility (by using the same basket of goods for every region), compared to the cost of attaining that utility in the reference region. As a consequence, the differences in poverty line only reflect price differences across regions. However in Bidani and Ravallion (1993) and Pradhan et al. (2000, 2001) the same basket of goods is limited to the food items only, whereas Nashihin (2007) included both food and non food items.

However, as CBS (2003) argued, the comparability across regions has been improved by calculating the price deflator which is to standardise the regional price to Jakarta's price, as discussed in Appendix 3.A. In contrast to Bidani and Ravallion (1993), Pradhan et al. (2000, 2001) and Nashihin (2007), CBS (2003) did not fix the same basket of goods, meaning it did not maintain the same utility level across regions. Although, they are criticised as not consistent, CBS methods

yielded almost similar ranking of provinces for poverty measures. The ranks from the least to the poorest (P0) were consistent with the iterative method which was adapted in Pradhan et al. (2001) with the Spearman rank correlation of 0.92 in 1999. The distribution of provinces from P0 was also comparable with the Ravallion (1994) and Bidani and Ravallion (1993) methods, which were adapted in Friedman (2005). The Spearman rank correlation was found to be 0.91 in 1993.

Therefore, the mean consumption per capita is only deflated to the initial period of 1984 to reflect the change over time. Accordingly, the real mean consumption per capita (*MEAN*) is in 1984 prices calculated as follows :

$$MEAN_{i,t} = \frac{NMEAN_{i,t}}{\left[\frac{PL_{i,t}}{PL_{i,84}} \right]} \quad (3.9)$$

Where

$MEAN_{i,t}$ = real mean consumption per capita of province i per month in year t (Rupiah, 1984 prices)

$NMEAN_{i,t}$ = nominal mean consumption per capita of province i per month in year t (Rupiah)

$PL_{i,t}$ = poverty line of province i in year t (Rupiah)

$PL_{i,84}$ = poverty line of province i in year 1984 (Rupiah)

Returning to the earlier discussion on the difference between the growth of mean consumption per capita from the household surveys and growth of consumption from the national or regional accounts, to support the preference for using the former measure, Table 3.1 presents the OLS estimate on the relationship between mean consumption per capita taken from the National Socioeconomic Survey, and RGDP taken from the regional accounts.

Table 3.1. The OLS Estimate of the Relationship between $\ln MEAN$ and $\ln RGDP$ and $\ln HHCONS$

Explanatory Variable	(1)		(2)	
$\ln RGDP$	0.34 (15.17)	***		
$\ln HHCONS$			0.50 (10.98)	***
cons	7.79 (26.32)	***	5.98 (10.43)	***
R-sq	0.57		0.41	

Source : Author's calculation

Notes :

*** denotes significance at the 1% level. Figures in parentheses are t ratios.

The OLS estimation is based on the estimation of $\ln MEAN = \alpha + \beta \ln Y$

Where $\ln Y$ is either $\ln RGDP$ or $\ln HHCONS$.

$RGDP$ = Real Regional Gross Domestic Product per capita (in 1983 Rupiah)

$HHCONS$ = Real Household Consumption per capita (from regional accounts)
(in 1983 Rupiah)

The results in Table 3.1 support the findings of Ravallion (2003), that a one per cent increase in real household consumption per capita from the regional accounts is associated with an increase in real mean consumption per capita from the household surveys of 0.5 per cent. Growth in real household consumption from regional accounts explains half of the variation in mean consumption per capita, whereas the coefficient was lower for $RGDP$ which only explains 34 per cent of the variation in mean consumption per capita. $RGDP$ and $HHCONS$ fluctuates more than $MEAN$. The findings support the previous arguments that there is an indication of the tenuous association between mean consumption per capita and $RGDP$, and support the preference for using mean consumption per capita from the National Socioeconomic Survey.

3.4. Modeling Poverty

3.4.1. The Basic Model

The most basic model of the determinant of absolute poverty is illustrated below. The rate of absolute poverty is a function of mean consumption per capita at date t (y or here it is replaced by $MEAN$ as identified in equation 3.9).

$$P_{\alpha,t} = f(MEAN_t) \quad (3.10)$$

This is what Friedman (2005) refers empirically in the log form, as the gross growth elasticity of poverty. At this stage there is no control for the shape of the income distribution.

3.4.2. The Augmented Model

The augmented model shows that the rate of absolute poverty is a function of mean consumption per capita at date t ($MEAN_t$), and other explanatory variables at time t (X_t).

$$P_{\alpha,t} = f(MEAN_t, X_t) \quad (3.11)$$

This is a multivariate analysis of poverty which disentangles the key determinants of poverty or poverty reduction given the intercorrelation of the explanatory variables. Following the discussion in Chapter Two on the literature review, X_t includes inequality, natural resources, openness, human capital, infrastructure and the two new determinants of interprovincial migration and intergovernmental transfers.

For estimation purposes, equations 3.10 and 3.11 are transformed into the most common regression model which is in a logarithmic form (except for natural resources and interprovincial migration variables), following Ravallion and Chen (1997), Deolalikar (2002), Friedman (2001, 2005), Adams (2004), Adams and Page (2003, 2005), and Meng, Gregory and Wang (2005). With this log linear model, coefficients of the explanatory variables can be directly interpreted as the elasticity of absolute poverty with respect to the explanatory variables.⁷

⁷ The estimation is a semilog form for natural resources and migration as they are not in log form.

3.5. Econometric Estimation

3.5.1. Panel Data

For the purpose of estimating regional growth elasticity of poverty or regional poverty determinants, a panel data set is used that incorporates both cross-sectional (across provinces) and time series (across years) dimensions. Panel data are usually being used in applied work especially for policy analysis (Wooldridge, 2003). A panel data estimation is mostly useful for controlling time constant unobserved heterogeneity (in this case, provinces) which may correlated with the explanatory variables in the empirical model. This is the advantage of using panel data.

Accordingly, in this thesis, the standard Ordinary Least Squares (OLS) is not appropriate since it does not acknowledge unobserved heterogeneity across provinces. The OLS estimation will give biased estimates of the parameters. Therefore panel data estimation is used not only to incorporate unobserved heterogeneity across provinces but also to control for omitted time variant variable bias which is captured in the time year dummies.

The STATA version 9 econometric program is used to run these panel data estimations.

3.5.2. Fixed Effects for Poverty Estimations

An absolute poverty measure will be a strictly decreasing function of the mean consumption, given a fixed poverty line and Lorenz curve (Ravallion, 1995). Consumptions of all parts of the distribution change in the same proportion. This is an assumption that holds for measuring the growth impact (change in mean consumption) on poverty in several methodologies of decomposing absolute poverty measures discussed in Chapter Two (Datt and Ravallion, 1992; Kakwani, 1993 and Bourguignon, 2003). Nevertheless, the Lorenz curve is also likely to vary. When the growth effect of mean consumption is estimated, the change in distribution is not yet controlled for. Therefore it is possible that a higher mean may be also associated with higher poverty (Ravallion, 1995). In this case,

poverty estimations become an empirical issue.

The most basic model, as implied by equation 3.10, as used in Chapters Four and Five, is the reduced form of poverty estimation, suggested by Ravallion and Chen (1997) which is as follows:

$$\ln P_{\alpha,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_t + \varepsilon_{i,t} \quad (3.12)^8$$

Where :

$P_{\alpha,i,t}$ are the poverty measures of P0, P1 and P2 of province i at time t (per cent)

$MEAN_{i,t}$ is proxy of income of province i at time t, which is
 $MEAN_{i,t}$ = Monthly Mean Consumption Per capita (Rupiah, 1984 prices)⁹

t is the index for year (t =1984, 1987, 1990, 1993, 1996, 1999, 2002)

e is the index for 6 dummies (e=1, 2, 3, 4, 5, 6)

d are the year dummies for years when the consumption module of the National Socioeconomic Survey took place
 $d_{87} = 1$ if t=1987, or 0 otherwise
 $d_{90} = 1$ if t=1990, or 0 otherwise
 $d_{93} = 1$ if t=1993, or 0 otherwise
 $d_{96} = 1$ if t=1996, or 0 otherwise
 $d_{99} = 1$ if t=1999, or 0 otherwise

⁸ Deolalikar (2002), Ravallion and Datt (2002) and Friedman (2003) use the level of income (in log form), not growth, as the independent variable. Friedman (2005) and Meng, Gregory and Wang (2005), are also among those who use fixed effects or random effects estimation to analyse the growth elasticity of poverty.

⁹ It is acknowledged that by using the log mean consumption per capita variable, the impact of the log population on the left hand side variable is restricted to be equal magnitude but with an opposite sign to log mean consumption. There is another alternative measurement by using the log mean consumption and log of population separately as two independent variables. The log of population is a proxy for the size of the region (as discussed in details in Alesina, Spolaore and Wacziarg (2004)). However, for the purpose of the thesis, it was decided to use mean consumption per capita as a single variable for several reasons (i) for consistency with the growth elasticity of poverty and determinants of poverty literature used in this thesis and (ii) to maintain variable consistency with the use of variables in growth equation. The dependent variable in the growth equation is growth of mean consumption per capita.

$d_{02} = 1$ if $t=2002$, or 0 otherwise

The base period is year 1984.

δ is the provincial fixed effect (unobserved heterogeneity)

ε is a white-noise (random) error term that includes errors in the poverty measure.

The term γ_1 is the “growth elasticity of poverty” with respect to mean consumption given by $MEAN_{i,t}$. This elasticity is different to that calculated by Datt and Ravallion (1992), Kakwani (1993), and Bourguignon (2003), as their growth elasticity of poverty must be negative and each elasticity has a distinctive value for any poverty measure, both means and distributions. As Meng, Gregory and Wang (2005) argued, the relationship between poverty, growth and inequality is more empirical and is not as simple as suggested by theoretical approaches of decomposition as previously discussed in Chapter Two (in the latter there is an identity that links changes in the poverty headcount with changes in the poverty line, mean consumption and changes in distribution).

Accordingly, the growth elasticity of poverty estimated in equation 3.12 is an empirical elasticity without being controlled by changes in the distribution. As a consequence, without knowing exactly how the distribution changes, which relies on how the Lorenz curve changes with growth of mean consumption, the growth elasticity of poverty can have any sign (either positive or negative sign).

The main interest here is whether actual growth processes typically reduce poverty and whether, with the distribution varying consistently with the data, falling poverty still be observed with rising mean consumption per capita.

While Ravallion and Chen (1997) and Adams (2004) use first difference (FD), this thesis uses fixed effect (FE) for the following reasons. First, fixed effects are used in order to use all the information available, as this is unbalanced panel data. It is unbalanced due to several missing observations for the headcount ratio in 1990 in nine provinces (CBS did not publish the data for those respective provinces), and the unavailability of mean consumption per capita for Aceh,

Maluku and Papua (a National Socioeconomic Survey module was not undertaken in any of these three provinces in 2002 due to the social and political unrest). Second, the Fixed Effects is more efficient than First Difference because in any province, random errors are usually assumed to be serially independent, not serially correlated with each other across time periods (Wooldridge, 2003). For example, the error term in the province i at time t is not serially correlated with the error term in province i at time s , that is, $E[\varepsilon_{i,t}\varepsilon_{i,s}] = 0$ if $t \neq s$.

With fixed effects estimations, both dependent and independent variables for each observation of i are time averaged as follows

$$\ln \bar{P}_{\alpha,i} = \rho_0 + \rho_1 \overline{MEAN}_i + \delta_i + \bar{\varepsilon}_i \quad (3.13)$$

where, for example: $\ln \bar{P}_{\alpha,i}$ is the time average of $\ln P_{\alpha,i,84}, \dots, \ln P_{\alpha,i,02}$

Then,

$$\ln P_{\alpha,i,t} - \ln \bar{P}_{\alpha,i} = \gamma_0 + \gamma_1 (\ln MEAN_{i,t} - \ln \overline{MEAN}_i) + \sum_{e=1}^{e=6} \beta_e d_t + \varepsilon_{i,t} \quad (3.14)$$

The unobserved fixed effect has disappeared.

Where, in addition to the previous notation,

$\bar{P}_{\alpha,i}$ = is the time average of level of poverty measures of P0, P1 and P2 of province i (per cent)

$\overline{MEAN}_i$ = is time averaged mean consumption per capita of province i (Rupiah, in real terms)

Further, the multivariate analysis of the poverty for the augmented model specified in section 3.4.2 (after incorporating panel data estimation features) is presented as follows :

$$\ln P_{0,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \sum_{j=1}^{j=k} \gamma_j \ln X_{i,t} + \delta_i + \varepsilon_{i,t} \quad (3.15)$$

Where in addition to the previous notation:

$X_{i,t}$ are other relevant determinants ($j=1, \dots, k$), discussed earlier in section 3.4.2, and will be discussed later on in detail in both Chapter Six and Seven. In both Chapter Six and Seven, the discussion will only be limited on headcount

poverty index (P0).

Fixed effects estimation treats the unobservable heterogeneity (at provincial level) as a parameter to be estimated for each observation in cross section i (Wooldridge, 2003). This is similar to OLS estimations when each dummy variable of each cross sectional observation (that is province) is included (dummy variable regression). Fixed effects also assume there is a correlation between the explanatory variables and the unobservable heterogeneity.

The six year dummies (d87, d90, d93, d96, d99 and d02) are incorporated to capture the omitted variables which vary across time, and, in general, the impact of macroeconomic conditions, and also if there is any specific poverty alleviation strategy in each National Socioeconomic Survey consumption module period. The coefficients of these year dummies will indicate whether the level of poverty is higher on average (if there is significant positive sign) or lower (if there is significant negative sign) than for the base period of 1984.

When other determinants are included, although panel data estimation should minimise the multicollinearity problem, a rule of thumb test for multicollinearity is applied (Griffiths, Hill and Judge, 1993). When a correlation coefficient between two independent variables is higher than 0.8, which indicates a strong linear and disturbing relationship, one of these variables should be dropped.

3.5.3. Generalized Method of Moments for Growth Estimations

Growth estimations are used to explain the indirect channel of the determinants and their impact on poverty, as discussed in Chapter Two. Accordingly a panel data framework is also adopted in growth estimations to take into account the provincial fixed effect which correlates with the explanatory variables (Islam, 1995; Caselli, Esquivel and Lefort, 1996). Furthermore, Caselli, Esquivel and Lefort (1996) argue that determinants of growth are mostly endogenous.

Therefore, to capture the provincial effects, omitted variable, and the endogeneity issue (which are important in discussing conditional convergence in growth

literature), a structural model is presented below using the benchmark estimation model of Mankiw, Romer and Weil (1992) in a reduced form of growth estimations. This is then modified to fit the panel data framework (Islam, 1995).

$$\ln MEAN_{i,t} - \ln lagMEAN_{i,t-3} = \delta_0 + \delta_2 \ln lagMEAN_{i,t-3} + \sum_{j=1}^k \gamma_j \ln X_{i,t} + \sum_{e=1}^{e=6} \lambda_e d_t + \delta_i + \varepsilon_{i,t} \quad (3.16)$$

or the model 3.16 is modified to be more simple , as follows

$$\ln MEAN_{i,t} = \delta_0 + \delta_1 \ln lagMEAN_{i,t-3} + \sum_{j=1}^k \gamma_j \ln X_{i,t} + \sum_{e=1}^{e=6} \lambda_e d_t + \delta_i + \varepsilon_{i,t} \quad (3.17)$$

Where in addition to the previous notation:

$lagMEAN_{i,t-3}$ is three year lag of mean consumption per capita in province i at time t-3 (Rupiah, 1984 prices)¹⁰

$X_{i,t}$ are other relevant determinants (j=1....k)

$\delta_1 = \delta_2 + 1$

“Model 3.17 is a dynamic panel estimation in which there is a lagged dependent variable. Therefore, the standard fixed effect estimation then cannot be used and the Generalized Method of Moments (GMM) is used. GMM is the best to capture provincial effects, omitted variable and endogeneity issue as most determinants of growth are endogeneous. The standard fixed effect estimation cannot be used since growth estimation is a dynamic panel with a lagged of dependent variable as the independent variable.

Although it is argued that the GMM is only valid for estimation with large cross sectional units (in this case meaning many provinces), GMM is used to solve the dynamic feature and the endogeneity issue (Arellano and Bond, 1991). The basic technique of this estimation is First Difference to remove provincial fixed effects and then the estimation will select the appropriate instruments for the endogenous explanatory variables, in order to create the consistent and efficient parameters. The common instruments used are the lagged values of the relevant endogenous

¹⁰ Growth estimations adopt three year lags, instead of a one year lag, to match the three yearly National Socioeconomic Survey consumption module data that are used in this thesis.

variables, which are then set as predetermined variables. The validity of the instruments is shown by the absence of serial correlation in the error term, which can be investigated using Arellano and Bond tests for serial autocorrelation and the Sargan test for overidentifying restrictions. For the Arellano and Bond tests for a serial correlation, the first order autocorrelation (in the first stage of regression) can be ignored (if it exists), but it is the requirement that there is no second order correlation (AR(2)) (Arellano and Bond, 1991).

As in the poverty estimations, the six year dummies (d87, d90, d93, d96, d99 and d02) are also incorporated to capture omitted variables that vary across time and, in general, the impact of macroeconomic conditions and specific poverty alleviation strategies in each period covered by the National Socioeconomic Survey consumption module.

3.6. Methodology and Approach for Each Chapter

As an overview, it is useful to present a summary of the objectives, assumptions and the main methodologies and approaches of each chapter. Details of the methodologies are discussed in each chapter and Table 3.2 summarises the coverage of the empirical chapters.

The econometric methodology in Chapters Four and Five follows Ravallion (1995) and Ravallion and Chen (1997) where the Lorenz curve is free to vary (without being controlled with inequality). In Chapter Four, the main objective is to establish whether there was heterogeneity of the growth elasticity of poverty across growth episodes, whereas Chapter Five focuses on whether there was heterogeneity of growth elasticity of poverty across different regions (groups of provinces). As the main focus is growth only, the growth elasticity of poverty is then estimated for the three absolute poverty measures of P0, P1 and P2. These two chapters used fixed effects estimations.

In Chapter Five, in order to analyse the regional effects on the growth elasticity of poverty, three regional classifications of groupings of provinces in Indonesia are used. They are classifications based on the Java-Bali and the Outer Islands

division, on islands groups, and on Hill's (1989) classification. The first two are the most common and simple classifications, whereas the last takes into account the main structural characteristics of the groups, which are natural resources, population density and geographical location.

The econometric methodology in Chapter Six also follows Ravallion and Chen (1997) with a more general standard estimation taking inequality into account, following Besley and Burgess (2003), Adams (2004) and Adams and Page (2003, 2005). Therefore the negative sign of the coefficient of mean consumption per capita is expected, whereas the sign of the Gini elasticity of poverty given growth is expected to be positive. In Chapter Six, with additional explanatory variables in addition to mean consumption per capita, the robustness of growth elasticity of poverty estimated in Chapter Four and Five is tested.

Table 3.2. The Coverage of Empirical Chapters (Four to Seven)

Determinants and Issues	Chapter Four	Chapter Five	Chapter Six	Chapter Seven
Poverty Indicators	P0, P1, P2	P0, P1, P2	P0	P0
Growth Elasticity of Poverty				
All periods	v		v	v
Across growth episodes	v		v	v a)
Across regions		v	v	v a)
Other Determinants				
<i>Structure of the economy</i>				
Natural resources			v	v
Openness			v	v
All periods			v	v
Across growth episodes			v	v a)
Across regions			v	v a)
<i>Structure of society and community</i>				
Human capital			v	v
All periods			v	v
Across growth episodes			v	v a)
Across regions			v	v a)
Inequality			v	v
<i>Public services (policies)</i>				
Infrastructure			v	v
All periods			v	v
Across growth episodes			v	v
Across regions			v	v a)

Table 3.2. The Coverage of Empirical Chapters (Four to Seven), *Continued*

Determinants and Issues	Chapter Four	Chapter Five	Chapter Six	Chapter Seven
Intergovernmental transfers				v
All periods				v
Across growth episodes				v
Across regions				v
<i>Population Mobility (interprovincial migration)</i>				v
In-migration				v
All periods				v
Across growth episodes				
Across regions				v
Out-migration				v
All periods				v
Across growth episodes				
Across regions				v
Transmigration				v
All periods				v
Across growth episodes				
Across regions			v	v
Growth Estimations				
Source : Author's summary				

Source : Author's summary

Note : 'v' means the determinants and issues are analysed in the relevant chapter.

'a)' means the issues are presented in the appendix

Nevertheless, in Chapter Six the focus is only on P0. Here not only is growth included in poverty estimation but other common determinants of poverty headcount index are also added, which are natural resources, human capital, openness and infrastructure. These determinants are taken into account with the objective of showing whether there are possibly direct impacts of these determinants on poverty, in addition to the indirect channel through economic growth. The additional determinants are also important as control variables for the growth elasticity of poverty to ascertain whether the inclusion of other determinants makes growth elasticity of poverty higher or more pro-poor.

The discussion of direct and indirect effects, to test the proposed hypotheses, are carried out separately (not as a system), following the strategy of Palmer-Jones and Sen (2003). Both channels are estimated by reduced form regional growth and poverty estimations, that are estimated by generalized method of moments (for growth estimations) and fixed effects (for poverty estimations), as discussed in Sections 6.4. Therefore, the magnitude of the total effect (from direct and indirect channels) cannot be quantified.

With a similar econometric methodology and approach (direct and indirect, growth and poverty estimations) Chapter Seven expands on the findings of Chapter Six with the addition of the two new poverty determinants of interprovincial migration and government transfers. Interprovincial migration includes non-assisted in-migration, out-migration and government assisted transmigration programs. As in Chapter Six, Chapter Seven only focuses on the P0 determinants. In Chapter Seven, the robustness of the findings of common determinants of poverty discussed in Chapter Six will also be tested.

Appendix 3.A.

Official Measurement of Poverty in Indonesia

Estimates of poverty in Indonesia were first published officially by CBS in 1984, covering poverty data from 1976-1981. Since then the CBS has calculated the number of poor people for every three year period, plus the percentage of population living under the poverty line.

The poverty line is a threshold categorising whether or not someone is poor and is based on the monetary value consumption necessary to fulfil the basic needs of food and non food items. The benchmark for defining poverty is if a person can fulfil a 2100 calories intake per day, as required by the 1978 National Workshop on Food and Nutrition. The methodology in determining this minimum standard of calories intake has been improved over time. Since 1993, the value of 2100 calories has been calculated based on a selected commodity basket that also takes account of differences among provincial consumption patterns. These commodities are selected from 52 similar items from both urban and rural areas, although they can vary across provinces. The 2100 calories level is based on food consumption from a reference population with consumption at the previous poverty line which is then adjusted based on the inflation rate.

The non food items are selected based on a Basic Commodity Basket Survey (*Survei Paket Komoditi Kebutuhan Dasar* or *SPKKD*) covering more than 40 non food items which vary across urban and rural areas. These non food items include clothing, housing, health, education, transportation, and other goods and services. The poverty line is based on a summation of food and non food minimum consumption needs.

The current CBS methodology of poverty line measurement incorporates three significant improvements (CBS, 2003). First, it covers more commodities as basic needs. Second, comparability has been improved across time. Third, it is claimed that comparability across provinces has also been improved. The comparability

over time has also been improved by applying the 1999 share of expenditure (consumption) for each product to total expenditure on 52 commodities. The expenditure share of each product in the bundle is different across provinces but similar over time. The comparability across provinces has been improved by indexing the price level in each province to the price level in Jakarta. Therefore CBS (2003) argued that with this methodology the basic needs standard of the reference population in each province is comparable, because they have similar real consumption. Therefore, disparities in consumption arise only because of differences in terms of consumption patterns and price and not because of differences in income.¹¹

Nevertheless the methodology is still considered dynamic in the sense that different consumption tastes and patterns among provinces are considered.

In detail, the measurement of the poverty line is set out below. For example, to calculate the 2002 poverty line (CBS, 2003, p.5-6) the procedure is as follows:

1. Determine the reference population which is the 20 per cent of the population just above the 2002 estimated poverty line. The 2002 estimated poverty line is calculated based on the 1999 poverty line adjusted by the inflation rate between February 1999 and February 2002.
2. Select 52 basic food commodities for the national level, and then calculate the average price of these commodities for each province. The average price is calculated as in this formula :

$$P_{i,j} = \sum_{k=1}^{k=52} P_{i,j,k} \alpha_{j,k} \quad (3.A.1)$$

$P_{i,j}$ = average price in province i and region j (either rural or urban)

$P_{i,j,k}$ = average price in province i and region j (either rural or urban) for commodity k

¹¹ However, the shortcoming of the CBS poverty line arises especially in the regional price differences, which are calculated and discussed in Nashihin (2007).

$\alpha_{j,k}$ = the expenditure (consumption) share of commodity k in region j in

1999 $\alpha_{j,k} = \frac{V_{j,k}}{V_j}$, where $V_{j,k}$ is expenditure for commodity k in region j

and V_j is the total expenditure for 52 commodities in region j.

The average price is then used as a deflator in calculating the real consumption of the population.

3. Calculate the price deflator for each province i which is standardised to Jakarta with the following formula:

$$SP_{i,j} = \frac{P_{i,j}}{P_{Jakarta,j}} \quad (3.A.2)$$

where $SP_{i,j}$ is the price deflator and S means standardised, so SP is standardised price.

4. Calculate the real expenditure for each household with

$$RE_{i,j,h} = \frac{E_{i,j,h}}{SP_{i,j,h}} \quad (3.A.3)$$

RE is the real expenditure

E is the nominal expenditure

h is household

5. Calculate the real expenditure distribution of population in each province both in urban and rural areas (for each j).
6. Based on the distribution of real expenditure, food expenditure (FE) is calculated by identifying selected commodity basket of the reference population in each province. FE is calculated as follows:

$$FE_i = \sum_{k=1}^{k=52} P_{i,k} Q_{i,k} = \sum_{k=1}^{k=52} V_{i,k} \quad (3.A.4)$$

FE_i = food expenditure in province i

$P_{i,k}$ = average price of commodity k in province i

$Q_{i,k}$ = average quantity of commodity k which is consumed in province i

$V_{i,k}$ = expenditure for consumption of commodity k in province i

7. Then, the FE is adjusted to represent 2100 calories, to calculate the food poverty line (FPL) in which

$$FPL_i = HK_i * 2100 \text{ where } HK_i = \frac{FE_i}{\sum_{k=1}^{k=52} K_{i,k}} = \frac{\sum_{k=1}^{k=52} V_{i,k}}{\sum_{k=1}^{k=52} K_{i,k}} \quad (3.A.5)$$

$K_{i,k}$ = calorie of commodity k in province i

HK_i = average price of calorie in province i

8. Calculate the non food poverty line (NFPL) which is based on the consumption pattern of the same reference population, using this formula :

$$NFPL_i = \sum_{l=1}^{l=n} r_l V_{l,i} \quad (3.A.6)$$

$NFPL_i$ = non food poverty line in province i

r_l = the share of expenditure of non food item l ($l=1, \dots, n$) to the reference population non food expenditure in province i.

V_l = value of expenditure of non food item l in province i

l = selected non food items in each province.

9. The total poverty line PL then is calculated as $PL = FPL + NFPL$ (3.A.7)

Appendix 3.B. The List of Provinces in Indonesia

i Provinces

- 1 Aceh
- 2 North Sumatra
- 3 West Sumatra
- 4 Riau
- 5 Jambi
- 6 South Sumatra
- 7 Bengkulu
- 8 Lampung
- 9 DKI Jakarta
- 10 West Java
- 11 Central Java
- 12 DI Yogyakarta
- 13 East Java
- 14 Bali
- 15 West Nusa Tenggara
- 16 East Nusa Tenggara
- 17 West Kalimantan
- 18 Central Kalimantan
- 19 South Kalimantan
- 20 East Kalimantan
- 21 North Sulawesi
- 22 Central Sulawesi
- 23 South Sulawesi
- 24 Southeast Sulawesi
- 25 Maluku
- 26 Papua

Chapter Four

The Growth Episodes and Their Impacts on Poverty

4.1. Introduction

There are two sources of heterogeneity of growth elasticity of poverty in cross country literature. First, heterogeneity across countries and second, heterogeneity across time periods (Bourguignon, 2003).

Furthermore, heterogeneity of the growth elasticity of poverty within a country is also expected to apply across regions and time periods, but most single country literature tries to explain the heterogeneity only across regions but not across time periods. Previous literature on Indonesia also ignores the longer time series frame.

This use of a short time frame may be due to the problem of data availability as a longer time series is necessary for an extended analysis. Nevertheless, Friedman (2005) did extend the focus for the period 1984-1999, although he did not decompose this longer time frame into several growth episodes. In this study, the time periods are extended. For the purpose of this thesis, a time series consistent regional data set (at provincial level) has been collected from 1984-2002, so that the heterogeneity of growth elasticity of poverty across different time periods can be analysed.

This chapter analyses the impact of growth episodes on poverty, and the links between poverty and growth related policy, especially trade liberalisation which played an important role in development during Indonesia's pre-crisis period. Poverty reduction in the mid 1980s was claimed to be due to the employment growth fuelled by the implementation of trade liberalisation (Hill, 2000; Temple, 2003).

This chapter revisits the growth elasticity of poverty (GEP) in Indonesia using a panel of seven consecutive cross section National Socioeconomic Surveys

(*SUSENAS*) from 1984-2002, covering 26 provinces.¹ This is an extension of the previous literature on the growth elasticity of poverty by Friedman (2005), who used six surveys (from 1984-1999), by including the 2002 survey which was made at “the end of recovery” period following the crisis and also the decentralisation period which began in 2001. Nevertheless, this chapter does not aim to measure the impact of the decentralisation period on the growth elasticity poverty, given that the data are for the year 2002.

This chapter provides a background to the role of growth only as one determinant of regional poverty in Indonesia, with a special focus on the differences across growth episodes. Accordingly, the intention is to analyse whether different rates of regional growth, assumed to be influenced by national policy, have had an impact on regional poverty.

The previous literature on poverty has overlooked the impact of specific identifiable growth episodes. This chapter attempts to address this matter. In the case of Indonesia, the main focus is whether the growth elasticity of poverty varies over time during different growth episodes. In more detail, the first hypothesis is that the growth elasticity of poverty during the second period of liberalisation (1990-1996) would have been lower than the growth in the first period of liberalisation (1984-1990), since the reform was stronger during the first period. The second hypothesis is that the growth elasticity of poverty during the recovery period (1999-2002) would have been lower than in the second period of liberalisation, as the economy gradually recovered from the economic crisis of 1997-1998.

The analysis will mainly be based on data collected by the Central Board of Statistics of Indonesia (CBS), which are mainly from the National Socioeconomic Survey of *SUSENAS*, the national and regional accounts, and the National Labour Force Survey of *SAKERNAS*.

¹ Growth Elasticity of Poverty is defined as the per centage reduction in headcount poverty when mean consumption (expenditure) per capita increases by one per cent.

This chapter is organised in five sections. The second section presents the growth episodes, and their impacts on poverty. Section three discusses empirical methodology and approach, and section four investigates the results. Section five presents conclusions.

4.2. The Growth Episodes and Their Impacts on Poverty

From the 1970's up to 2002, Indonesia had experienced several development episodes, including the oil boom of 1972 to around 1981, the rice boom of 1978-1983, the first period of liberalisation from 1984-1990, followed by the second period of liberalisation, and some backsliding on reform during 1990-1996, the financial and economic crisis 1997-1998, and finally, the recovery after the crisis of 1999-2002.²

It is important to note there is no clear consensus on when the first of the liberalisation periods started. One strand of the literature mainly refers to micro reform, especially trade liberalisation, from 1987 as being the starting point (Woo, Glassburner and Nasution, 1994 and Hill, 2000), with 1986 considered the turning point due to the sharp decline in oil price (Hill, 2000). In addition, there were several liberalisation packages in 1986 to ease import and export procedures.³

There was some earlier fiscal reform (such as tax reform in 1983 and 1985) and exchange rate reform (such as devaluation in 1983), as discussed by Soesastro (2006) who identifies liberalisation as commencing from 1982. Aswicahyono and Feridhanusetyawan (2004) have also argued that microeconomic reform had been undertaken at a slower pace during 1982-1985.

² As the East Asian crisis is a period of contraction and no data for the National Socioeconomic Survey consumption module are available for this period, the immediate crisis impacts are not discussed here.

³ There was a May 1986 package which had a "duty exemption and drawback scheme" as the initial step in an export-promoting path of industrialization. This package allowed export oriented firms to purchase imported inputs at international prices.

The periods chosen are partly taken to match the data availability provided by the National Socioeconomic Survey consumption module which has been undertaken every three years from 1984-2002. 1984 is chosen as the starting year, as it was after that year that non oil manufacturing growth became the main engine of industrial sector growth in Indonesia (Hill, 1997), leading to the strong liberalisation reforms of 1984-1988. Therefore 1984-1990 is considered to be the first period of liberalisation. In the second liberalisation period from 1990-1996, the pace of reform was much slower than it had been in the mid 1980s-1990, as discussed by Hill (1997).

Therefore, the question is how to link these growth episodes with poverty. Were the Growth Episodes Pro-Poor ? Timmer (2004) argued that the growth during those episodes was pro-poor since income distribution remained stable.

It can be argued that the growth episodes related policy could be expected to have an impact on poverty during the respective periods, especially through the employment effect of labour intensive growth. Rapid growth at the macro level with growth of manufacturing exports during the liberalisation periods has been shown to be labour intensive (Fujita and James, 1997; Hill, 2000).⁴ Further, Hill (2000) has argued that the growth of export oriented labour intensive manufacturing sectors can be seen as one factor among others which explain a good record of poverty alleviation in Indonesia. This is an effect on the demand side (Timmer, 2004), whereas on the supply side growth, there was also improved education and health standards of the poor (Hill, 2000).

Employment elasticity is one tool to capture the responsiveness of labour market changes in the macroeconomic conditions (Islam and Nazara, 2000). Under different macroeconomic conditions, a one per cent change in economic growth can be a measure of more or less employment intensity. Therefore employment

⁴ Timmer (2004) also argued that agriculture and the rural economy are important for both land scarce and abundant regions. He further suggested that if the labour-intensive manufacturing period had not taken place, agriculture in the Outer Islands would probably have contributed more to pro-poor growth by creating migration opportunities from Java, especially for work in the plantations.

elasticity will be used to indicate whether growth is more or less labour intensive.⁵ The question here is whether the growth elasticity of poverty is higher when growth is more labour intensive.

Table 4.1 shows different growth rates using various income proxies during the different growth episodes. Comparing the four measures of growth of income per capita, which are GDP per capita, non oil and gas GDP per capita, private consumption per capita, and real mean consumption per capita, the difference in the magnitude of growth from the national accounts and the household survey is the result of a different level of GDP and household consumption per capita, as discussed earlier, plus the difference in deflator used.

**Table 4.1. Annualised Rates of Growth in Different Growth Episodes
(per cent) 1984-2002**

Income Proxy	1984-2002	1984-1990	1990-1996	1999-2002
<i>National Accounts</i>				
GDP	5.3	6.3	7.2	5.6
Agriculture GDP	3.8	5.1	4.5	3.2
Manufacturing GDP	6.5	10.0	9.9	3.5
GDP per capita	3.3	4.1	5.3	2.7
Non oil and gas GDP per capita	3.4	5.0	6.1	0.9
Private consumption per capita	3.8	3.1	6.2	2.0
<i>Households survey</i>				
Real mean consumption per capita (with Private Consumption of GDP deflator)	2.7	3.7	1.5	5.7
Real mean consumption per capita (with GDP deflator)	2.9	3.7	2.1	4.0
Real mean consumption per capita (with PL deflator)	1.0	1.5	1.4	2.8

Source :CBS, *National Socioeconomic Survey*, and *National Accounts*, various years

Note: Here the most appropriate deflator to convert mean consumption per capita is by the poverty line (PL) deflator, as discussed in Chapter Three.

In addition, there are different trends of growth in income per capita from the national account and the household survey. For GDP per capita, non oil and gas GDP per capita, and private consumption per capita, growth was higher during the second period of liberalisation and lower during the recovery period. This was an

⁵ Apart from its impact through growth, poverty rates can also decline because the number of jobs (employment) increases, as in the case of Indonesia.

opposite trend compared with real mean consumption per capita which was stagnant if not actually lower during the second period of liberalisation.

Although the magnitude of real consumption per capita (with poverty line deflator) is almost similar to GDP per capita during the recovery period, the trend was different. As shown in Table 4.1, it is apparent that this trend was relatively robust irrespective of which measure of deflator of mean consumption per capita is used. This may indicate that, coming from a really low base, consumption was the quickest sector of the economy to recover. Nevertheless it does not necessarily imply that the other sectors, such as investment and trade which are captured in the national accounts, had also recovered.

The following section discusses briefly each growth episode and its likely impact on the growth elasticity of poverty.

4.2.1. The First Period of Liberalisation (1984-1990)

From the national accounts, during this first period of liberalisation GDP grew by 6.3 per cent, with manufacturing growing by 10 per cent per annum, higher than agriculture. This first period of liberalisation can be called a transformation period in which Indonesia experienced two interrelated features of industrialisation. First, there was a transformation from an economy that relied on oil and gas to a more diversified economy based on a strong export-oriented manufacturing sector. Second, there was a transformation in terms of employment from the primary sector to the manufacturing sector.

From March 1985 till May 1990, a series of deregulation packages were launched to liberalise the economy and especially to promote non oil exports. These policies included export incentive reform.⁶ Export incentives consisted of tax and financial subsidies, and administrative improvements to simplify procedures by reducing the number of licences necessary to export goods

⁶ Hill (2000) pointed out that the strongest trade reform took place in the 1986-1989 period, when protection was reduced progressively.

Reform in the banking sector began in 1983, when the government removed the ceilings on time deposit rates at state banks and on the lending controls for all banks. This was followed by the 1988 package when restrictions were removed on the extension of bank branches and the establishment of new banks, except for purely foreign owned banks (McLeod, 1993; Aswicahyono and Feridhanusetyawan, 2004).

As a result of these trade reforms and deregulation, tariffs and NTBs declined significantly (Fane, 1996; Hill 2000; and Aswicahyono and Feridhanusetyawan, 2004). Moreover, as discussed earlier, there was significant growth in exports, structural transformation and poverty reduction during this first period (Hill, 2000).

The sectoral transformation from agriculture to manufacturing, as discussed earlier, was repeated in employment during the mid 1980s, leading to an expansion of footloose labour intensive manufacturing sectors, such as clothing, woven fabrics, footwear, electronics, furniture, yarn, toys and sporting goods, glass and glassware, which are mainly centred in Java and Bali (Hill, 2000).

The question then arises: did the growth which led the expansion of the labour intensive manufacturing sector, and the economy as a whole, actually reduce poverty? Manning (1998) and Osmani (2004) have argued that lower absolute poverty measures during the first period of liberalisation were mainly a result of the employment expansion created by growth, with slow growth in real wages.

As indicated in Table 4.2, there was a significant increase in employment (in terms of absolute change) during 1984-1990, for all sectors, including the manufacturing sector. As a result, poverty should have declined. During the first period of liberalisation, as can be seen in Table 4.2, when the total employment elasticity was high at 0.41 and the manufacturing employment elasticity was still higher (0.63), the poverty headcount ratio reduced nationally by 6.1 percentage points from 29.5 per cent in 1984 to 23.4 per cent in 1990, whereas the poverty gap index reduced from 6.8 to 4.5 per cent and the squared poverty gap index fell from 2.4 to 1.3 per cent (see Table 4.3).

Table 4.2. Growth and Employment Indicators 1984-2002

	1984-1990	1990-1996	1993-1996 a)	1999-2002
Employment				
<i>Absolute change (000)</i>				
All sectors	10,806	9,843	6,475	2,830
Manufacturing sector	2,352	3,077	1,987	594
<i>Growth (percentage per year)</i>				
All sectors	2.6	2.1	2.7	1.2
Manufacturing sector	6.3	5.8	7.0	2.0
GDP				
<i>Growth (percentage per year)</i>				
All sectors	6.3	7.2	7.9	5.6
Manufacturing sector	10.0	9.9	11.6	3.5
Employment elasticity				
All sectors	0.41	0.29	0.34	0.21
Manufacturing sector	0.63	0.58	0.61	0.57

Source : CBS, *National Labour Force Survey* and *National Accounts*, various years.

Notes :

- Employment Elasticity of all sectors (manufacturing sector) $EMPL_{A(M),T}$, is calculated

by the author using this formula = $EMPL_{A(M),T} = \frac{AGE_{A(M),T}}{AGMO_{A(M),T}}$. $AGE_{A(M),T}$, is

annualised growth of employment in all sectors (manufacturing sector), $AGMO_{A(M),T}$ is annualised growth in all output (manufacturing output), T is the growth episodes (1984-1990, 1990-1996, 1999-2002). A=all sectors, M=manufacturing sector

- Refers to the period 1993-1996 only, since in the empirical section, due to the longitudinal format of panel data with fixed effects which uses level estimation, instead of the period for 1990-1996, the elasticity can only be compared between 1984-1990 and 1993-1996. Nevertheless, Table 4.2 shows that the trend in terms of labour intensive growth, which is measured by employment elasticity, was similar. The rank of the elasticity based on growth episodes (from the highest to the lowest) was 1984-1990, 1990-1996 and 1999-2002 for all sectors and for manufacturing alone. The ranking also holds if, instead of 1990-1996, the period 1993-1996 is used.

This indicates that this growth did in fact reduce poverty. Despite the difference in time periods, the manufacturing employment elasticity during the first period of liberalisation was higher than indicated in the previous findings of Manning (1996) who estimated a manufacturing elasticity of 0.5 during the early 1980s, and lower than Islam (2001) who found that manufacturing employment elasticity was 0.76 in 1981-1985. The elasticity in the latter period (the second period of liberalisation) was also consistent with Islam (2001) who found the manufacturing employment elasticity was 0.66 in 1986-1992, and with Islam and Nazara (2000) who found that manufacturing employment elasticity was 0.60 from 1988-1993.

Table 4.3. Trend of Poverty Rates 1984-2002

Year	P0 (%)	P1 (%)	P2 (%)
1984	29.5	6.8	2.4
1987	25.7	5.3	1.6
1990	23.4	4.5	1.3
1993	20.6	5.8	1.7
1996	17.6	1.8	0.4
1999	23.4	4.3	1.2
2002	18.2	3.0	0.8

Source : CBS, *National Socioeconomic Survey*, various years

4.2.2. The Second (Further) Liberalisation Growth Period (1990-1996)

During the period 1990 to 1996 the economy grew by 7.2 per cent while manufacturing output grew at a slightly slower pace than during the first period at 9.9 per cent. Liberalisation also slowed (Hill, 1997). Aswicahyono and Feridhanusetyawan (2004) have labelled this period as one of 'deregulation fatigue', although they referred to a slightly different period of 1992-1997. Not only was the reform slower and less comprehensive, but there was also some backsliding which emerged with the more interventionist policy (Fane, 1996). For example, there was the clove monopoly, the restrictions on inter-island orange trade from West Kalimantan in 1991, and an increase in the tariff surcharge on imports of propylene and ethylene in 1993. There was also national car project between Kia Motors of South Korea and Timor Putra Nasional, an Indonesian company controlled by one of the Suharto's sons, under which Timor was exempted from paying luxury taxes (Fane, 1996; Aswicahyono and Feridhanusetyawan, 2004).

During the second period of liberalisation, and especially during 1993-1996, there was a slight decrease in jobs creation (employment changes in absolute terms) both for all sectors and for the manufacturing sector, which probably indicates that the previous labour surplus had begun to be exhausted (as indicated in Table 4.2). The employment elasticity during this second period of liberalisation was also lower than during the first period of liberalisation, both for all sectors and for the manufacturing sector alone. Growth was thus less labour intensive during this period.

Do such findings mean that growth was also less pro-poor during this second period liberalisation ?⁷ The poverty headcount reduced by 5.8 percentage points from 23.4 to 17.6 per cent during this period, a slight larger relative decline than in the first period. Poverty fell faster, probably due to increases in real wages in all sectors, including construction, textiles and government administration (Manning, 1998; Feridhanusetyawan, 2002). Real wages in the manufacturing sector grew by 33 per cent during this period, an annual growth rate of around 5 per cent. The rapid growth of manufacturing exports finally began to have an impact on the general price of the unskilled labour.

Comparing the first and the second periods of liberalisation, the first hypothesis is anticipates that the growth elasticity of poverty during the first period of liberalisation would be higher than that during the second period of liberalisation since growth was also more labour intensive during the earlier period of stronger reform.

4.2.3. The Crisis Period (1997-1998)

The financial and economic crisis hit Indonesia in 1997. The economy was in turmoil, contracting by more than 13 per cent in 1998, and a political crisis followed. Suharto stepped down as President in 1998. As this period was one of contraction rather than growth, the impact of this crisis period on growth elasticity of poverty will not be discussed.

4.2.4. The Recovery Period (1999-2002)

As indicated in Table 4.1, following the crisis the economy rebounded to grow at 5.6 per cent per annum. Monthly mean consumption per capita increased by 2.8 per cent per year, which was higher than during both periods of liberalisation. However, GDP per capita grew much more slowly than in the pre-crisis period. The manufacturing sector recovered slowly by 3.5 per cent per year during this period.

⁷ The discussion of the definition of pro-poor growth can be found in Chapter Two.

During the recovery period, job creation was much lower than it was in both liberalisation periods (see Table 4.2). In terms of elasticity, both total and manufacturing sector elasticity was lower than in the pre-crisis period. Growth was also less labour intensive, however, people could not afford to be unemployed. Even in the case of economic contractions during the crisis, unemployment was lower than expected (Feridhanusetyawan, 2002). Instead, there was a shift of main occupation, with the displaced workers shifted from shrinking sectors to others, especially agriculture, or to the informal sector (Timmer, 2004). This adjustment reflected the flexibility in the Indonesian labour market (Manning, 2000 and Feridhanusetyawan, 2002).

Was growth during this recovery period less pro-poor ?

The poverty headcount ratio decreased by 5.2 per centage point to 18.2 per cent in 2002, which was only slightly higher than in 1996 (17.6 per cent). Suryahadi and Sumarto (2001) categorised poor people with per capita consumption below the poverty line immediately after the crisis, as (i) chronic and (ii) transient poor. The first category refers to those most likely to remain poor in the future, and the second category to those who might improve their consumption and be above the poverty line. Using their own methodology, Suryahadi and Sumarto (2001) concluded that the headcount ratio of transient poor had increased from 12.6 per cent in 1996 to 17.9 per cent of the population in 1999, whereas the chronic poor headcount index increased from 3.2 per cent to 9.5 per cent during the same period. Since the chronic poor contributed the largest share of the increase in the total headcount ratio during the crisis, growth during the recovery period should have had lifted consumption, at least of those in transient poverty above the poverty line.

Therefore, the second hypothesis to be proposed is that the growth elasticity of poverty during the recovery period would be expected to be low as growth was less labour intensive at a time when the economy was only just recovering after the crisis.

4.3. Empirical Methodology and Approach

Chapter Three provided an account of the general empirical methodology and approach used for both data collection and measurement.

The most basic model, suggested by Ravallion and Chen (1997), which is similar to equation 3.12:⁸

$$\ln P_{\alpha,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \sum_{e=1}^{e=6} \beta_e d_e + \delta_i + \varepsilon_{i,t} \quad (4.1)$$

$P_{\alpha,i,t}$ are poverty measures P0, P1 and P2 of province i at time t (per cent), where $\alpha = 0,1,2$.

$MEAN_{i,t}$ is the proxy of monthly mean consumption per capita (Rupiah, 1984 prices)

t is the index for year (t =1984, 1987, 1990, 1993, 1996, 1999, 2002)

e is the index for 6 dummies (e=1,2,3,4,5,6)

d are the year dummies for years when the National Socioeconomic Survey took place:

$d_{87} = 1$ if t=1987, or 0 otherwise

$d_{90} = 1$ if t=1990, or 0 otherwise

$d_{93} = 1$ if t=1993, or 0 otherwise

$d_{96} = 1$ if t=1996, or 0 otherwise

$d_{99} = 1$ if t=1999, or 0 otherwise

$d_{02} = 1$ if t=2002, or 0 otherwise

The base period is year 1984.

δ is the provincial fixed effect (unobserved heterogeneity)

ε is a white-noise error term that includes errors in the poverty measure.

⁸ The chosen methodology is also used in Friedman (2001, 2005) and Adams (2004) who calculated the growth elasticity of poverty in a cross country framework. Nevertheless, Adams (2004) had taken into account changes in distribution in calculating the growth elasticity of poverty.

There is no a priori sign of GEP, as the change in distribution is not yet controlled for. The main interest here whether the actual growth processes, as discussed by Ravallion and Chen (1997), typically reduce poverty.

Equation 4.1 assumes the impact of growth is similar across periods and one might argue that the result is not robust as the estimation of equation 4.1 suffers from omitted variable bias. Nevertheless, to some extent, the omitted variable problem which vary across time has been solved by incorporating six year dummies (d87, d90, d93, d96, d99 and d02). The year dummies also capture in general, the impact of macroeconomic conditions in each National Socioeconomic Survey consumption module period. Furthermore, the objective is only to analyse the growth impact without any other explanatory variables.

The coefficients of these year dummies compared to the base period of 1984 will indicate whether the level of poverty was higher on average (if there is a significant positive sign) or lower (if there is a significant negative sign) than for the base period of 1984.

However, equation 4.2 aims further to see whether there are differences in the growth elasticity of poverty across growth episodes. Therefore it is assumed the impact of growth on consumption is different across growth episodes by allowing interaction between real mean expenditure per capita and growth episodes. Six year dummies are still incorporated to capture the omitted variable bias.

$$\ln P_{\alpha,i,t} = \gamma_0 + \rho_1 \ln MEAN_{i,t} + \rho_2 EPISODE_{2,t} * \ln MEAN_{i,t} + \rho_3 EPISODE_{3,t} * \ln MEAN_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (4.2)$$

Where : $EPISODE_{j,t}$ are the dummies for growth episodes⁹ (only included in the estimation as the interaction variable), $j=2,3$

⁹ The dummies of growth episodes are used to capture the macroeconomic conditions during the specific growth episodes. Nevertheless, due to the format of the estimation and to match the period of the three yearly National Socioeconomic Survey Consumption Modules, the second liberalisation period only covers 1993 and 1996, while 1990 is included in the first period of liberalisation.

$EPISODE_{2,t} = 1$ if $t=1993$ and 1996 , or 0 otherwise

(the second period of liberalisation)

$EPISODE_{3,t} = 1$ if $t=1999$ and 2002 , or 0 otherwise

(the recovery period)

The base period of the growth episode is 1984-1990 (the first period of liberalisation)

To test the structural stability of the regression model, in order to check whether there is a structural change in growth and poverty relationship, the F test of joint significance of the interactions terms is carried out.

4.4. Empirical Results

4.4.1. The Growth Elasticity of Poverty Headcount Index (P0 GEP)

4.4.1.1. All periods

Table 4.4 column 1 reveals that the P0 growth elasticity of poverty (P0 GEP) in 1984-2002 was -2.21, which means a ten per cent increase in mean consumption per capita reduced the poverty headcount by 22.1 per cent. Even without being controlling for changes in the distribution of income, growth still reduced the poverty headcount.¹⁰

The inclusion of year 2002, which was the end of the recovery period, is likely to generate a slightly different result to Friedman's (2005) calculation of -1.96 to -2.33 (depended on the poverty line being used, and also without Gini coefficient as a control variable) during the period 1984-1999. This indicates that, at time t , for example, province x has an average real mean consumption of 100,000 Rupiah and a headcount ratio of 20 per cent. Therefore at time $t+1$, when average real

¹⁰ The author also tried to estimate GEP by using regional accounts data as a proxy for income. As previously discussed in Chapter 3, the growth elasticity of poverty is sensitive to the measure of income used (Adams, 2004). The result shows that the growth elasticity of poverty by using the Regional Gross Domestic Product (RGDP) per capita was lower (-0.24 for P0, -0.19 for P1 and -0.30 for P2) which is actually comparable with the findings of Suryahadi, Suryadarma and Sumarto (2006). The GEP with RGDP was lower than the growth elasticity of poverty which uses the mean consumption per capita, which may be due to lower correlation between RGDP per capita, and absolute poverty measures (Adams, 2004).

income per month increases by 10 per cent to 110,000 Rupiah, the headcount ratio decreases to 15.6 per cent.

Table 4.4. The Growth Elasticity of Poverty Headcount Index (P0 GEP)¹¹

Explanatory Variable	P0		GEP Across Growth Episodes	
	(1)		(2)	
	FE Estimate		FE Estimate	
<i>lnMEAN a)</i>	-2.21	***	-2.06	***
	(-18.79)		(-13.72)	
<i>EPISODE₂*lnMEAN</i>			-0.12	
			(-1.35)	
<i>EPISODE₃*lnMEAN</i>			-0.12	
			(-1.39)	
d87	-0.05		-0.04	
	(-1.30)		(-1.22)	
d90	-0.03		-0.04	
	(-0.75)		(-0.92)	
d93	-0.09	**	1.37	
	(-2.20)		(1.26)	
d96	-0.33	***	1.13	
	(-8.44)		(1.04)	
d99	-0.29	**	1.23	
	(-8.02)		(1.12)	
d02	-0.35	***	1.17	
	(-8.72)		(1.07)	
cons	30.37	***	28.59	
	(21.13)		(15.55)	
R-sq within	0.87		0.87	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. All estimations include Year Dummies. Number of observations are 171.

a) refers to the first period of liberalisation 1984-1990.

4.4.1.2. Across growth episodes

What happened to the growth elasticity of poverty across periods? The GEP of poverty headcount was only significant during the first period of liberalisation, as indicated in Table 4.4 column 2. Although, the joint significance F test is

¹¹ In estimating a panel data, one should choose between consistent estimate (Fixed Effect) or efficient estimate (Generalised Least Squares or GLS, which has already corrected for the heteroskedasticity problem). Random Effect (GLS) procedure does not acknowledge the fixed effect of provinces explicitly, it is efficient but not consistent. Nevertheless, the standard error correction procedure (for heteroskedasticity – consistent) was applied to all the calculations for fixed effects. The coefficients do not change and there is only a slight difference in standard error. The same results were found for all other calculations in this chapter and subsequent chapters. The other standard error correction procedure of clustered standard errors is not relevant since the unit of analysis is not a household level.

significant which shows that there is a structural change in the relationship between growth and poverty across growth episodes, none of the interactions terms is significant.

It is important to note that Table 4.4 column 2 shows the coefficient of $\ln MEAN$ as P0 GEP during the base period 1984-1990. The coefficients for the other periods are interpreted as deviations from this base period. For example, the coefficient of $\ln MEAN$ is -2.06, the P0 GEP for the first period of liberalisation. Therefore, the coefficient of $EPISODE2 * \ln MEAN$ is -0.12, so the P0 GEP for the second period of liberalisation was equal to -2.18, which is also similar to the P0 GEP for the recovery period. A ten per cent increase in income will reduce the poverty headcount by 21.8 per cent. However, the difference between P0 GEP for the first period of liberalisation and P0 GEP of other episodes is not statistically significant at $\alpha=10\%$.

By taking into account different growth episodes, in comparison with the P0 estimation, none of the coefficients of year dummies is significant at $\alpha=10\%$. This might indicate growth of mean consumption per capita has explained almost everything (all omitted time varying variables) for headcount poverty.

4.4.2. The Growth Elasticity of Poverty Gap Index (P1 GEP) and Poverty Severity Index (P2 GEP)

4.4.2.1. All periods

Here it can be seen that the P1 growth elasticity of poverty (P1 GEP) was slightly less elastic than P0 GEP (-2.21), although the magnitude did not differ much (see Table 4.5 column 1) at -2.15.¹²

Although in the 18 years from 1984-2002, growth did lower the headcount index, the expenditure gap in 2002 was still the same as it was in 1984. This probably explains why the P1 GEP was less than P0 GEP because growth did not reduce the expenditure gap ratio. For example, if the poverty gap index (P1) is 2 per cent initially, a 10 per cent increase in mean consumption per capita will reduce

¹² The growth elasticity of poverty is more elastic if it is higher in the absolute number.

the gap index by 21.5 per cent to 1.6 per cent. Whereas in the case of the headcount index, for example, it was initially at 20 per cent with -2.21 P0 GEP, so a 10 per cent increase in mean reduces the headcount index to 15.6 per cent.

Table 4.5. The Growth Elasticity of Poverty Gap Index (P1 GEP)

Explanatory Variable	P1			
	(1)		GEP Across Growth Episodes (2)	
	FE Estimate		FE Estimate	
<i>lnMEAN</i> a)	-2.15	***	-2.53	***
	(-9.26)		(-9.11)	
<i>EPISODE₂*lnMEAN</i>			0.59	***
			(3.59)	
<i>EPISODE₃*lnMEAN</i>			-0.08	
			(-0.50)	
d87	-0.13	*	-0.13	**
	(-1.75)		(-2.00)	
d90	-0.14	*	-0.12	*
	(-1.75)		(-1.61)	
d93	0.16	**	-7.06	***
	(2.00)		(-3.52)	
d96	-1.15	***	-8.36	***
	(-15.02)		(-4.17)	
d99	-0.51	**	0.50	
	(-7.07)		(0.25)	
d02	-0.64	***	0.41	
	(-8.19)		(0.20)	
cons	28.16	***	32.75	***
	(9.91)		(9.66)	
R-sq within	0.83		0.85	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. All estimations include Year Dummies. Number of observations are 171.

a) refers to the first period of liberalisation 1984-1990.

Therefore, following equation 3.7 in Chapter Three, there is not much improvement in terms of average consumption among the poor, if the initial expenditure gap is 10 per cent (2/20) and the expenditure gap after increase in mean is also still around 10 per cent (1.57/15.58), as the magnitude of P0 and P1 GEP did not differ much. This shows the gap does not change much more than the initial gap (9.9 per cent) and the average consumption among the poor was still at 90 per cent of the poverty line. In other words, the average living standard of the poor did not improve much, as illustrated in Table 4.6.

Table 4.6. Illustration of the Change in Expenditure Gap as an Implication of P0 and P1 GEP

GEP	Poverty Rates t (per cent)	Growth (per cent)	Poverty Rates t+1 (per cent)	Expenditure Gap t =P0/P1	Expenditure Gap t+1 =P0/P1
(a)	(b)	(c)	(d)=(b)-((a)*(c) *(b)/100)	(e)	(f)
P0	-2.21	20	10	15.58	10
P1	-2.15	2		1.57	9.92

Source : Author's calculation

Table 4.7 column 1 shows growth elasticity of poverty was higher for P2 than both P0 and P1 at -2.42. As P2 GEP > P1 GEP and P2 GEP > P0 GEP. This means that growth over time also led to an improvement in the distribution amongst the poor.

Table 4.7. The Growth Elasticity of the Poverty Severity Index (P2 GEP)

Explanatory Variable	P2			
	(1)		GEP Across Growth Episodes (2)	
	FE Estimate		FE Estimate	
lnMEAN a)	-2.42	***	-2.93	***
	(-7.74)		(-7.85)	
EPISODE ₂ *lnMEAN			0.79	***
			(3.59)	
EPISODE ₃ *lnMEAN			-0.10	
			(-0.44)	
d87	-0.22	**	-0.23	**
	(-2.28)		(-2.56)	
d90	-0.21	*	-0.18	*
	(-1.88)		(-1.75)	
d93	0.07		-9.64	***
	(0.65)		(-3.57)	
d96	-1.42	***	-11.11	***
	(-13.81)		(-4.12)	
d99	-0.68	***	0.53	
	(-7.09)		(0.20)	
d02	-0.85	***	0.42	
	(-8.05)		(0.15)	
cons	30.28	***	36.52	***
	(7.93)		(8.01)	
R-sq within	0.79		0.82	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. All estimations include Year Dummies. Number of observations are 171.

a) refers to the first period of liberalisation 1984-1990.

The coefficients of year dummies for P0, P1 and P2 are significant for all periods analysis, except for d87 and d90 in P0 estimation and d93 in P2 estimation (Tables 4.4, 4.5 and 4.7, all column 1). This discrepancy may reflect omitted variables which are not captured by growth and up to now are still lumped together in the year dummies and some pro-poor strategies. These may vary across time and are significant to poverty reduction. In addition, the significances of year dummies can also have additional interpretations. Especially for d96, d99 and d02 which are always statistically significant, 1996/1997 was the end of the three year Less Developed Villages Presidential Instruction (*Inpres Desa Tertinggal/IDT*) program which aimed to reduce the number of the poorest people in the less developed villages.

The years 1999 and 2002 were closely related to the Social Safety Net program to overcome the social impact of the crisis. The Less Developed Villages Presidential Instruction provided a capital injection of Rp. 20 to 60 million per village in terms of small scale credit covering 20,000 poor villages across Indonesia (Perdana and Maxwell, 2004). The Social Safety Net program provided more basic necessities such as food security (the sale of the subsidized rice), health subsidies (medical services, family planning, health centre operations), scholarships and an employment creation (*padat karya*) program (Sumarto, Suryahadi and Widyanti, 2001; Perdana and Maxwell, 2004).

4.4.2.2. Across growth episodes

One important finding for P1 and P2 GEP is that growth in the second period of liberalisation was less poverty elastic than either in the first period or the recovery period, as indicated in Tables 4.5 and 4.7 column 2.¹³ The P1 GEP during the first period of liberalisation was -2.53, whereas it was only -1.94 (-2.53+0.59) during the second period of liberalisation. P2 GEP during the first period of liberalisation was -2.93 but it was lower at -2.14 (-2.93+0.79) during the second period of liberalisation.

¹³ The joint F test of the interaction terms is significant (both for P1 and P2).

Comparing the first and second period of liberalisation, the first hypothesis is confirmed for P1 and P2, that is the growth elasticity of poverty was significantly higher during the first period of liberalisation when growth was more labour intensive. As the pace of the reform was stronger during the first period of liberalisation, it moved those living below the poverty line (on average) closer to the poverty line. Then the pace of the liberalisation slowed down during the second period when growth was less labour intensive, and should have begun to experience a diminishing return in terms of poverty impact. For the poverty headcount index, growth continued to have a high impact on P0 GEP (although the difference was not significant). However, this did not hold for the depth and the poverty severity index, as the pace of the liberalisation was also slower.

There was a diminishing return of growth to both P1 and P2 causing the impact of growth to be also lower during this period. Due to this factor, growth during the second period of liberalisation could only potentially raise poor people with consumption close to the poverty line and its the impact was less for those with consumption well below the poverty line.¹⁴ The fact that the very poor missed out on the benefits of the liberalisation, may indicate that the very poor lived in the isolated and remote area and did not have enough capacity such as human capital to participate in the labour market (in responding to the job creation).

In addition, as indicated in Table 4.1, annual mean consumption per capita grew more slowly during the second liberalisation period compared with the first period. Accordingly, average consumption per capita among the poor also fell slightly compared with the previous period, contributing to a lower P1 and P2 GEP. As the estimation has not taken into account the changes in distribution, another important inference is that the GEP actually followed the changes in distribution. In fact, there was higher Gini inequality in 1996, at 0.36 compared with that in 1990 at 0.33. Therefore the growth impact on poverty, especially on P2 which places a higher weight on unequal income distribution, was also lower, since inequality increased.

¹⁴ Heltberg (2004) argued that for a given distribution, growth is expected to have a higher impact on poverty the closer the consumption of the poor to the poverty line.

In contrast, P1 and P2 GEP were the highest during the recovery period 1999-2002, i.e. -2.61 (-2.53+-0.08) for P1 and -3.03 (-2.93+-0.10) for P2, as indicated in Tables 4.5 and 4.7 all column 2, although the difference is not statistically significant compared with P1 and P2 GEP during the first period of liberalisation, the base period.

Therefore the hypothesis that the growth elasticity of poverty was low during the recovery period is rejected. Although growth was considered to be less labour intensive, after the economic crisis, when growth did resume it was from a relatively lower base of mean consumption per capita (see Table 4.1).

Accordingly, the growth impact on poverty gap and the poverty severity index was larger and the impact stronger compared to the situation when mean consumption per capita was already relatively high (where the growth or the return was larger). It is also possible that macroeconomic conditions during the recovery period were again conducive to growth in reducing poverty. Thus, when growth resumed, people living under transient poverty also recovered quickly, with consumption expected to return to normal. Furthermore, as discussed in Sumarto, Suryahadi and Widyanti (2001), during the recovery period a lot of government expenditure was allocated to a poverty alleviation program, known as the Indonesian Social Safety Net program discussed earlier, which affected not only P0 GEP but also P1 and P2 GEP even more than P0 GEP.

Tables 4.4, 4.5 and 4.7 column 2 also reveal that, across growth episodes, the sequence of $P0\ GEP < P1\ GEP < P2\ GEP$ only occurred during the first period of liberalisation and the recovery period. Growth in the second period of liberalisation might have less impact on poverty for those whose consumption was located well below the poverty line.

The coefficients of year dummies from d87 to d96 in Tables 4.5 and 4.7 column 2 are significant and had a negative sign, meaning that, on average, P1 and P2 in the years 1987-1996 were less than for the base period of 1984. It suggests that other time varying variables, which have not been captured by growth, may matter for P1 and P2 reduction. Dummy variables d93 and d96 are also possibly influenced

by the Less Developed Village Presidential Instruction program discussed earlier. Nevertheless the coefficient of year dummies of d99 and d02 (for across growth episodes analysis) were not significant for all P0, P1 and P2 estimations.

Finally, Table 4.8 presents the summary of the growth elasticity of poverty across periods as discussed earlier. The results presented below may differ from the results presented in Chapter Six, when the multivariate analysis is carried out to address the omitted variable bias more properly.

Table 4.8. GEP Estimates of Absolute Poverty, All Growth Episodes

	P0	P1	P2
1984-2002 (all periods)	-2.21*)	-2.15*)	-2.42*)
<i>Across growth episodes</i>			
First period of liberalisation	-2.06*)	-2.53*)	-2.93*)
Second period of liberalisation	-2.18	-1.94*)	-2.14*)
Recovery period	-2.18	-2.61	-3.03

Source : Author's calculation

Note : *) significant

4.5. Conclusions

This chapter uses seven waves of the National Socioeconomic Survey consumption modules to calculate the Growth Elasticity of Poverty (GEP) by taking into account provincial unobserved heterogeneity of provinces and growth episodes. Several important findings emerge.

First, GEP is significant. Growth has been 'friendly' to the poorest of the poor, P1 and P2 generally, although it was not always better than P0, even without being controlling for other variables and inequality.

Second, on whether the impact of growth episodes on poverty differs over time, except for P1 and P2 GEP, the first period of liberalisation was not significantly higher than the second period of liberalisation. Thus the evidence from the recovery period does not support the hypothesis. In addition, the results suggest

that, in general, the relationship between labour intensive growth and the growth elasticity of poverty was not as strong as the data on employment seemed to indicate.

Third, in general, some of the coefficients of the year dummies of the National Socioeconomic Survey consumption modules period are significant and reflect not only the possibility of omitted variables, which matter directly for poverty reduction, but also time-specific pro-poor strategies. This important point leads us to the next empirical estimation in Chapter Six where growth alone is shown to be insufficient for poverty reduction.

Chapter Five

Regional Growth Elasticity of Poverty Estimates, How Does Regional Poverty Respond to Growth ?

5.1. Introduction

In Chapter Four it has been shown that there was heterogeneity of growth elasticity of poverty across growth episodes. This chapter now examines whether there was also heterogeneity of growth elasticity of poverty across regions within Indonesia. The issue of growth elasticity of poverty across regions is important as it is closely related with regional development in Indonesia, the largest archipelagic country in the world. This is especially because there is such regional diversity which has persisted over time, not only in terms of resource endowment, but also socio economic indicators (Hill, 1989).

As one of the countries categorised by the World Bank (1993) as one of the East Asian miracle, Indonesia experienced rapid economic growth for three decades (1966-1996) up to the recent East Asian financial crisis. The national trend shows that the growth brought changes both in the structure of the economy and in the living conditions of the population.

Whilst, at the national level, falling absolute poverty headcount had been associated with economic growth, it is necessary to investigate whether the same phenomena can be found in regions or groups of provinces in Indonesia.

Therefore, this chapter investigates the role of regional effects on growth elasticity of poverty. It is expected that if heterogeneities are found across regions, these may reflect the diversities of those regions. As in Chapter Four, the growth elasticity of poverty is estimated by using data from seven consecutive cross section National Socioeconomic Surveys from 1984-2002, covering 26 provinces.

This chapter focuses specifically on the regional growth elasticity of poverty, which is based on a typology of distribution of provinces through several conventional classifications of provinces that have already been proposed. Here, however, there are three additional values which can add to the previous literature. As in Chapter Four, first, this analysis will use a longer time series, with an additional year 2002 as unit of observation. The intention is to extend the Friedman (2005) analysis to investigate the role of regional effects on the growth elasticity of poverty. While there should have been a common effect that growth was pro-poor nationally, the question must be asked whether the growth elasticity of poverty differed across groups of provinces.¹ Second, the analysis is based not only on the headcount index but will include other absolute poverty measures, notably poverty gap and squared poverty gap index. Third, it will test growth elasticity of poverty across groups of provinces which are beyond a contiguous grouping by geographical location.

As this is a preliminary analysis, in this empirical section the main focus is to examine only growth of consumption (expenditure) as an independent variable. The role of other variables will be analysed separately in Chapters Six and Seven, where the role of regional structural characteristics, and not only growth, are also analysed as determinants of poverty reduction.

Provinces thus are classified either on the basis of (i) Java-Bali and all other provinces (so-called Outer Islands); by (ii) major islands groups; and to be more analytical, by (iii) the Hill (1989) regional classification which takes into account geographical location, natural resource endowment and population density of the provinces.

Three hypotheses are advanced. First, the growth elasticity of poverty should have been high in Java-Bali as growth in this region was associated with greater integration of markets, both international and domestic owing to better infrastructure and greater human capital, enabling the greater transmission of the growth impact to poverty reduction.

¹ The discussion about the definition of pro-poor growth can be found in Chapter Two.

Second, the growth elasticity of poverty is expected to have been low in resource rich provinces, since growth was slower and most of the revenue from oil and gas extraction was appropriated by the Central Government rather than to the provinces and thus growth was likely to provide a limited spillover to the domestic population.²

Third, the growth elasticity of poverty is expected to have been high in low income, relatively isolated provinces where growth was more labour intensive as the main sector tends to be agriculture and there was a tendency towards convergence.³

It is assumed that all the hypotheses to be tested are valid for all three absolute poverty measures used in this chapter.

The chapter is organised into seven sections. Following the introduction, section two presents the data and measurements. Section three describes trends in provincial poverty changes and economic growth. Section four discusses the conventional groupings of provinces in Indonesia. Section five presents an empirical methodology and strategy. Section six analyses the empirical results, while the final section draws conclusions from this analysis.

5.2. Data and Measurements

Chapter Three discusses for the data and measurement issues. In short, three absolute poverty measures (P0, P1 and P2) identified by Foster, Greer and Thorbecke (1984), together with real mean consumption per capita, are used to estimate the growth elasticity of poverty.

² As discussed in Chapter Two.

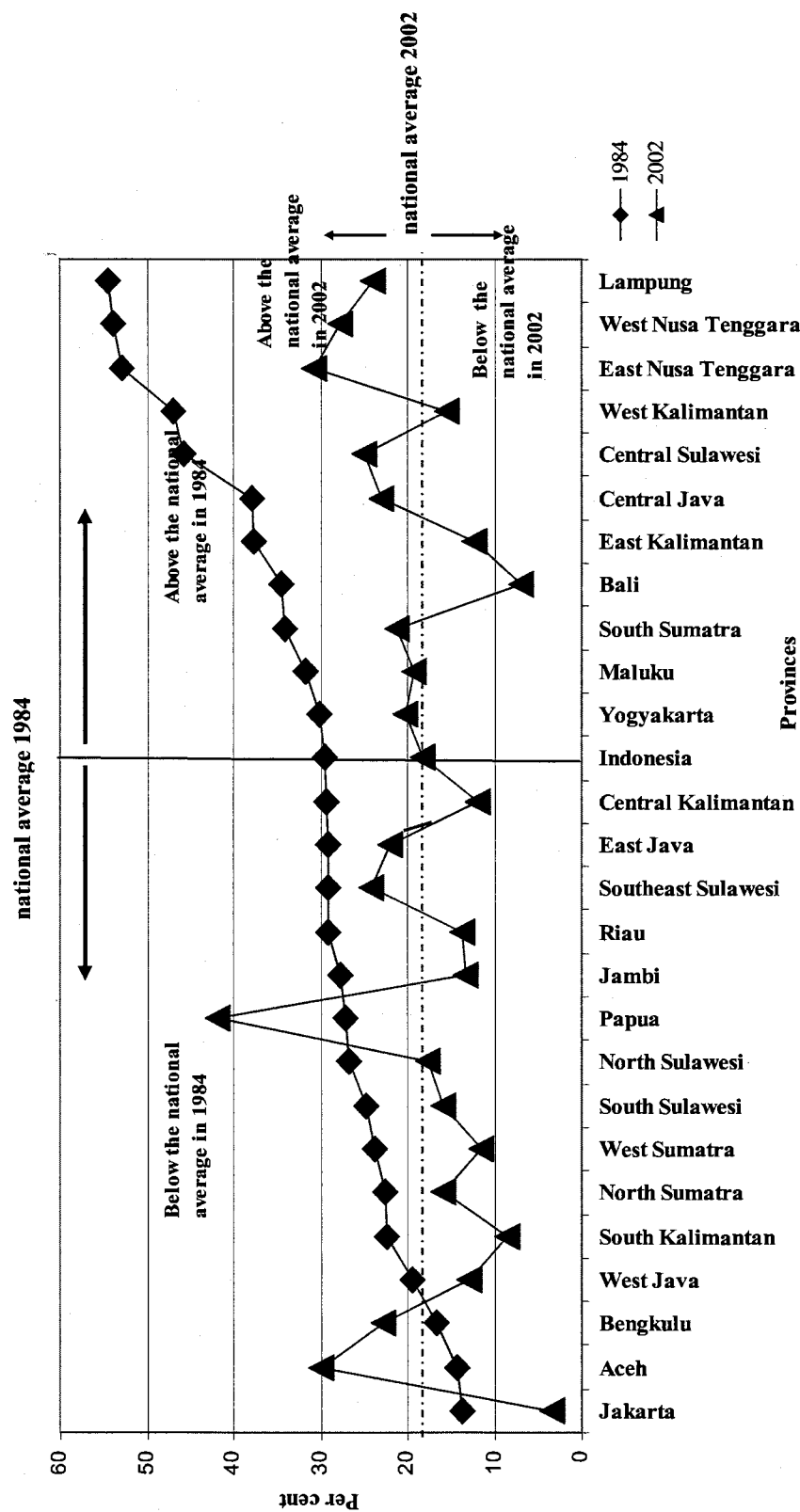
³ *ibid.*, p. 99.

5.3. Trends in Provincial Poverty

As can be seen from Figure 5.1, there are clear disparities in headcount poverty ratio among provinces in Indonesia.

However, in general, the headcount poverty was lower in 2002 than in the initial period of 1984, suggesting a common impact that growth reduced headcount poverty during 1984-2002, except for Bengkulu, Aceh and Papua. For Aceh and Papua the higher headcount index in 2002 than in 1984 may be related to the fact that there has been ongoing social and political unrest in these provinces. Nevertheless, it can be seen that provinces such as West and East Nusa Tenggara, Maluku, Papua, and Lampung persistently had high headcount poverty ratios both in 1984 and 2002, while the ratios in Jakarta, West Java, and Bali were always lower.

Figure 5.1. Provincial Headcount Poverty Ratio 1984-2002 (%)



Source : CBS, National Socioeconomic Survey, 1984-2002

What about the trend in the changes in poverty? Table 5.1 provides the trend rates of absolute poverty change in terms of the headcount index (P0), the poverty gap index (P1) and the squared poverty gap or poverty severity index (P2) of all provinces. These are *compounded* annualised changes (Table 5.1 columns 4, 5, 6) and the relative change compared with the initial level (Table 5.1 columns 7, 8, 9). There was a large variation in terms of the trend rate of reduction per year in the headcount ratio, from 8.5 per cent in Bali, (followed closely by Jakarta and then the four Kalimantan provinces), to the lowest rate of Aceh which experienced, in fact, an annual increase of the headcount ratio of 4.2 per cent per year. Amongst the provinces with fast reduction of headcount ratio (Bali, Jakarta, and East, South, West and Central Kalimantan), half of them started with low headcount ratio in 1984 which were already less than half of the national average (Jakarta, South and Central Kalimantan). The relative change, which is the point change in poverty rate as a percentage of the initial rate, also shows an almost similar pattern. For Bali, Jakarta, and the four Kalimantan provinces, the 2002 headcount index was less by at least 60 per cent of the initial 1984 headcount index.

The same phenomena can be found in the poverty gap and squared poverty gap indices, that show patterns of regional variation in poverty reduction (see Table 5.1).

**Table 5.1. Initial Poverty Rate in 1984 and Poverty Changes 1984-2002,
by Provinces and Islands Grouping**

	Provinces	Initial Rate in 1984			Annualised Change			Relative Change a)		
		P0	P1	P2	P0	P1	P2	P0	P1	P2
		(per cent)			(per cent per year)			(per cent)		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Java-Bali	27.5	6.0	2.0	-4.1	-5.6	-7.0	-47.6	-58.4	-66.2
	Jakarta	13.7	2.3	0.6	-7.4	-9.3	-11.3	-75.0	-82.8	-88.5
	West Java	19.4	3.4	0.9	-2.2	-2.8	-3.3	-33.4	-39.6	-44.9
	Central Java	37.9	8.9	3.1	-2.7	-4.4	-5.8	-39.1	-55.2	-65.7
	Yogyakarta	30.1	6.4	2.1	-2.2	-2.9	-3.6	-33.2	-40.7	-48.2
	East Java	29.1	6.8	2.4	-1.6	-3.1	-4.6	-24.8	-43.1	-57.2
	Bali	34.4	8.4	2.9	-8.5	-11.4	-13.5	-80.0	-88.8	-92.7
2	Outer Islands	32.8	8.2	3.0	-2.7	-4.2	-5.4	-30.0	-43.2	-49.4
2.1.	Sumatra	30.2	6.7	2.2	-1.9	-2.7	-3.2	-17.0	-23.5	-22.5
	Aceh	14.3	2.0	0.4	4.2	4.5	5.1	108.6	119.5	145.0
	North Sumatra	22.6	4.2	1.2	-2.0	-2.6	-3.1	-29.8	-37.8	-43.6
	West Sumatra	23.8	5.3	1.9	-3.9	-5.8	-8.0	-51.4	-65.9	-77.6
	Riau	29.1	4.8	1.2	-4.1	-4.8	-5.1	-53.2	-58.5	-61.0
	Jambi	27.7	3.9	0.9	-4.0	-2.7	-1.6	-52.3	-39.3	-25.1
	South Sumatra	34.1	7.5	2.5	-2.6	-4.4	-5.7	-37.7	-55.4	-65.2
	Bengkulu	16.7	2.8	0.6	1.7	1.1	1.4	35.8	22.4	28.3
	Lampung	54.5	15.5	6.0	-4.5	-7.0	-8.9	-55.9	-73.1	-81.2
2.2.	Nusa Tenggara	53.4	16.3	6.6	-3.3	-5.7	-7.6	-45.2	-64.8	-75.6
	West									
	Nusatenggara	53.8	16.3	6.5	-3.6	-6.3	-8.6	-48.4	-69.2	-80.2
	East Nusatenggara	52.9	16.3	6.8	-3.0	-5.0	-6.6	-41.9	-60.3	-70.9
2.3.	Kalimantan	35.3	8.5	3.2	-2.3	-4.7	-6.6	-64.1	-74.2	-77.6
	West Kalimantan	47.0	11.9	4.2	-6.0	-8.5	-10.3	-67.1	-80.0	-85.8
	Central									
	Kalimantan	29.4	5.2	1.3	-4.9	-5.1	-4.5	-59.6	-60.9	-56.4
	South Kalimantan	22.4	4.0	1.1	-5.2	-6.9	-8.2	-62.0	-72.5	-78.6
	East Kalimantan	37.7	11.4	4.6	-6.1	-9.5	-12.0	-67.6	-83.4	-89.9
2.4.	Sulawesi	28.3	7.8	3.2	-2.3	-4.7	-6.6	-33.1	-56.2	-69.0
	North Sulawesi	26.7	9.0	4.1	-2.3	-6.1	-8.9	-34.3	-67.7	-81.2
	Central Sulawesi	45.7	12.0	4.4	-3.3	-5.3	-7.0	-45.5	-62.7	-72.8
	South Sulawesi	24.7	6.5	2.5	-2.4	-4.6	-6.5	-35.6	-57.1	-70.3
	Southeast Sulawesi	29.1	7.7	3.0	-1.0	-2.6	-3.9	-16.8	-37.4	-51.5
2.5.	Maluku and Papua	32.9	8.2	3.0	-0.2	-0.9	-2.5	-7.9	-27.0	-45.5
	Maluku	31.7	7.8	2.9	-2.7	-2.3	-3.7	-39.2	-34.1	-49.6
	Papua	27.2	7.3	2.8	2.4	0.5	-1.3	54.0	9.0	-20.5
	Indonesia	29.5	6.8	2.4	-2.7	-4.4	-5.9	-38.3	-55.8	-66.5

Source : CBS, National Socioeconomic Survey, various years

Note : Author's calculation

a) Relative change compared with the initial level is calculated with the following formula,

$$\frac{P_{\alpha,i,2002} - P_{\alpha,i,1984}}{P_{\alpha,i,1984}} * 100$$

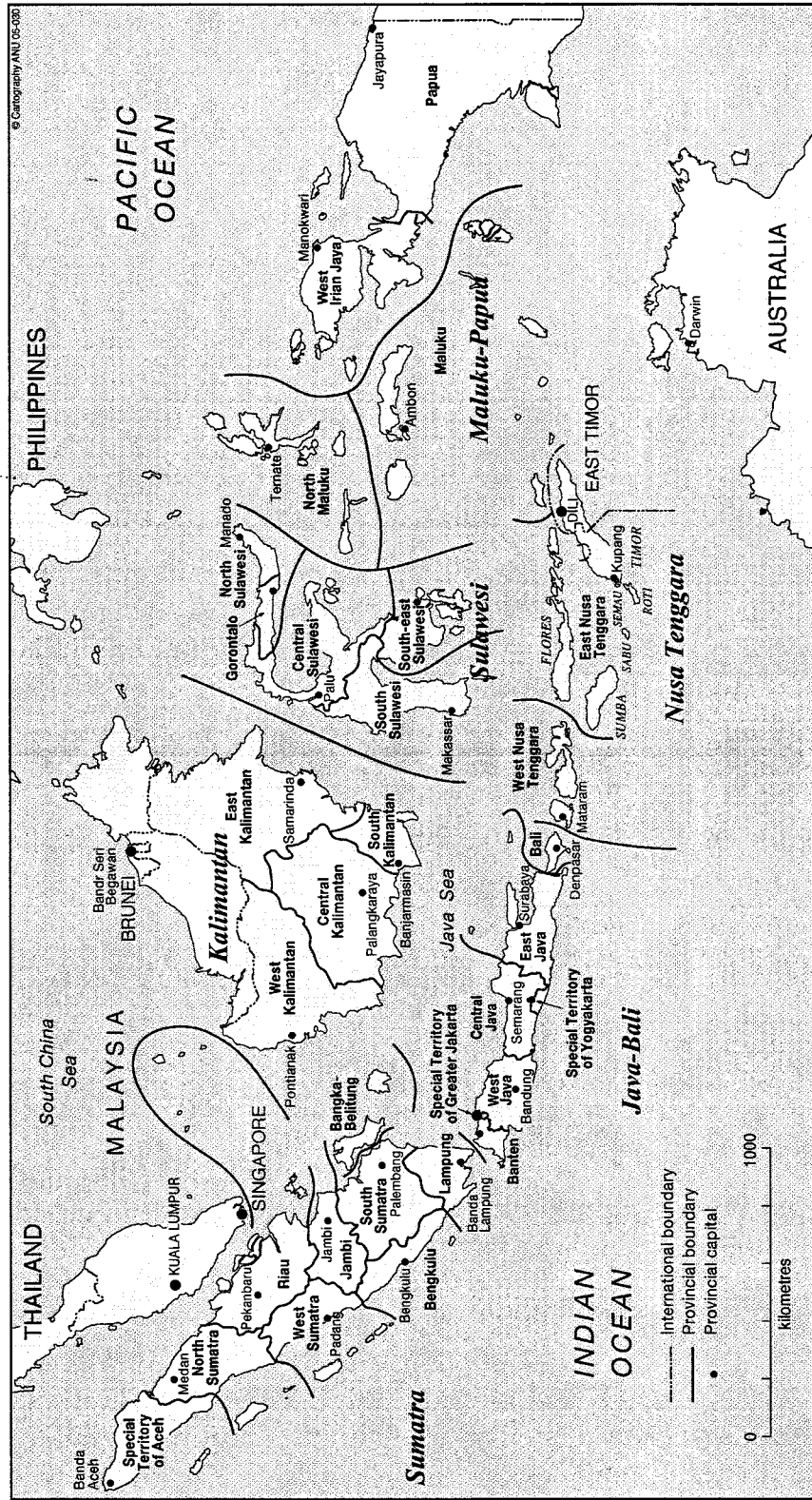
Therefore the question must be asked why there are disparities in terms of absolute poverty reduction among provinces in Indonesia? While the cross country studies find that the cross country measures of absolute poverty tend to fall with the general pattern of economic growth, it is expected that the variation in terms of regional absolute poverty reduction within a country could also be explained by the variation in regional economic growth. For a given similar rate of growth of income, the impact on poverty can also be different. Accordingly, the growth elasticity of poverty in Indonesia is estimated based on the conventional groupings of provinces outlined below.

5.4. Conventional Groupings of Provinces in Indonesia

The available data will not give robust estimates in the inter-provincial differences in the growth elasticities of poverty using econometric specification since there are only seven years of observations for each province. Therefore, to overcome this problem, the variation of growth elasticities of poverty are expected to be captured across groups of provinces, which are based on a typology of provinces that reflects geographical locations, or groups of provinces with common differences in structural characteristics that may affect the growth-poverty relationship.

As noted, the conventional regional classification of provinces in Indonesia is that between Java-Bali and the other (Outer Island) provinces (see the map of Indonesia in Figure 5.2). A second classification system is to divide the Outer Islands into five groups of islands: Sumatra, Nusa Tenggara, Kalimantan, Sulawesi, and Maluku-Papua (or sometimes Eastern and Western Indonesia, where Western covers Java-Bali and Sumatra). A third classification is to divide the provinces based on their structural characteristics. Hill (1989) pioneered this type of classification by taking into account the geographical location, natural resource endowment and population density indicators of the provinces. However, his original classification is updated with current data to reflect the structural changes that have occurred, since most of the factors behind underlying his classification relied on 1980s data.

Figure 5.2. Indonesian Map



Source : Resosudarmo (ed.), *The Politics and Economics of Indonesia's Natural Resources*, 2005
 Note : Outer Islands are Sumatra, Kalimantan, Nusa Tenggara, Sulawesi, and Maluku-Papua.

Table 5.2 below presents the initial poverty level in 1984 and trends of poverty changes, by Hill's province grouping, in which the classification has been updated as in Table 5.5.

Table 5.2. Initial Poverty Rate in 1984 and Poverty Changes 1984-2002, by the Hill Province Grouping

Provinces	Initial Rate in 1984			Annualised Change			Relative Change a)		
	P0	P1	P2	P0	P1	P2	P0	P1	P2
	(per cent)			(per cent per year)			(per cent)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Aceh	14.3	2.0	0.4	4.2	4.5	5.1	108.6	119.5	145.0
Riau	29.1	4.8	1.2	-4.1	-4.8	-5.1	-53.2	-58.5	-61.0
East Kalimantan	37.7	11.4	4.6	-6.1	-9.5	-12.0	-67.6	-83.4	-89.9
Papua	27.2	7.3	2.8	2.4	0.5	-1.3	54.0	9.0	-20.5
<i>Resource rich provinces</i>	25.1	5.4	1.8	-0.9	-2.3	-3.3	10.4	-3.3	-6.6
Lampung	54.5	15.5	6.0	-4.5	-7.0	-8.9	-55.9	-73.1	-81.2
DKI Jakarta	13.7	2.3	0.6	-7.4	-9.3	-11.3	-75.0	-82.8	-88.5
West Java	19.4	3.4	0.9	-2.2	-2.8	-3.3	-33.4	-39.6	-44.9
Central Java	37.9	8.9	3.1	-2.7	-4.4	-5.8	-39.1	-55.2	-65.7
DI Yogyakarta	30.1	6.4	2.1	-2.2	-2.9	-3.6	-33.2	-40.7	-48.2
East Java	29.1	6.8	2.4	-1.6	-3.1	-4.6	-24.8	-43.1	-57.2
Bali	34.4	8.4	2.9	-8.5	-11.4	-13.5	-80.0	-88.8	-92.7
<i>Densely populated provinces</i>	29.0	6.5	2.2	-4.2	-5.8	-7.3	-48.8	-60.5	-68.3
North Sumatra	22.6	4.2	1.2	-2.0	-2.6	-3.1	-29.8	-37.8	-43.6
West Sumatra	23.8	5.3	1.9	-3.9	-5.8	-8.0	-51.4	-65.9	-77.6
South Sumatra	34.1	7.5	2.5	-2.6	-4.4	-5.7	-37.7	-55.4	-65.2
South Kalimantan	22.4	4.0	1.1	-5.2	-6.9	-8.2	-62.0	-72.5	-78.6
North Sulawesi	26.7	9.0	4.1	-2.3	-6.1	-8.9	-34.3	-67.7	-81.2
South Sulawesi	24.7	6.5	2.5	-2.4	-4.6	-6.5	-35.6	-57.1	-70.3
<i>Settled Outer Island provinces</i>	25.6	5.8	2.0	-3.1	-5.1	-6.7	-41.8	-59.4	-69.4
Jambi	27.7	3.9	0.9	-4.0	-2.7	-1.6	-52.3	-39.3	-25.1
Bengkulu	16.7	2.8	0.6	1.7	1.1	1.4	35.8	22.4	28.3
West Kalimantan	47.0	11.9	4.2	-6.0	-8.5	-10.3	-67.1	-80.0	-85.8
Central Kalimantan	29.4	5.2	1.3	-4.9	-5.1	-4.5	-59.6	-60.9	-56.4
Central Sulawesi	45.7	12.0	4.4	-3.3	-5.3	-7.0	-45.5	-62.7	-72.8
Southeast Sulawesi	29.1	7.7	3.0	-1.0	-2.6	-3.9	-16.8	-37.4	-51.5
Maluku	31.7	7.8	2.9	-2.7	-2.3	-3.7	-39.2	-34.1	-49.6
<i>Sparsely populated provinces</i>	35.2	8.3	2.8	-2.9	-3.6	-4.2	-35.0	-41.7	-44.7
West Nusa Tenggara	53.8	16.3	6.5	-3.6	-6.3	-8.6	-48.4	-69.2	-80.2
East Nusa Tenggara	52.9	16.3	6.8	-3.0	-5.0	-6.6	-41.9	-60.3	-70.9
<i>Isolated provinces</i>	53.4	16.3	6.6	-3.3	-5.7	-7.6	-45.2	-64.8	-75.6
<i>Indonesia</i>	29.5	6.8	2.4	-2.7	-4.4	-5.9	-38.3	-55.8	-66.5

Source : CBS, National Socioeconomic Survey, various years

Note : Author's calculation

a) Relative change compared with the initial level is calculated with the following formula,

$$\frac{P_{\alpha,i,2002} - P_{\alpha,i,1984}}{P_{\alpha,i,1984}} * 100$$

The following subsection describes the group of provinces by (i) Java-Bali and the Outer Island provinces, (ii) islands grouping, and (iii) the Hill province grouping. Table 5.3 presents the annualised growth rates of mean consumption per capita 1984-2002. Furthermore, the selected indicators of non oil and gas Regional Gross Domestic Product (RGDP), education and infrastructure, presented in Table 5.4, are used to describe the social economic indicators of these groups of provinces.

Income per capita. The indicators used are non oil and gas RGDP per capita in 1983 rupiah. Provincial RGDP per capita reflects what each province produces per person.

Education. The indicators selected are junior secondary school net enrolments as a percentage of the relevant age group, and secondary school and higher attainment ratio as a percentage of population aged 10 and higher. Secondary schooling is chosen over the primary schooling indicators to better capture the disparity among provinces, since not much variation can be found in primary schooling indicators, especially on the enrolment ratio. Schooling increases the ability to learn and also productivity (Garcia Garcia and Soelistianingsih, 1998).

Infrastructure. The indicators selected are the percentage of paved roads to total road length, and the paved road density (multiplied by 1000 to reflect km per 1000 km²). As discussed in Chapter Two, paved road length is the simplest indicator of infrastructure which is necessary to interconnect all growth-generating sectors in different regions, especially to link the poor with the economic activity within the regions or across regions (Kwon, 2006; Jalilian and Weiss, 2006). Paved roads is chosen since it is a better indication of the quality of roads, as also used by previous literature on Indonesia (Hill, 2000). Nevertheless, this indicator has weaknesses as it is biased against regions which depend on non road transportation, for example in regions which depend more on river and sea transport (such as West Kalimantan, Papua, etc).

5.4.1. Java-Bali and the Outer Island Provinces

As indicated in Table 5.1, the initial poverty measures for Java- Bali in 1984 for P0, P1 and P2 were slightly lower than for the Outer Islands. Moreover, Java-Bali also experienced more rapid poverty reduction and grew faster than the Outer Islands, as indicated in Table 5.3.

Table 5.3. Annualised Growth Rates of Mean Consumption Per Capita 1984-2002

No	Group of Provinces	Annualised Growth Rates of Mean Consumption Per capita (per centage per year)
1	Java-Bali	1.14
2	Outer Islands	0.90
2.1	Sumatra	0.87
2.2	Nusa Tenggara	0.88
2.3	Kalimantan	1.15
2.4	Sulawesi	0.55
2.5	Maluku-Papua	-2.3 a)
3	The Hill province grouping	
3.1	Resource rich provinces	-0.54 a)
3.2	Densely populated provinces	1.14
3.3	Settled Outer Island provinces	0.61
3.4	Sparsely populated provinces	0.93
3.5	Isolated provinces	0.88
	Indonesia	

Source : CBS, *National Socioeconomic Survey* and *Regional Accounts* various years

Note :

Mean expenditure per capita for Aceh, Papua and Maluku is not available for the year 2002 since the National Socioeconomic Survey did not take place in these provinces due to the local social and political unrest. Therefore, a) was the annualised growth rate for 1984-1999. Accordingly, the poverty measures (P0, P1 and P2) for these provinces in 2002, are the estimated figures based on 1999 poverty line. The annualised growth rate of mean consumption per capita for the resource rich provinces in 1984-2002, excluding Aceh and Papua, was 1.56.

In 1984, Java-Bali combined RGDP contributed 56 per cent of the total national GDP. Java-Bali were more industrialised than the Outer Islands. The contribution of the manufacturing sector at 17.8 per cent of total RGDP in 1984 while the Outer Islands' share was only 9.5 per cent.

The Java provinces benefited most from the 1980s trade liberalisation particularly the response of labour intensive manufacturing. West Java, Jakarta and East Java are the provinces where the three major industrial areas (Bandung, Jakarta and Surabaya) are located (Garcia Garcia and Soelistianingsih, 1998). Bali benefited most from the tourism deregulation which had opened direct flights from other countries to Bali from 1985 (Jayasuria and Nehen, 1989), expanding labour intensive activities in the tourist and related sectors.

The selected socio economic indicators of Java and the Outer Islands in 1984

While most economic activity and development are centred in Java-Bali, not surprisingly the indicators of development in Java Bali are also superior to those of the Outer Island provinces. As can be seen in Table 5.4, in terms of RGDP per capita, Java-Bali ranked higher than the Outer Island provinces. The Outer Island provinces, RGDP per capita (excluding oil and gas) was actually lower than the national average.

Java-Bali was also endowed with greater human capital. By 1985, around 20.4 per cent of its population graduated from junior secondary high school and higher, with also a high enrolment ratio which was around 50.5 per cent in 1984. In contrast, the Outer Island provinces recorded an attainment of 16.3 per cent in 1985 which was around the national average, although the net enrolment was still lower than the national average at 39.4 per cent in 1984 (Table 5.4 columns 2 and 3).

Greater mobility of capital and labour, and integration of markets are supported by the availability of infrastructure. More than 66 per cent of roads in Java-Bali were paved, which was more than two times higher than in the Outer Island provinces (Table 5.4 column 4).

First hypothesis. Therefore, in general, the linkages between growth and poverty reduction are expected to be higher in Java-Bali. Growth is expected to be associated with greater integration of markets, owing to higher income per capita, better human capital, and better infrastructure. This enables a greater impact of growth on the utilisation of labour and capital and absolute poverty.

Table 5.4. Selected Socioeconomic Indicators of Group of Provinces at the Initial Period.

No	Group of Provinces	Income Per capita RGDP Per capita, non oil and gas 1984 (index, national=100)	Education		Infrastructure	
			Junior Secondary School and Higher Attainment Ratio 1985 (per cent)	Net Enrolment Ratio of Junior Secondary School 1984 (per cent)	Paved Roads 1984 Density (km per 1000 km2)	% of total road length (4)
1	Java-Bali	105	20.4	50.5	66.3	267.4
2	Outer Islands	92	16.3	39.4	29.6	22.8
	2.1. Sumatra	98	17.8	42.1	35.0	44.9
	2.2. Nusa Tenggara	49	10.1	28.7	23.6	56.9
	2.3. Kalimantan	127	16.2	36.2	26.1	8.2
	2.4. Sulawesi	85	17.0	42.0	26.2	46.1
	2.5. Maluku and Papua	90	15.1	40.8	23.0	4.0
3	The Hill Province Grouping					
	3.1 Resource Rich Provinces	131	19.6	42.6	21.0	6.5
	3.2. Densely Populated Provinces	102	19.3	48.1	62.6	226.5
	3.3. Settled Outer Island Provinces	99	18.7	28.7	36.5	67.7
	3.4. Sparsely Populated Provinces	85	14.5	44.1	23.0	12.6
	3.5. Isolated Provinces	49	10.1	37.5	23.6	56.9
4	National average	100	16.5	41.1	39.3	39.9

Source: CBS, Regional Accounts, 1984; National Socioeconomic Survey, 1984; Intercensal Population Survey, 1985; Division of Transportation Statistics, 2005.

5.4.2. Classification Based on Islands Grouping

In this category, provinces are divided at a more detailed level based on geographical location into six islands groups, where in addition to Java-Bali, the Outer Islands category is decomposed into Sumatra, Nusa Tenggara, Kalimantan, Sulawesi and Maluku-Papua. In terms of contribution to total national GDP, Sumatra has ranked consistently in second place after Java-Bali. The contributions of Kalimantan and Sulawesi to total GDP were also quite stable with more than nine and four per cent of total national GDP in 1984.

Sumatra and Kalimantan were relatively more industrialised than Sulawesi, Nusa Tenggara and Maluku-Papua, where the share of agriculture sector to the RGDP was still high and the share of manufacturing sector to RGDP was low in 1984. Nusa Tenggara's agricultural share to RGDP was at 54.8 per cent while Sulawesi's was at 41.4 per cent in 1984. In contrast, in the same year the share of the manufacturing sector to RGDP was only 2.2 and 4.7 per cent respectively in Nusa Tenggara and Sulawesi.

Kalimantan recorded the most rapid reduction in poverty measures (5.6 per cent per year for P0, 7.5 and 8.7 per cent per year for P1 and P2), followed by Java-Bali, as indicated in Table 5.1. Kalimantan also produced the highest growth, as shown in Table 5.3. As argued by Nazara, Sonis and Hewings (2001), Kalimantan was also a leader beside Java since it benefited from the buoyant of oil and timber boom period in the mid 1970s.

It is perhaps surprising that Nusa Tenggara has recorded quite rapid poverty reduction, higher than in Sumatra, Sulawesi and Maluku-Papua, as indicated in Table 5.1. Nevertheless, since Nusa Tenggara initially started with a much higher poverty incidence in 1984, a faster reduction was not sufficient to reduce its poverty to a low level. Moreover, Nusa Tenggara grew quite fast. Its mean consumption per capita grew faster than Sumatra, Sulawesi, and Maluku and Papua. This phenomenon suggests that the isolated provinces can catch up and grow faster than the richer provinces; here, it is possible that there is tendency of convergence from Nusa Tenggara.

In fact, as Hill (1992) confirmed, growth rate of the isolated provinces never lagged behind that of the rich provinces, whereas the rich provinces had never grown much faster than the isolated provinces.

The story of convergence was confirmed by empirical study by Garcia Garcia and Soelistianingsih (1998) who looked at the period 1973-1983 and found that isolated provinces had caught up with richer provinces (β convergence) both in absolute and conditional cases. They found the estimated coefficient for absolute β convergence during this period was 1.7 per cent, meaning it would take 41 years to reduce the discrepancy in provincial per capita GDP by half. In this situation, the isolated provinces tended to catch up slowly with rich ones. Conditional β convergence is calculated by including total fertility growth, human capital and natural resource endowments. As it was 2.1 per cent for 1983-1993, this means it would take 33 years to reduce the differences in GDP per capita by half. This is faster than the absolute β convergence. This finding actually reveals that GDP per capita will converge faster if provinces have better human capital and a lower fertility rate. Unfortunately, the isolated provinces are usually the ones with low education levels, the least skilled people, and a higher fertility rate.

In more current analysis, Vidyattama (2006) also found that there was absolute β convergence in GDP per capita for period 1975-2002, with lower magnitude than Garcia Garcia and Soelistianingsih (1998) which was 1.5 per cent, meaning that it would take 46 years to reduce the discrepancy in provincial per capita GDP by half. However, he also found that the speed of convergence has become slower across successive growth episodes from 1975.

The selected socio economic indicators of the islands groups in 1984

To understand the disparities across islands groups, this section focuses on the six islands groups based on non oil and gas RGDP per capita, education, and infrastructure indicators at the initial period of 1984.

As discussed earlier, socio economic performance in Java and Bali was mostly better than any other provinces or other islands groups. Nonetheless, in terms of

initial non oil and gas RGDP per capita indicators in 1984, Java-Bali was still lower than Kalimantan, owing to East Kalimantan's very high RGDP per capita, even excluding oil and gas. This was also due to the existence of the natural resource rich enclave of oil and gas, combined with a smaller population size (Table 5.4 column 1). At the other extreme, there are the two provinces of Nusa Tenggara where the RGDP per capita was the lowest among the island groups. Sulawesi also still lagged behind, performing better only than Nusa Tenggara.

As indicated in Table 5.4, in terms of human capital, based on 1984 junior secondary school and higher attainment ratio and the net enrolment ratio of junior secondary school, the ranking was Java-Bali, Sumatra and Sulawesi, Kalimantan, Maluku-Papua, and Nusa Tenggara. The infrastructure indicator showed Java-Bali was most advanced, followed by Sumatra, Kalimantan, Sulawesi, Nusa Tenggara and Maluku-Papua. Thus the classification by islands groups still shows the superior scores of Java-Bali over other islands groups (with the exception of Kalimantan in terms of the non oil and gas RGDP per capita indicator). At the other extreme, in general, the isolated provinces lagged on all indicators. However it is interesting that Nusa Tenggara, in spite of lagging in development indicators, still seemed to experience growth convergence as discussed earlier.

Based on the above discussions, the first hypothesis, would also seem to apply here, that according to island groupings, that the growth elasticity of poverty is expected to be high in Java-Bali.

5.4.3. The Classification of Provinces Based on Hill (1989)

On a cross country basis, countries are commonly classified according to their key characteristics. For example, countries in the Middle East and Latin America are classified as the natural resource abundant countries, which have unfortunately experienced lower growth compared with their resource poor neighbouring countries. As explained in Chapter Two (Sachs and Warner, 1995, 2001) countries which are relatively more natural resource abundant tend to experience "*the curse*" as they experience slow growth. The mining sector is not labour intensive but rather more capital intensive, as argued by Roemer and Gugerty (1997). Accordingly, the growth elasticity of poverty in the resource rich

provinces is expected to be low.

Gallup, Sachs and Mellinger (1999), who discussed the link between geography and development, also classified countries according to geographical condition and population density. For example, in terms of population density, India, Indonesia and China are categorised as densely populated countries, whereas Australia and New Zealand are categorised as sparsely populated provinces.

A similar classification can also be carried out to categorise provinces or regions within a country. In Indonesia, an analytically more sophisticated division of provinces which goes beyond the simple Java-Bali and Outer Islands or geographical location was initially developed by Hill (1989).⁴

As indicated in Table 5.5, provinces can thus be classified into five categories. First, there are five resource rich provinces which are endowed with mining, oil and gas. Second, there are three isolated provinces, which are isolated from the rest of Indonesia, not to mention isolated from Jakarta, the capital city which is the centre of economic activity, because they lack transportation networks and infrastructure. This is almost similar to the classification of landlocked economies in Gallup, Sachs and Mellinger (1999) which are geographically disadvantaged not only by lack of access to sea and economic areas but also because of the underdevelopment of their infrastructure. This is where the geographic poverty traps are located (Jalan and Ravallion, 2002). Third, based on population density, there are seven densely populated provinces, including one Outer Island province of Lampung, and five sparsely populated provinces. The densely populated provinces seem to be associated with higher levels of economic development, to support Bloom, Canning and Malaney's (1999) contention that more densely populated regions may have higher income per capita if there are chances for specialisation and economics of scale. For example, specialisation in trade benefited the high densely populated coastal regions due to better access to infrastructure and more opportunities for division of labour (Gallup, Sachs and Mellinger, 1999). Fourth, the six settled Outer Island refer to provinces with long

⁴ The detailed analysis of the disparities across regions can be found in Hill (1989).

established economic identity due to broad international economic diffusion (Hill and Weidemann, 1989); Bengkulu is missing in the classification.

Hill (1989) also acknowledged that the classification can easily be debated since it is also possible that one province fits in more than one category.⁵ This is the shortcoming of such classification which is rather ambiguous and inevitably there are marginal cases. Nevertheless, the categories have provided some analytical insights, and can be tested in explaining the pattern of analysis on provincial disparity.

The updated classification of provinces based on Hill (1989)

Hill's classification is updated by considering more recent indicators from 1984-2002 presented in Table 5.5.⁶ There are few changes regarding the classification of the provinces as shown in Table 5.6. Therefore, as indicated in Table 5.5, according to this updated classification, there are four resource rich provinces, two isolated provinces, seven densely populated provinces, six settled Outer Island provinces and seven sparsely populated provinces. Since there is no substantial modification to Hill classification, the updated classification is also termed as the original classification. Or, for simplicity, the Hill province grouping.

The densely populated, isolated provinces and settled Outer Islands are unchanged from the original classification. Lampung was initially classified as a densely populated province, mainly because of the government sponsored "transmigration program". It was the major transmigration destination (although the choice of Lampung as one major transmigration destination was discontinued in 1980s). The classification is still valid based on updated data 1984-2002 on population density.⁷ Lampung is located close to Java, is connected by road transportation along the Trans Sumatra Highway with the rest of Sumatra, and by ferry transportation with Java. This makes Lampung a 'border' region not only from its geographical location but also on the basis of its socio economic indicators, which have generally lagged (Bakir and Humaidi, 1989).

⁵ For example, Papua may also be classified under the sparsely populated provinces.

⁶ See Table 5.A for the selected indicators of this Hill province grouping in the 2000s.

⁷ The discussions of the transmigration program are in Chapter Seven.

Table 5.5. Classification of Provinces Based on Hill (1989)

Original Classification	Provinces	Updated Classification	Provinces
Resource rich provinces	1 Aceh 2 Riau 3 Jambi 4 East Kalimantan 5 Papua	Resource rich provinces	1 Aceh 2 Riau 3 East Kalimantan 4 Papua
Densely populated provinces	1 Lampung 2 DKI Jakarta 3 West Java 4 Central Java 5 DI Yogyakarta 6 East Java 7 Bali	Densely populated provinces	1 Lampung 2 DKI Jakarta 3 West Java 4 Central Java 5 DI Yogyakarta 6 East Java 7 Bali
Isolated provinces	1 West Nusa Tenggara 2 East Nusa Tenggara 3 East Timor	Isolated provinces	1 West Nusa Tenggara 2 East Nusa Tenggara
Settled Outer Island provinces	1 North Sumatra 2 West Sumatra 3 South Sumatra 4 South Kalimantan 5 North Sulawesi 6 South Sulawesi	Settled Outer Island provinces	1 North Sumatra 2 West Sumatra 3 South Sumatra 4 South Kalimantan 5 North Sulawesi 6 South Sulawesi
Sparsely populated provinces	1 West Kalimantan 2 Central Kalimantan 3 Central Sulawesi 4 Southeast Sulawesi 5 Maluku	Sparsely populated provinces	1 Jambi 2 Bengkulu 3 West Kalimantan 4 Central Kalimantan 5 Central Sulawesi 6 Southeast Sulawesi 7 Maluku
	Bengkulu ?		

Source: Hill (ed.), *Unity and Diversity : Regional Economic Development in Indonesia since 1970*, 1989 and author's update

**Table 5.6. Natural Resource Endowment and Population Density Indicators
of the Hill Province Grouping**

Classification	Provinces	Share of Oil and Gas per centage of RGDP		Population Density	
		1984-2002	Rank	(persons per km2) 1985-2000	Rank
Resource rich provinces	Aceh	26.8	3	64	16
	Riau	74.5	1	39	19
	East Kalimantan	39.3	2	10	25
	Papua	16.0	4	4	26
Densely populated provinces	Lampung	-		179	7
	DKI Jakarta	-		12636	1
	West Java	12.0	6	817	4
	Central Java	0.04	12	894	3
	DI Yogyakarta	-		935	2
	East Java	0.2	11	689	5
	Bali	-		509	6
Isolated provinces	West Nusa Tenggara	-		175	8
	East Nusa Tenggara	-		72	14
Settled Outer Island provinces	North Sumatra	2.4	9	148	9
	West Sumatra	-		95	11
	South Sumatra	15.6	5	59	17
	South Kalimantan	2.8	8	74	13
	North Sulawesi	-		86	12
	South Sulawesi	-		117	10
Sparsely populated provinces	Jambi	7.4	7	40	18
	Bengkulu	-		64	15
	West Kalimantan	-		23	22
	Central Kalimantan	-		10	24
	Central Sulawesi	-		29	21
	Southeast Sulawesi	-		38	20
	Maluku	1.2	10	22	23
National average		7.6		95	

Source: CBS, *Regional Accounts and Yearbook of Statistics*, various years

East Timor is dropped from the classification due to the fact that this province proclaimed its independence in 1999. Jambi is transferred from the group of resource rich provinces in the original classification to the sparsely populated provinces since, as indicated in Table 5.6. Bengkulu, based on its population density, is also classified as a sparsely populated provinces.

From the poverty indicators shown in Table 5.2 earlier, it is clear that, except for the resource rich provinces, all the groups of provinces experienced reduction in poverty at more than two per cent per year for headcount index, more than three per cent per year for poverty gap index, and more than four per cent per year for severity of poverty index. The resource rich classification experienced slow-paced poverty-reduction compared to other groups. In contrast, the isolated provinces recorded both rapid annual reduction and a high relative change of poverty gap and severity of poverty index (Table 5.2 columns 8 and 9).

Table 5.3 shows that the isolated provinces grew faster than the settled Outer Islands and the resource rich provinces, which in the wake of resource boom of the 1970s grew slowest. The fact that the isolated provinces grew relatively fast is an indication of convergence, as discussed earlier.

In addition to the convergence phenomenon, the reason the isolated provinces grew relatively fast is probably also closely related to the fact that in isolated provinces agriculture is still the main sector and also the sector where the poor are usually employed. Accordingly the question to be raised is whether the growth elasticity of poverty in the isolated provinces is high due to the convergence and the labour intensive of growth in agricultural sector, or it is low due to its lag in any development indicators.

The selected socio economic indicators of the Hill province grouping in 1984.

Referring back to Table 5.4, the socio economic indicators of the Hill province grouping on non oil and gas RGDP per capita, education and infrastructure indicators at the initial period of 1984 are also shown.

From the income per capita indicators, the resource rich provinces recorded the highest RGDP per capita in 1984, even when excluding oil and gas, followed by the densely populated provinces.⁸ The settled Outer Islands which mainly consist of the prosperous Sumatra and Kalimantan provinces, also possessed higher

⁸ It is suspected that high mean consumption per capita of the resource rich provinces is due to polarisation of income in urban areas (especially for East Kalimantan and Riau which had a high percentage of population living in urban areas).

income per capita indicators than sparsely populated provinces and the lowest category of the isolated provinces.

Education was recorded as the highest in Java-Bali, followed by either the resource rich provinces or the settled Outer Island provinces. Education in the sparsely populated provinces was only superior compared to the isolated provinces.

To understand the indicators relating to the resource rich provinces, one should distinguish both the origin of the resource and the ultimate beneficiary of income. The resource rich provinces produce high RGDP per capita but consume much less consumption per capita, indicating that these provinces do not benefit much from what they produce. Most of the revenue from growth of these mining activities went to the Central Government and was not allocated among local people. In addition, the direct spillover effect of employment to local people is limited, since most poor people work in the agricultural sector in rural areas and not in the mining, oil and gas sector. This phenomenon is evident also in the lower share of employment to national employment than the regional share of RGDP to national GDP. Therefore, it is not surprising that the resource rich provinces experienced the slowest rate of poverty reduction, as indicated in Table 5.2.

Based on earlier discussion of the Hill province grouping, two additional hypotheses are added.

Second hypothesis. The transmission between growth and poverty would be likely to be weak in resource rich provinces since growth was likely to provide few spillovers to the domestic economy and most of the revenue from growth went to the Central Government rather than to the province.

Third hypothesis. The linkage between growth and poverty was likely to be high in low income and relatively isolated provinces because growth was labour intensive, as the main sector was agriculture, producing a tendency towards convergence in growth. Isolated provinces grew faster than the rich provinces.

5.5. Empirical Methodology and Approach

The empirical methodology and approach follows that set out in Chapter Three. Here it is necessary to remember that the growth elasticity of poverty (GEP) as calculated is an empirical elasticity in which the distribution curve follows the data, as in Chapter Four. Therefore, there is no a priori sign of GEP as discussed earlier in Chapter Four.

The differences in effect of growth of income to poverty across groups is captured by adding the interaction effects between $\ln MEAN$ and the regional dummy variables, as also carried out by Ravallion and Chen (1997) who tried to capture the regional impact of growth on poverty reduction in cross country literature.

Based on the Java-Bali and Outer Island Province Categorisation

$$\ln P_{\alpha,i,t} = \rho_0 + \rho_1 \ln MEAN_{i,t} + \rho_2 OUTER_i * \ln MEAN_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (5.1)$$

Based on Island Groups Categorisation

$$\ln P_{\alpha,i,t} = \vartheta_0 + \vartheta_1 \ln MEAN_{i,t} + \vartheta_2 SUM_i * \ln MEAN_{i,t} + \vartheta_3 NTE_i * \ln MEAN_{i,t} + \vartheta_4 KAL_i * \ln MEAN_{i,t} + \vartheta_5 SUL_i * \ln MEAN_{i,t} + \vartheta_6 MAPA_i * \ln MEAN_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (5.2)$$

Based on the Hill province grouping Categorisation

$$\ln P_{\alpha,i,t} = \varphi_0 + \omega_1 \ln MEAN_{i,t} + \omega_2 SPAR_i * \ln MEAN_{i,t} + \omega_3 RICH_i * \ln MEAN_{i,t} + \omega_4 ISO_i * \ln MEAN_{i,t} + \omega_5 SETT_i * \ln MEAN_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (5.3)$$

Where

i	is the index for province (i=1,....., 26), as in Appendix 3.B.
$P_{\alpha,i,t}$	is the level of poverty measures of P0, P1 and P2 of province i at time t (per cent), where $\alpha = 0,1,2$
$MEAN_{i,t}$	is proxy of income of province i at time t, which is Mean Consumption Per Capita (Rupiah, 1984 prices)
t	is the index for year (t =1984, 1987, 1990, 1993, 1996, 1999, 2002)

e	is the index for 6 dummies ($e=1,2,3,4,5,6$)
d	are the year dummies for time periods of when the National Socioeconomic Survey took place
	$d_{87} = 1$ if $t=1987$, or 0 otherwise
	$d_{90} = 1$ if $t=1990$, or 0 otherwise
	$d_{93} = 1$ if $t=1993$, or 0 otherwise
	$d_{96} = 1$ if $t=1996$, or 0 otherwise
	$d_{99} = 1$ if $t=1999$, or 0 otherwise
	$d_{02} = 1$ if $t=2002$, or 0 otherwise
	The base period is year 1984.
SUM_i	is dummy of Sumatra=1 if $i \leq 8$, or 0 otherwise
NTE_i	is dummy of Nusa Tenggara =1 if $i=15$ and $i=16$, or 0 otherwise
KAL_i	is dummy of Kalimantan =1 if $17 \leq i \leq 20$, or 0 otherwise
SUL_i	is dummy of Sulawesi=1 if $21 \leq i \leq 24$, or 0 otherwise
$MAPA_i$	is dummy of Maluku and Papua=1 if $i=25$ and $i=26$, or 0 otherwise
$OUTER_i$	is dummy of Outer Island provinces
	$OUTER_i = 1$ if $i=1-8$ or $15-26$, or 0 otherwise
ISO_i	is dummy of isolated provinces
	ISO_i if $i=15$ and 16 or 0 otherwise
$SPAR_i$	is dummy of sparsely populated provinces
	$SPAR_i = 1$ if $i=5, 7, 17, 18, 22, 24$ and 25 or 0 otherwise
$RICH_i$	is dummy of the resource rich provinces
	$RICH_i = 1$ if $i=1, 4, 20$ and 26 , or 0 otherwise
$SETT_i$	is dummy for settled Outer Island provinces
	$SETT_i = 1$ if $i=2, 3, 6, 19, 21, 23$ or 0 otherwise

The base category is Java-Bali ($i=9-14$) for equations 5.1 and 5.2, and the densely populated provinces (Java-Bali and Lampung, $i=8-14$) for equation 5.3.

δ is the provincial fixed effect (unobserved heterogeneity)
 ε is a white-noise error term that includes errors in the poverty measure.

It is important to note that the time varying omitted structural variables are still lumped together into year dummies. A more comprehensive treatment of the structural variables which affect poverty reduction will be carried out in the following Chapters Six and Seven.

5.6. Empirical Results

To differentiate the Growth Elasticity of Poverty (GEP) among the three different measures of poverty; P0 GEP, P1 GEP and P2 GEP are used. Generally, the findings show that an increase in mean consumption per capita will reduce absolute poverty measures of P0, P1, and P2, even without being controlled by distribution change (inequality).

5.6.1. Growth Elasticity of Poverty Headcount Index (P0 GEP)

The following results for the P0 GEP are presented, starting with the decomposition of provinces between Java-Bali and the Outer Islands. These results are shown in Table 5.7 column 1.

Similar to Table 4.4 in Chapter Four, the results presented in Table 5.7 may be claimed as not robust since it only captures the basic model. However, the results are still valid for two reasons, (i) to some extent omitted variable bias has been solved by including year dummies, (ii) the objective of this chapter is to examine the impact of growth only. In Chapter Six, the multivariate analysis is carried out which addresses the omitted variable bias more properly, by including the specific explanatory variables.

Table 5.7. The Growth Elasticity of Poverty Headcount Index across Regions (P0 GEP)

Explanatory Variable	P0 GEP Across Regions					
	(1)		(2)		(3)	
	FE Estimate		FE Estimate		FE Estimate	
<i>lnMEAN</i>	-2.42	***	-2.45	***	-2.42a)	***
	(-12.42)		(-12.80)		(-13.22)	
<i>OUTER*lnMEAN</i>	0.24					
	(1.35)					
<i>SUM*lnMEAN</i>			0.51	**		
			(1.92)			
<i>NTE*lnMEAN</i>			0.57			
			(1.26)			
<i>KAL*lnMEAN</i>			-0.20			
			(-0.77)			
<i>SUL*lnMEAN</i>			0.90	**		
			(2.26)			
<i>MAPA*lnMEAN</i>			0.53	#		
			(1.53)			
<i>RICH*lnMEAN</i>					0.45	*
					(1.77)	
<i>ISO*lnMEAN</i>					0.53	
					(1.15)	
<i>SETT*lnMEAN</i>					0.16	
					(0.52)	
<i>SPAR*lnMEAN</i>					0.19	
					(0.66)	
d87	-0.04		-0.03		-0.04	
	(-1.03)		(-0.94)		(-1.01)	
d90	-0.03		-0.04		-0.03	
	(-0.65)		(-0.86)		(-0.61)	
d93	-0.08	**	-0.08	*	-0.08	**
	(-2.00)		(-1.89)		(-2.04)	
d96	-0.32	***	-0.31	***	-0.32	***
	(-8.05)		(-7.64)		(-8.07)	
d99	-0.28	**	-0.28	***	-0.28	***
	(-7.76)		(-7.50)		(-7.71)	
d02	-0.34	***	-0.33	***	-0.34	***
	(-8.45)		(-8.00)		(-8.43)	
cons	30.77	***	29.11	***	30.61	***
	(20.21)		(18.75)		(19.92)	
R-sq within	0.87		0.88		0.87	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # Denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. a) includes Lampung. Column; (1) refers to result of estimation 5.1; column (2) refers to result of estimation 5.2; column (3) refers to result of estimation 5.3. Number of observations are 171.

To interpret these results, Table 5.7 column 1 shows the coefficient of *lnMEAN* with the interpretation that P0 GEP of Java-Bali is used as the base category,

which is expected to have the highest GEP. The coefficient for the other groups is interpreted as a deviation from Java-Bali GEP. The coefficient of $\ln MEAN$ is -2.42. Thus the P0 GEP for Java-Bali was -2.42, which means that a one per cent increase in mean consumption per capita will decrease the poverty headcount ratio by 2.42 per cent. Therefore, when the coefficient of $OUTER * \ln MEAN$ was 0.24, this means that the P0 GEP for Outer Islands was $-2.42 + 0.24$, which is equal to -2.18. However this difference is not statistically significant.

When the Outer Islands grouping is broken down into the five islands groups of Sumatra, Nusa Tenggara, Kalimantan, Sulawesi and Maluku-Papua, as in Table 5.7 column 2, Java-Bali P0 GEP was -2.45 which is significantly different from P0 GEP in Sumatra and Sulawesi and Maluku and Papua at $\alpha=15\%$. Sumatra's P0 GEP was -1.94, then Sulawesi with P0 GEP of -1.55 (the lowest) whereas Maluku-Papua had a higher P0 GEP of -1.92. Kalimantan recorded the highest P0 GEP with -2.65, while Nusa Tenggara recorded lowest with P0 GEP of -1.88, but these differences compared with Java-Bali are not statistically significant. The results of the decomposition by Java-Bali and Outer Islands and by islands groups confirm the first hypothesis that the P0 GEP was high in Java-Bali.

The Hill province grouping, which is expected to explain the regional variation better, indicated that the base category of P0 GEP in the densely populated provinces, was -2.42. Then, the sequence was the settled Outer Islands, the sparsely populated provinces, the resource rich provinces and finally the isolated provinces. However, except for the resource rich provinces none of the coefficients of the interaction between groups of provinces and $\ln MEAN$ is significant. The P0 GEP in the densely populated provinces is significantly different from the resource rich provinces which had lower P0 GEP with -1.97. This confirms the second hypothesis that the P0 GEP was lower in the natural resource rich provinces as growth was likely to provide few spillovers to the domestic economy. In contrast, as P0 GEP was the lowest in the isolated provinces, the third hypothesis on the convergence theory is rejected.

It is interesting to see that the coefficients of year dummies of 1993, 1996, 1999 and 2002 are significant regardless how the data are categorised, as indicated in Table 5.7, and they all have negative signs which means that they contributed to lower P0 than in the base period of 1984. This indicates that, first, there were other variables which were significant in reducing poverty headcount which up to this stage are still lumped together in year dummies and, second, the existence of specific time period pro-poor strategies. These more likely included the Less Developed Village INPRES (Instruksi Presiden Desa Tertinggal/IDT) program for the three years period 1994/95-1996/97 (based on INPRES No 3 in 1993 (National Development Planning Agency or BAPPENAS, 1994)) which was designed specifically to alleviate poverty (Akita and Szeto, 2000), and later the Social Safety Net program which was designed as a response to the crisis, as discussed in Chapter Four. These findings provide a very significant background for the analysis to be presented in the following two chapters.

5.6.2. Growth Elasticity of Poverty Gap Index (P1 GEP) and Poverty Severity Index (P2 GEP)

P1 GEP and P2 GEP show almost similar patterns. As indicated in Tables 5.8 and 5.9, except for Sumatra and the settled Outer Islands P2 GEP, none of the interactions coefficient between $\ln MEAN$ and groups of provinces is significant.

**Table 5.8. The Growth Elasticity of the Poverty Gap Index across Regions
(P1 GEP)**

Explanatory Variable	P1 GEP Across Regions					
	(1)		(2)		(3)	
	FE Estimate		FE Estimate		FE Estimate	
<i>lnMEAN</i>	-2.14	***	-2.07	***	-2.28	***
	(-5.51)		(-5.31)		(-6.30)	
<i>OUTER*lnMEAN</i>	-0.02					
	(-0.05)					
<i>SUM*lnMEAN</i>			0.62			
			(1.14)			
<i>NTE*lnMEAN</i>			-0.88			
			(-0.95)			
<i>KAL*lnMEAN</i>			-0.21			
			(-0.39)			
<i>SUL*lnMEAN</i>			-0.02			
			(-0.03)			
<i>MAPA*lnMEAN</i>			-0.61			
			(-0.86)			
<i>RICH*lnMEAN</i>					0.21	
					(0.41)	
<i>ISO*lnMEAN</i>					-0.80	
					(-0.87)	
<i>SETT*lnMEAN</i>					0.83	
					(1.41)	
<i>SPAR*lnMEAN</i>					-0.10	
					(-0.18)	
d87	-0.13	*	-0.14	*	-0.12	*
	(-1.74)		(-1.93)		(-1.63)	
d90	-0.14	*	-0.15	*	-0.12	
	(-1.74)		(-1.81)		(-1.38)	
d93	0.16	**	0.12		0.16	**
	(1.99)		(1.38)		(2.01)	
d96	-1.15	***	-1.18	***	-1.14	***
	(-14.84)		(-14.45)		(-14.76)	
d99	-0.51	***	-0.53	***	-0.50	***
	(-7.02)		(-7.06)		(-6.93)	
d02	-0.64	***	-0.66	***	-0.63	***
	(-8.13)		(-7.98)		(-7.95)	
cons	28.17	***	26.59	***	27.96	***
	(9.85)		(8.38)		(9.20)	
R-sq within	0.83		0.84		0.83	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # Denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. a) includes Lampung. Column (1) refers to result of estimation 5.1; column (2) refers to result of estimation 5.2; column (3) refers to result of estimation 5.3.. Number of observations are 171.

Table 5.9. The Growth Elasticity of Poverty Severity Index across Regions (P2 GEP)

Explanatory Variable	P2 GEP Across Regions					
	(1)		(2)		(3)	
	FE Estimate		FE Estimate		FE Estimate	
<i>lnMEAN</i>	-2.45	***	-2.35	***	-2.64a)	***
	(-4.70)		(-4.53)		(-5.46)	
<i>OUTER*lnMEAN</i>	0.04					
	(0.07)					
<i>SUM*lnMEAN</i>			1.09	#		
			(1.52)			
<i>NTE*lnMEAN</i>			-1.63			
			(-1.31)			
<i>KAL*lnMEAN</i>			-0.22			
			(-0.31)			
<i>SUL*lnMEAN</i>			0.02			
			(0.02)			
<i>MAPA*lnMEAN</i>			-0.87			
			(-0.91)			
<i>RICH*lnMEAN</i>					0.28	
					(0.42)	
<i>ISO*lnMEAN</i>					-1.52	
					(-1.24)	
<i>SETT*lnMEAN</i>					1.25	#
					(1.59)	
<i>SPAR*lnMEAN</i>					0.14	
					(0.18)	
<i>d87</i>	-0.22	**	-0.24	**	-0.21	***
	(-2.24)		(-2.47)		(-2.10)	
<i>d90</i>	-0.20	*	-0.22	**	-0.16	#
	(-1.87)		(-1.92)		(-1.42)	
<i>d93</i>	0.07		0.01		0.08	
	(0.65)		(0.09)		(0.72)	
<i>d96</i>	-1.42	***	-1.47	***	-1.41	***
	(-13.64)		(-13.51)		(-13.62)	
<i>d99</i>	-0.68	***	-0.72	***	-0.67	***
	(-7.02)		(-7.18)		(-6.94)	
<i>d02</i>	-0.85	***	-0.88	***	-0.83	***
	(-7.97)		(-7.93)		(-7.79)	
<i>cons</i>	30.25	***	27.92	***	29.84	***
	(7.88)		(6.62)		(7.34)	
<i>R-sq within</i>	0.79		0.80		0.80	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # Denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. a) includes Lampung. Column (1) refers to result of estimation 5.1; column (2) refers to result of estimation 5.2; column (3) refers to result of estimation 5.3.. Number of observations are 171.

Table 5.10 presents a summary of the results. The P1 GEP in Java-Bali was -2.14, meaning that one per cent increase in mean consumption per capita will reduce the poverty gap by -2.14 per cent. For example, in Java-Bali the P1 initially was 20 per cent. If mean consumption increased by 10 per cent, this growth would reduce P1 by 21.4 per cent to 15.7 per cent. Likewise, as in P0 GEP, the P1 GEP in the Outer Islands was relatively similar (-2.16) , although the difference from Java-Bali P1 GEP is not significant.

According to the islands grouping, indicated by Table 5.10, P1 GEP was -2.07 in Java- Bali which was slightly lower than it was under the Java-Bali and Outer Islands decomposition. It is interesting to find that, contrary to its P0 GEP, the highest P1 GEP was recorded in Nusa Tenggara, which was then followed by Maluku and Papua, Sulawesi, Kalimantan, Java-Bali and Sumatra. However, the differences of P1 GEP in the other groups of provinces from P1 GEP in Java-Bali is not significant. Almost the same pattern could be found for the results of P2 GEP. Java-Bali only ranked the fourth with P2 GEP of -2.35, whereas the highest P2 GEP was Nusa Tenggara followed by Maluku and Papua (both Nusa Tenggara and Maluku and Papua started with high initial P1 and P2). Yet, in the case of P2 GEP, only Sumatra's P2 GEP was significantly different from Java-Bali.

In short, the Hill province grouping shows the same pattern for P1 and P2 GEP: it was highest in the isolated provinces of Nusa Tenggara and it was low in the resource rich provinces. The densely populated provinces ranked the third for P1 GEP and the second for P2 GEP. In the case of P1 GEP, none of the coefficients of interactions is significant, whereas in the case of P2 GEP, it was only for the settled Outer Islands that the difference between this group of provinces and the densely populated provinces was statistically significant.

Table 5.10. GEP Estimates for Absolute Poverty across Regions

	Growth Elasticity of Poverty					
	P0	P1			P2	
1. Java-Bali	-2.42 *)	-2.45 *)	-2.14 *)	-2.07 *)	-2.45 *)	-2.35 *)
2. Outer Island	-2.18		-2.16		-2.41	
2.1. Sumatra	-1.94 *)			-1.45		-1.26 *)
2.2. Nusa Tenggara	-1.88			-2.95		-3.98
2.3. Kalimantan	-2.65			-2.28		-2.57
2.4. Sulawesi	-1.55 *)			-2.09		-2.33
2.5. Maluku and Papua	-1.92 *)			-2.68		-3.22
3. The Hill province grouping						
3.1. Resource rich provinces				-1.97 *)	-2.07	-2.36
3.2. Densely populated provinces				-2.42 *)	-2.28 *)	-2.64 *)
3.3. Settled Outer Island provinces				-2.26	-1.45	-1.39 *)
3.4. Sparsely populated provinces				-2.23	-2.38	-2.50
3.5. Isolated provinces				-1.89	-3.08	-4.16

Source : Author's calculations

Note : *) significant

There are several important points that could be drawn from these findings. First, it is interesting to note that in contrast with P0 GEP, there was a possible convergence story for the P1 and P2 GEP of the isolated provinces, which supports our third hypothesis, even though the differences from the base category are not statistically significant. Growth might have lower returns for those provinces in which the level of P1 and P2 were already low, as in the densely populated provinces. This might also be related to location of the average poor. In the densely populated provinces, it is possible that most poor were located closer to the poverty line, whereas for the isolated provinces, as these provinces are the least developed and were consistently had high poverty measures (Corner, 1989), the average poor were located lower than in the densely populated provinces, further away below the poverty line. Therefore, the effect of the growth impact on P1 and P2 only improved the gap between the poverty line and the average consumption of the poor and also the inequality among the poor in these isolated provinces (for simplicity, it is assumed that the poverty line is fixed). But it did not necessarily raise the consumption level of the poor above the poverty line. Second, the second hypothesis for the resource rich provinces, that the GEP was low in these provinces, is confirmed for P0, P1 and P2, although it is only significant for P0 GEP.

The results also show several interesting findings related to the coefficient of year dummies. The year dummies of d87, d90, d96, d99 and d02 are mostly significant, whereas d93 is rarely significant. For d87 and d90, they are mostly significant due to the time omitted varying variables which have not yet controlled in the estimation. Similar explanations apply for the significance of d96, d99 and d02. Nevertheless, there were also pro-poor strategies for these years, as 1996/1997 was the end of the Less Developed Village INPRES program, and 1999 and 2002 were the years when the Social Safety Net program operated as a response to the crisis. These pro-poor programs might play important role in decreasing absolute poverty, not only in terms of headcount index as indicated in Table 4.3 earlier, but also in term of poverty severity index (P2). In 1993, P2 was at 1.7 but then, in 1996, P2 declined relatively by surprisingly 75% (0.4). Similarly, that after the crisis, P2 was higher again in 1999 at 1.2, nevertheless, it declined relatively by 35% (to be 0.8) in 2002.

5.6.3. Is The Elasticity Across Regions Higher for Distribution Sensitive Poverty Measures?

A higher elasticity of distribution sensitive poverty measure indicates that growth in the mean leads the standard deviation of the consumption among the poor to decline (the severity of poverty decreases). Therefore it is expected that $P0\ GEP < P1\ GEP < P2\ GEP$.

In general there are mixed results, as indicated in Table 5.10. However, several interesting findings are evident. First, the growth elasticity was the highest for distribution sensitive poverty for all groups under the Hill province grouping except for the settled Outer Islands, although the pattern of $P0\ GEP < P1\ GEP < P2\ GEP$ did not hold for the densely populated provinces. Since, most poor in the densely populated provinces were located closer to the poverty line, the impact of growth in reducing P0 was higher than that of P1 and P2. Growth might have resulted in diminishing returns for P1 and P2, which were already low in this group of provinces. Second, in contrast, the growth elasticity was the lowest for the distribution sensitive poverty measure in Sumatra: $P0\ GEP > P1\ GEP > P2\ GEP$. For Sumatra, growth had a higher impact on consumption of the poor who were located closer to the poverty line, but did not necessarily improve poverty for those whose consumption were far below the poverty line.

5.7. Conclusions

Following Chapter Four, this chapter has found that there was heterogeneity in terms of growth elasticity across regions. The detailed findings are explained below.

First, without controlling by inequality, growth is pro-poor; in general, growth reduces the poverty measures in all groups of provinces.

Second, Java-Bali GEP was high and robust at around -2.4. This is a consistent result for Java-Bali regardless how the data are categorised. Across groups of provinces, in the resource rich provinces P0, P1 and P2 GEP was low, whereas for the isolated provinces, P1 and P2 GEP was high, in confirmation of the

convergence theory. However the findings did not imply that higher GEP will cause lower poverty rates, as in the case of the isolated provinces.

Third, under the Hill province grouping, within each group of provinces growth had been pro-poor for the poorest among the poor, except for Sumatra and the settled Outer Islands.

Nevertheless the findings in this chapter have still been limited to analysing only the role of regional dimensions of growth in reducing absolute poverty in order to search whether a variation exists. Further analysis is needed to answer the question why the growth was more pro-poor in some groups of provinces. Therefore, a more comprehensive treatment will require multivariate analysis to estimate directly the role of all determinants (growth of income and other determinants) on poverty reduction in order to examine the following objectives:

First, whether after being controlling for other determinants, the growth elasticity of poverty might indicate different patterns. Nevertheless, the focus of the next chapter will be restricted to the headcount index.

Second, to elaborate whether differences could also be found between regions and time periods in the role of other determinants of poverty, besides growth, which can have direct impact on poverty. Among the proposed other determinants are natural resources, infrastructure, human capital and openness, as previously discussed in the literature.

These two objectives necessitate a discussion on the role of two new determinants: migration and intergovernmental transfers, which are usually ignored in the literature. It is expected that both will be found to be important for regional development and poverty. Migration influences the distribution and growth of the population, welfare in both sending and receiving regions, and consequently the poverty headcount index. In relation to transfers, especially during the previous New Order Government 1967-1998, the development centered in the Java-Bali and the resource rich provinces, and the revenues then were transferred back in terms of public goods to the other parts of the country. A

discussion of the interprovincial migration and intergovernmental transfers will be presented in Chapter Seven.

APPENDIX 5.A. Selected Indicators of the Hill Province Grouping in The 2000's (See Table 5.A)

5.A.1. The Resource Rich Provinces

There are four provinces classified as the resource rich provinces, namely Aceh, Riau, East Kalimantan and Papua. Aceh and Riau are very rich in oil and gas, East Kalimantan with oil, gas and timber, and Papua with oil and gas and other minerals including copper and gold. With their mining, oil and gas, East Kalimantan and Riau were the two richest provinces during 1984-2002. Nevertheless, excluding oil and gas, only East Kalimantan and Papua still recorded high RGDP per capita during the same period. Table 5.A shows the non oil and gas RGDP per capita of East Kalimantan and Papua still ranked second and third in 2002. Unfortunately, although these provinces are rich with natural resource endowment, most of the revenue accrued from growth of those activities went to the Central Government prior to the decentralisation.⁹ The direct employment effect was also limited due to the capital intensive nature of mining and quarrying activities, and therefore employment went to relatively more skilled labour who came mostly from outside the respective producing provinces. Only a small portion of these provinces' revenue was enjoyed by the local people who mostly lived in rural areas and worked in the agriculture sector.

As a result, these resource rich provinces usually consume much less than their RGDP per capita. Average real mean expenditure per capita, taken from the household survey of Aceh, Riau, East Kalimantan and Papua, was around 24, 000 rupiah (in 1984 rupiah) per month or around less than 300, 000 rupiah per year during 1984-2002. In contrast, their RGDP per capita was around on average 2,2 million rupiah (in 1983 rupiah) and more than 833,300 on average (in 1983 rupiah), excluding oil and gas, for those four provinces during the same period.¹⁰

⁹ During the pre-decentralisation period, 100 per cent of oil and gas revenue went to the Central Government. Later, this revenue sharing was reduced during the post decentralisation period so that 85 per cent of oil and 70 per cent of gas revenue now goes to the Central Government, except in the case of Aceh where only 45 per cent of oil and 60 per cent of gas revenue goes to the Central Government, whereas for Papua it is just 30 per cent of the oil and gas revenue.

¹⁰ Real mean expenditure per capita is considered a better measure of welfare than the real RGDP per capita, since it shows the true level of expenditure in a province (Garcia Garcia and Soelistianingsih, 1998).

In terms of education indicators, all provinces except Papua showed a high average attainment ratio of junior secondary school and higher. Even East Kalimantan was only behind Jakarta and Yogyakarta, two centers of education in Indonesia, with more than 40 per cent of its population graduated from junior high secondary school and higher in 2000. In general, the education level of the natural resource rich provinces was higher than the national average (it was, in fact, the highest amongst all other groups of provinces).

In terms of infrastructure in relation to the availability of paved roads, the resource rich provinces were relatively behind the national average. Aceh was relatively more advanced in terms of paved roads than other resource rich provinces, having more than 50 per cent of total road length paved in 2002, and its ratio of paved roads to its size was also the highest amongst the resource rich provinces. On the other hand, Papua lagged behind, with only 20 per cent of its roads paved and with the lowest ratio of paved roads to its size. This finding also reflects the fact that the main system of transportation in Papua is not land transportation but river transportation for which, unfortunately, there is no available data.

5.A.2. The Isolated Provinces

The isolated provinces are considered to be the resource poor provinces which relied most on agricultural sector but they still contributed more than 30 per cent of RGDP in 2002.

As indicated in Table 5.A, West and East Nusa Tenggara were amongst the provinces with low average RGDP per capita in 2002. Their education indicator (in terms of secondary school and higher attainment ratio) were also among the lowest of the 26 provinces. Nevertheless it is interesting to see that in 2002 West Nusa Tenggara improved its infrastructure indicators, as it now ranked 12th, with 48 per cent of the roads paved, although this was still lower than the national average.

East and West Nusa Tenggara had persistently high poverty measures since, as Booth (1996) has argued, these provinces could not benefit from Java's rapid

manufacturing based economic growth. This was due to their backward agriculture, small land holdings and low agricultural productivity, thus creating chronic poverty in these provinces.

5.A.3. The Densely Populated Provinces

As a group, the densely populated provinces had high RGDP per capita, and good education and infrastructure indicators which are more advanced in comparison to those of other provinces.

Jakarta rated highest in non oil and gas RGDP per capita, education, and infrastructure indicators, owing its advantage to its central role as the capital city of Indonesia. In terms of education indicators, Jakarta and Yogyakarta were above the other Java provinces. Yogyakarta has traditionally had a reputation as a national centre of education over a long time (*kota pelajar*) (Booth and Damanik, 1989). West Java, the neighbour of Jakarta, benefited greatly in terms of spillover effect from the capital especially in the municipalities around Jakarta, Bogor, Tangerang, and Bekasi, known as BOTABEK which also became the alternative places to live for people who work in Jakarta. Infrastructure in Java is the best among the provinces.

As a result of the trade liberalisation period in 1987-1996, Java is also more industrialised than other provinces as West Java, Jakarta and East Java are the provinces where the three industrial areas (Bandung, Jakarta and Surabaya) are located (Garcia Garcia and Soelistianingsih, 1998).

Bali, as the sixth most densely populated province after the Java provinces, benefited much from its tourism industry. This is mainly as the result of the 1985 tourism deregulation which allowed direct flights from other countries to Bali. In terms of RGDP per capita, excluding oil and gas, Bali ranked fourth in 2002. Education indicators were also impressive. The boom in tourism industry is also strengthened by availability of infrastructure. More than 77 per cent of roads in Bali was paved by 2002, higher than the national average.

The only Outer Island province which is categorised as densely populated is Lampung, as a result of high population growth due to the “transmigration program” where it became the major transmigration destination from the overcrowded Java provinces. Amongst the densely populated provinces, Lampung RGDP per capita and education indicators in 2002 were comparable with West and Central Java although it still lagged behind in terms of infrastructure.

5.A.4. The Settled Outer Island Provinces

The settled Outer Island provinces designates provinces which are all endowed by a strong initial base. Table 5.A shows that, except for South Sumatra, the settled Outer Island provinces are actually characterised by a high score on at least one good indicator, either RGDP per capita, education or infrastructure indicators.

High RGDP per capita with better education and infrastructure indicators are recorded by West Sumatra. Hill (1992) mentioned that especially in West Sumatra (and North Sulawesi) there was a mission education system during the colonial era which penetrated into the local community. As a result, in 2000 around 35 per cent of the population aged 10 and over graduated from junior secondary school or higher in this province. For West Sumatra, strong Islamic values also penetrated much of the society, which helped it to achieve good education indicators. This success may also supported by the fact that, as can be seen from Table 5.A, West Sumatra was equipped with good infrastructure.

High RGDP per capita with better education was recorded by North Sumatra which, it can also be argued, might be classified as a resource rich province as it produces aluminum. On average, North Sumatra RGDP per capita (excluding oil and gas) was just below Bali and ranked fifth in 2002.

High RGDP per capita with better infrastructure can be found in South Kalimantan, which was only outclassed by East Kalimantan in terms of RGDP per capita.

Better education and infrastructure was recorded by North Sulawesi. As explained earlier, North Sulawesi was well known for its high education indicators (Hill, 1992).

Better infrastructure with lagging RGDP per capita was recorded by South Sulawesi.

5.A.5. The Sparsely Populated Provinces

In this category, the provinces are sparsely populated and, on average, are relatively worse off in all indicators compared with other groups of provinces except for the isolated provinces.

Jambi's classification changes from resource rich province to sparsely populated province since the contribution of the mining sector in its RGDP had been very small in 1990s. Only 47 people per square kilometer lived in Jambi by 2002. Bengkulu, a province was not included here in the original classification, showed mixed indicators. Its RGDP per capita was amongst the lowest of all provinces but nevertheless it recorded relatively a better education indicator in 2000.

In terms of RGDP per capita, only Central and West Kalimantan had RGDP per capita higher than the national average in 2002. In terms of education, only Bengkulu, Maluku and Central Kalimantan had junior school and above attainment ratios higher than the national average in 2000. All provinces in this group also lagged behind in terms of land transportation which is plausible since the main transportation, especially for provinces such as West Kalimantan, is river transportation.

Table 5.A. Selected Socioeconomic Indicators of the Hill Province Grouping in the 2000s

No	Provinces	Income per capita		Education		Infrastructure				
		RGDP Per capita (excluding oil and gas)	2002 (1983 Rupiah)	Rank	Junior Secondary School and higher attainment ratio	Rank	Paved Road Length 2002 (km per 1000 per 1000 km2)	Rank		
1	Aceh		720,321	8	38.0	5	50.7	11	103.1	15
4	Riau		735,641	7	37.2	6	30.7	22	34.6	19
20	East Kalimantan		1,962,944	2	40.5	3	24.1	24	8.1	25
26	Papua		1,085,330	3	26.7	22	20.4	25	5.9	26
Resource Rich Provinces			1,009,606		35.6		32.0		16.8	
8	Lampung		496,709	19	27.6	20	45.5	14	127.4	11
9	DKI Jakarta		2,544,383	1	60.1	1	100.0	1	7605.4	1
10	West Java		480,224	21	28.8	14	70.2	7	348.4	7
11	Central Java		529,407	17	24.9	23	72.7	6	499.1	4
12	DI Yogyakarta		542,287	15	43.6	2	73.6	4	1621.5	2
13	East Java		719,326	9	27.7	19	72.8	5	426.6	5
14	Bali		901,738	4	34.8	8	77.5	3	753.4	3
Densely Populated Provinces			699,326		35.4		71.2		419.5	
15	West Nusa Tenggara		472,412	22	21.2	25	48.0	12	123.7	12
16	East Nusa Tenggara		357,667	24	18.3	26	37.6	19	119.4	13
Isolated Provinces			416,374		19.7		40.3		120.7	

Table 5.A. Selected Socioeconomic Indicators of the Hill Province Grouping in the 2000s, *Continued*

No	Provinces	Income per capita		Education		Infrastructure	
		2002	Rank	2000	Rank	2002	Rank
		(1983 Rupiah)		(per cent)		(km per 1000 km ²)	
2	North Sumatra	866,935	5	40.0	4	39.3	17
3	West Sumatra	718,939	10	34.8	9	86.4	2
6	South Sumatra	653,261	13	28.8	15	39.9	16
19	South Kalimantan	845,581	6	28.2	18	55.0	9
21	North Sulawesi	277,578	25	35.7	7	66.7	8
23	South Sulawesi	629,106	14	28.3	17	54.2	10
<i>Settled Outer Island</i>							
<i>Provinces</i>							
5	Jambi	680,909		32.6		54.4	
7	Bengkulu	539,166	16	29.7	13	35.1	20
17	West Kalimantan	459,404	23	32.8	10	46.5	13
18	Central Kalimantan	682,611	12	23.7	24	34.1	21
22	Central Sulawesi	706,025	11	30.1	12	19.3	26
24	Southeast Sulawesi	496,254	20	27.6	21	40.1	15
25	Maluku	503,235	18	28.5	16	37.8	18
<i>Sparsely Populated</i>							
<i>Provinces</i>							
		274,690	26	32.7	11	29.1	23
		545,617		29.3		34.0	
<i>National average</i>		693,816		31.9		52.9	
						79.3	

Source : CBS, regional accounts, 2002; National Socioeconomic Survey, 2002; Population Census, 2000; Division of Transportation and Statistics, 2005.

Chapter Six

The Determinants of Regional Poverty in Indonesia 1984-2002: The Role of Inequality, Natural Resources, Human Capital, Infrastructure and Openness

6.1. Introduction

Chapters Four and Five demonstrated that consumption growth had a significant effect in reducing poverty in Indonesia. Without any controlling variables, the growth elasticity of poverty in Indonesia for the period 1984-2002 was -2.21.

However, as in most countries, in Indonesia, there are geographic concentrations of poverty such as in West and East Nusa Tenggara, Maluku, Papua and Lampung (as discussed in Chapter Five) and this phenomena is related to geographic poverty traps (Jalan and Ravallion, 2002; Bloom, Canning and Sevilla, 2003). It is obvious that despite robust economic growth, poverty still persists in some areas.

The two earlier chapters also argued that growth is not sufficient for poverty reduction.¹ There are other variables, referred to as structural variables and also policy variables, which possibly directly matter for poverty reduction (Bhagwati, 1988).

This chapter discusses the role of other determinants of regional poverty in Indonesia to answer why the absolute poverty measures are still high in some regions although the regional economy has grown. They cover the common determinants which are (i) a structure of an economy (the role of natural resources, and openness)², (ii) structure of the society and community (human capital and inequality), and (iii) public policies/services (infrastructure). Later, the

¹ Timmer (2004) proposed a three-tiered pro-poor strategy which are (i) economic growth with solid macroeconomic policy, linked through (ii) lower transaction costs and (iii) linked to the poor who need to invest in human capital.

² Although openness is a policy variable, in this case, openness is treated as a structural variable as in the sub national application, the trade policy is uniform within a country.

role of two other determinants of regional poverty, which are (iv) population mobility (migration) and (v) public policies/services (intergovernmental transfers), will be discussed in Chapter Seven. As the findings for P1 and P2 are not significantly different from P0 in Chapters Four and Five, it was decided not to replicate the analysis in Chapter Six, in order to simplify and focus on the determinants, rather than the measures of poverty.

The main purpose of this chapter is to analyse whether these common determinants, which are also important determinants of growth, have a direct impact on poverty, and to examine the question of whether other variables are likely to still reduce the poverty headcount index when growth slows.

Thus, two hypotheses are advanced on the relationship between poverty and the role of the determinants discussed above.

First, there is a positive relationship between the share of natural resources (oil and gas) and poverty, and a negative relationship with openness. Second, there are negative relationships between poverty and human capital and infrastructure, and a positive relationship with inequality.

In addition, this chapter attempts to analyse whether these determinants have an indirect impact on poverty through economic growth which is then associated with poverty.³

Compared to earlier studies on Indonesia which have investigated the determinants of regional poverty, there are at least two other distinguishing features of the present study.

First, this chapter also investigates the robustness of the Growth Elasticity of Poverty (GEP) discussed in Chapters Four (across growth episodes) and Five (across regions) with the inclusion of other determinants. Second, this chapter examines the growth episodes and regional effects of the determinants. The

³ The hypothesis regarding the indirect impact is discussed in section 6.4 of this chapter.

analysis of growth episode effects follows the three growth episodes: (i) the first period of liberalisation (1984-1990), (ii) the second period of liberalisation (1990-1996), and (iii) the recovery period (1999-2002). More detailed regional analysis is carried out based on the Hill province grouping (see Chapter Five for the Hill province grouping classification).

The empirical analysis will be based on the same panel data set of 26 provinces analysed in Chapters Four and Five, constructed from secondary data mainly collected by the Central Board of Statistics of Indonesia (CBS).

The chapter is organised in six sections. Following the introduction, the next section discusses the literature review. Section three presents the data and measurement. Section four presents the empirical methodology and approach. Section five analyses the empirical result. Section six presents conclusions drawn from this analysis.

6.2. Literature on the Determinants of Poverty

The literature review presented below provides more specific detail, following the general discussions in Chapter Two. While most of the studies discussed below are based on cross-country literature, unless otherwise specified, it is expected that similar indicators will generally still apply within a country using cross-regional analysis. This discussion especially focuses on the separate direct and indirect channels of these determinants of poverty and links these channels with the proposed hypotheses.

6.2.1. Structure of the Economy

6.2.1.1. Natural resources

Here the term natural resources refers to the oil and gas share in Gross Domestic Product (GDP) or Regional Gross Domestic Product (RGDP).⁴ The indirect effect through growth is considered ambiguous. Sachs and Warner (1995, 2001), using cross-country literature, argue that countries with relatively more natural resource abundance tend to experience “*a curse*” as they experience slow growth. This result is robust even after controlling for other variables such as initial income per capita, investment rates, and trade policy (Sachs and Warner, 1995; Leite and Weidmann, 1999; and Gylfason, Herbertsson and Zoega, 1999).

Several mechanisms can explain why countries with more natural resources tend to have slower growth. These mechanisms include rent seeking behaviour, which refers to the fact that profits from resource extraction are appropriated by officials and politicians (Sachs and Warner, 1995); Dutch disease experiences in resource rich countries also have negative impacts on growth for three reasons: (i) an increase in real exchange rates because there are large inflows of foreign exchange induced by the increased resource exports, (ii) natural resource booms crowding out labour and capital from certain important export sectors such as agriculture and manufacturing, which in turn causes these sectors to become uncompetitive (Frankel and Romer, 1999); and finally, (iii) inward looking policies associated with resource booms (Frankel and Romer, 1999). These factors cause natural resource rich countries to perform less well than their more poorly endowed neighbours.

Roemer and Gugerty (1997) extended the argument regarding natural resources as a curse by stressing the contention that the spillover effects of mining activities to the local people (especially in rural areas) are really small. They further argued that growth which originates from mineral exports is expected to be less labour intensive than growth which comes from agricultural or manufacturing exports.

⁴ Instead of the oil and gas export share to total exports, the share of oil and gas as a percentage of GDP or RGDP is used, not only because the data are not available but also conceptually to avoid a multicollinearity problem with a proxy which is measured by trade volume as a share of GDP/RGDP. It is assumed that countries or regions which produce a high share of mining, oil and gas to GDP or RGDP will also export.

This phenomenon can also be indicated by a lower share of employment to total national employment than the regional share of Regional Gross Domestic Product (RGDP) to national GDP. The mining sector is a capital intensive sector, which needs relatively highly skilled workers living and working exclusively and separated from local people (Ross, 2001). The direct impact of natural resources on poverty then is expected to be positive, as mining activities are unlikely to employ many poor people. As Ross (2001) found, in a study which examined the correlation between mineral dependence and the poverty headcount ratio in 51 countries, the higher the share of mineral dependence is the higher the poverty. Nevertheless, if the revenue from these activities is recycled wisely, i.e., through strong local institutions and effective policy, the impact of oil and gas can be positive for poverty alleviation.

In the Indonesian case, the previous literature on Indonesia based on Balisacan, Pernia and Asra (2003) found that a sign of this variable was ambiguous. It was not significant in the poverty regression, but was significant in the growth regression. It is most likely true that the oil and gas sectors in Indonesia have been engines of economic growth through their contribution to exports and to the national budget and public spending. However, the revenue from the growth of oil and gas activities went almost entirely to the Central Government rather than to the producing provinces, especially prior to the Decentralisation Period in 2001. In this situation, the growth was then relatively slower and was thus positively associated with poverty.

Therefore two hypotheses can be followed. Although, the expected relationship between natural resources and poverty can be considered ambiguous, the initial observation in Indonesia's case shows there should be a positive direct effect, and that oil and gas should contribute to an increase in absolute poverty. An indirect effect is not clear since oil and gas sectors are expected to contribute positively to growth but the fact that this revenue went back to the Central Government in the case of Indonesia could counter this positive effect in oil producing regions.

6.2.1.2. Openness

Openness, as measured by the ratio of total trade volume to GDP or RGDP, represents a greater connection to the international market. As discussed previously in cross regional analysis, the ratio of regional trade volume to regional output to some extent also captures the trade policy (Rodriguez and Rodrik (2000) in Chapter Two) as trade policies also influence the trade volume.

Openness is expected to facilitate the gains from international trade. Nevertheless, there is still no consensus in the cross-country literature regarding the impact of trade openness on poverty (Ravallion, 2005). As discussed in detail in Winters, McCulloch and McKay (2004), the links by which openness can have an impact on poverty are through three main channels of (i) households and the market, (ii) wages and employment, and (iii) economic growth.

The first two channels measure the separate effects of trade which are not captured by growth.

Openness or trade will have a direct impact on poverty through (i) the market for goods or services which matters for the poor, where poor households are net sellers or consumers, and (ii) wages and employment for the poor. First, as a net seller, an increase in the price of goods or services will increase poor household incomes and a decrease will reduce their income. An adverse impact on poverty can result if openness destroys a market for a specific commodity which matters for poor households.

The second channel of wages and employment is closely related to the fact that most of the poor rely on the labour market for income. If openness creates labour intensive products, it can boost labour demand and increase either wages or employment of the poor (or both). However as most poor are unskilled and possibly located in remote areas, they may be excluded from the impact of openness. Thus, only semi-skilled workers can take up opportunities to work in labour intensive sectors.

The third channel on the impact of openness on poverty through growth is discussed more thoroughly in the literature. A number of studies have related openness to economic growth, and analysed its impact on relative poverty or inequality. Through this channel, there are two links at play, one from (i) trade openness to growth, and (ii) from growth to poverty reduction.

Most of the literature discusses the relationship between openness and poverty in the international setting in cross-country analysis, in which each country has its own trade policy. This is different from the relationship between openness and poverty in a regional setting within a country where there is only one national trade policy but trade can have a different impact across different regions. For example, policies with regard to certain tradable goods sectors can have different impacts which depend on the importance of that sector in the relevant region. For instance, in the Indonesian context, trade policies for textile industries will have a greater impact for West Java, and trade policies for timber industries will have a greater impact for Kalimantan provinces. Nevertheless, as found in the cross-country literature, these three channels where openness can have an impact on poverty, are also expected to be valid for the cross regional analysis.

Empirical Literature on the Relationship between Openness and Poverty

The clearer and more established link actually runs from openness to growth. Frankel and Romer (1999) and Berg and Krueger (2003) showed that openness (measured by share of trade to GDP) made a positive contribution to growth. The subsequent link from growth to poverty reduction is also quite robust.

Confirming the theoretical literature, the empirical literature on the relationship between openness and poverty is discussed below.

- a) The impact is either small or not significant (with an adverse sign as found by Dollar and Kraay, 2002) or not robust (Ravallion, 2005)
- b) It increases inequality, implicitly indicating trade may not be good for reducing poverty (Barro, 1999; Lundberg and Squire, 2003). Several factors may contribute to the findings, apart from measurement issues for inequality and openness, or econometric specification or technique, openness may increase inequality, e.g., widening the wage gap between skilled and unskilled workers. As occurred in Latin American countries

during the 1980s and early 1990s (Robbins, 1996), where greater openness increased the relative demand for skilled labour (Anderson, 2005).

- c) There is only weak evidence of an additional impact from openness directly on poverty reduction, aside from its effect via economic growth (Roemer and Gugerty, 1997). The findings suggest openness usually works indirectly through economic growth.

While the above findings are mostly from cross country literature, similar relationships can be expected to be found in cross regional analysis within a country. Two hypotheses result. Theoretically, openness is expected to be negatively associated with poverty (from markets, employment and wages of the poor). Indirectly, openness is then expected to increase growth and be negatively associated with poverty.

Nevertheless, different from cross country data on international trade, the international export and import database for undertaking empirical analysis in the sub national analysis is very limited. This will be discussed later in section 6.3.

6.2.2. Structure of Society and Community

6.2.2.1. Human capital (education)

The role of human capital in poverty alleviation is usually mediated through economic growth.⁵ Through growth there are two effects that human capital (i) increases the growth rate and (ii) causes growth to be more pro-poor (Klasen, 2004). Lucas (1988) pioneered the proposition that human capital, here education, is one robust determinant of long run economic growth.⁶ Endogenous growth theory usually includes human capital as one factor of production.

Lucas (1988) mentioned that both schooling and learning by doing are important for growth. Following Lucas (1988), human capital is further claimed to contribute to growth by increasing knowledge accumulation (Romer, 1989),

⁵ See Becker (1994) on human capital and poverty alleviation.

⁶ Most literature focuses on the education component of human capital; health as another significant component is still missing.

lowering population growth (Becker, Murphy and Tamura, 1990), or both (Galor and Weil, 2000).

In terms of an empirical exercise, two important points should be taken into account. First, on the issue of measurement, is the question how to measure human capital, or, more specifically, how to measure education? Is it better to use concepts of 'flow' or 'stock' of human capital? Second, the impact of human capital in the empirical literature on growth is not conclusive (Gundlach, 1999; Pritchett, 2001).

On the first issue regarding flows versus stocks, flows represent current policy in human capital compared with the stock measures. Following Mankiw, Romer and Weil (1992), Loayza, Fajnzylber and Calderon (2002) used the rate of gross secondary school enrolment to represent the flow of human capital, which is a crude measure of stock of human capital.

The simplest stock of human capital proxy is the adult literacy ratio (Azariadis and Drazen, 1990). However, this literacy ratio has weaknesses in that it only focuses on primary education and the assumption that a person needs only to enter primary school in order to be able to read. Two other stock measures have been recently increasingly used in the empirical literature, namely educational attainment and average years of schooling (Barro and Lee, 1993; Benhabib and Spiegel, 1994; Krueger and Lindahl, 2001). These additions improve the adult literacy ratio measure, since the new measures include the highest attained education level in the labour force.

On the second issue, the inclusion of human capital is far from significant in explaining growth, as Benhabib and Spiegel (1994) found; and only marginally benefits the income of the poor (and is not significant) once the other determinants of growth are accounted for (Dollar and Kraay, 2002).

Why is this so? Pritchett (2001) offers three explanations for this, referring to the case in developing countries.

First, as the common proxies of human capital are either the enrolment rate (for example, the primary enrolment rates across cross countries) or average years of schooling, cross countries variations may be too low to produce a variation in human capital, as neither enrolment nor an additional year of schooling necessarily increases the quality of students or the stock of human capital. Further, Gundlach, de Pablo and Weisert (2004) in their response to the finding of Dollar and Kraay (2002) on education, argued that this is not the case when the quality of students has been incorporated. Gundlach, de Pablo and Weisert (2004) used a new measure of human capital which takes into account of international differences in the quality of education. They found the new measure had a direct impact on income of the poor as well as an indirect impact through economic growth.

Pritchett (2001) argues that there may also be a mismatch in supply and demand in human capital; an excess of supply of educated labour causes the marginal returns to education to reduce rapidly. Finally, Pritchett (2001) also argues that institutional factors may not be adequate, causing educational capital accumulation to lower economic growth. This refers to the obligation of the public sector to absorb the surplus of educated labour and become the employer of last resort, having an adverse impact on output and then on poverty.

The impact of human capital on poverty can also be direct, usually through human capital intervention (such as health and education interventions) directed as poverty alleviation strategies, such as providing free basic education for poor people. As is well documented in micro earning models of education, the main argument is that schooling increases the ability to learn, and is also a determinant of people's ability to take advantage of income earning opportunities (Schultz, 1981; Becker, 1994), thereby affecting poverty reduction. Gundlach (1999) claimed an increase in average years of schooling will substantially increase a worker's income.⁷ Earlier in Chapter Two, it is also argued that human capital is an important asset for the poor to live free from poverty.

⁷ Nevertheless, as argued by Psacharopoulos (1994), there is a diminishing rate of return of schooling when the level of schooling and per capita income increases.

To some extent, all of the arguments above will be accommodated in the empirical analysis. However, on the measurement issue, the proxies used are largely determined by data availability.

Nonetheless, theoretically, there are two channels through which education may impact on poverty. The direct channel argues that education should decrease absolute poverty, whereas the indirect channel theoretically argues that education first has a positive influence on growth and is then associated with poverty reduction.

6.2.2.2. Inequality

The impact of inequality on absolute poverty can be ambiguous; the outcome actually depends on which groups in the income distribution (e.g. deciles) are affected.

Inequality (in this case contemporaneous inequality) is also important as a factor affecting how much economic growth reduces poverty. As argued by Adams and Page (2003, 2005), economic growth is expected to reduce poverty more with a lower level of inequality. Several empirical studies decomposed the growth and inequality elasticity of poverty. Bruno, Ravallion and Squire (1996) found the growth elasticity of poverty was -2.28 whereas the Gini elasticity of poverty was 3.86.⁸ This growth elasticity of poverty is lower than that found by Ravallion and Chen (1997) at -3.12, but is similar to their Gini elasticity of poverty. In another empirical study, using a similar methodology but with a poverty line set at \$1.08 per person a day, Adams (2004) found the growth elasticity of poverty was -2.79 whereas the Gini elasticity of poverty was 3.3. These findings on the Gini elasticity of poverty are then supported by findings from Bruno, Ravallion and Squire (1996) who concluded that a modest change in inequality can affect change in the incidence of poverty.

⁸ By regressing the change in the log of the proportion of population living less than \$ 1 per person a day on the change in the log of the survey mean and in the log of the Gini Index across 20 countries within the 1984-1992 period.

However, inequality may affect poverty through economic growth. As mentioned earlier in Chapter Two, inequality can either increase or lower the growth, and vice versa.

On the causality from inequality to growth: Research suggests a negative relationship between inequality and growth (Alesina and Rodrik, 1994; Deininger and Squire, 1996, 1998). Inequality may be harmful for growth for the following reasons.

First, through political economy factors, in which the more unequal the income distribution, the less endowed is the median voter with capital and the higher is the equilibrium level of capital taxation which leads to lower economic growth (Alesina and Rodrik, 1994).

Second, the negative outcome occurs through economic links: Imperfections in the capital market where income distribution is unequal results in a greater number of poor without access to any economic activities. Therefore, for example, if these poor invest in schooling or education, this has to be financed by borrowing subsequently leading to lower economic growth (Deininger and Squire, 1998).

The third factor refers to the social inequality or social conflict channels due to discrimination within the society (Ferreira, 1999). The more unequal the distribution, the higher the possibility of political instability, which in turn can possibly lower investment (Alesina and Perotti, 1993).

In contrast, some alternative studies appear to suggest the reverse relationship occurs where inequality can have a positive effect on economic growth (Benabou, 1996 and Aghion, Caroli and Garcia-Penalosa, 1999). Furthermore, Forbes (2000) argued the finding of a negative relationship is not robust due to omitted variables, especially country fixed effects, in the cross-country growth literature. Barro (2000), on the other hand, found no relationship between inequality and growth. In their comprehensive paper, Banerjee and Duflo (2003) criticised the present literature on the inconclusive relationship between inequality and growth as a

result of imposing a linear relationship between these two variables. If one does not impose the linearity relationship, they suggested that, changes in inequality (increases or decreases) are associated with reduced growth in the next period.

This finding is supported by Galor and Tsiddon (1997a, 1997b), who specified a positive channel from inequality to growth. Galor and Tsiddon (1997a, 1997b) argued that inequality can be positively associated with growth particularly (i) during the periods of major inventions in technology and (ii) when individual level of human capital is determined by parental human capital (local environment externalities), especially during the early stages of development. Accordingly, there exists an ambiguous relationship between inequality and growth, the sign of the relationship between inequality and economic growth is not clear.

On the reverse causality of whether growth creates inequality, there is Kuznet's (1955) hypothesis with his inverted U curve on the relationship between growth and inequality. However, the relationship may not always be robust, depending on different countries' experiences.

Accordingly, two hypotheses are proposed here. Inequality is expected to have a direct positive association with poverty. Indirectly, since the literature suggests a complex relationship between inequality and growth, the expected sign is ambiguous.

6.2.3. Public Policies/Services (Infrastructure)

To start, there are proxies of infrastructure which are good for growth but not necessarily good for reducing poverty, and vice versa. For example, the length of paved roads and irrigation, may be better in capturing regional growth, but the availability of electricity and water supply may be more suitable for poverty alleviation. Nevertheless, in practice, there is no proxy which is considered superior either for growth and poverty. In addition, data availability is also an issue. For these reasons, the length of paved roads is the most commonly used indicator of infrastructure, for both growth and poverty. This is also in line with the fact that the length of paved roads directly affects transportation costs and thus

may be considered a basic form of infrastructure which is important for everyone including the poor.

Following the discussion in Chapter Two, the length of paved roads link the poor directly with economic activities, mainly for expanding employment and also for productivity in both agricultural and non agricultural sectors (Ali and Pernia, 2003; Yao, 2003) and interregional trade activities (Hayami and Kawagoe, 1993). They also affect access to education and health facilities within or across regions (Jalilian and Weiss, 2006; Warr, 2006 and Kwon, 2006).

In addition, indirect channels through growth are especially important if infrastructure can interconnect all growth-generating sectors in different regions and so lead to higher economic growth, which is then associated with poverty reduction (Yao, 2003; Kwon, 2006).

In addition to roads, Ali and Pernia (2003) specified two other types of infrastructure used in the empirical literature: irrigation and electricity. The impact can be both direct or indirect. Irrigation allows crops to grow better. Balisacan and Pernia (2002) found that irrigation directly affects incomes of the poor in the Philippines with an elasticity of -0.31, whereas, in their China study Fan, Zhang and Zhang (2002) found the elasticity of irrigation on the output was 0.41 which then had an impact on reducing poverty incidence. Palmer-Jones and Sen (2003) also specified the indirect impact of irrigation in India which speeds up agricultural growth and in turn is associated with poverty reduction.

Electricity can be also a proxy of technology. Lack of electricity has an impact on lowering the productivity of the poor. Balisacan, Pernia and Asra (2003) found technology index (which combines electricity and communication facilities) had a significant direct impact on the income of the poor in Indonesia, whereas electricity was not significant for the Philippines (Balisacan and Pernia, 2002).

Therefore hypotheses are proposed for both direct and indirect affects. Infrastructure is expected to reduce poverty directly and increase growth which

then indirectly reduces poverty. The empirical analysis will be limited to the proxies available.

6.3. Data and Measurement

Chapter Three provides general discussion of data and measurement issues. Nevertheless, this chapter uses only the poverty headcount index (P0) as the dependent variable, in order to have more focused discussion on the relationship between absolute poverty and its determinants.

In addition to mean consumption per capita, other explanatory variables to be used, are presented below. These proxies are the best available measurement for all the variables of interest.

6.3.1. Inequality

Due to data availability, the proxy for income inequality is the Gini coefficient/index based on household consumption expenditure from the National Socioeconomic Survey.

6.3.2. Human Capital

Although criticised by Pritchett (2001), the main indicator selected is the average years of schooling as this is the best proxy available. As described earlier this is calculated based on the methodology developed by Barro and Lee (1993). The data are estimated based on the 1990 and 2000 Population Census and the 1985 and 1995 Intercensal Population Survey (SUPAS).

Alternatively, the education attainment to the level of completed Junior High School (JHS) or higher is also explored as an alternative proxy of stock of human capital. The Junior High School enrolment ratio is also used as a crude measure of human capital, although it measure flows instead of the stock of human capital.

6.3.3. Infrastructure.

The indicator selected is the paved road length per capita (multiplied by 1000 to reflect km per 1000 persons). The indicator is calculated based on data provided by the Division of Transportation Statistics of the Indonesian Central Board of

Statistics (CBS). As discussed in Chapter Five, the paved roads indicator might not be preferable for those provinces where rivers are the main system of transportation. It is also less useful if there are big differences in population density across provinces, for example between the high densely populated province of Jakarta and the sparsely populated province of Papua.

Another type of infrastructure variable that is considered to be more relevant in poverty analysis can also be incorporated, e.g., electricity (Balisacan, Pernia and Asra, 2003), and water supply. However, as these variables are found to be highly correlated with paved road length per capita in Indonesia, they cannot be included in the analysis.

The geographic poverty trap literature suggests that investing in local infrastructure is beneficial for the poor.

6.3.4. Openness

This chapter uses the ratio of total trade to RGDP.⁹ As for RGDP, Export and import data are based on constant 1983 prices. Interprovincial and foreign export and import data are calculated by the Central Board of Statistics. Both are taken from the regional accounts covering both domestic and international trade. Apart from the issue of data availability, the justification to also include domestic trade is that domestic trade also matters for enhancing regional growth.

Accordingly, interprovincial export and import data are calculated based on the survey of interprovincial flow of goods. Nevertheless these trade data have limitations as follows :

- What is usually referred to as openness covers only international trade, while this proxy covers both international and domestic trade.

⁹ Although some studies such as Dollar and Kraay (2004) and Rodriguez and Rodrik (2000) argued that changes in the trade ratio to GDP is a better representation of trade policy (therefore in a cross-country setting representing different countries' trade policies), but volume of trade as a percentage of RGDP is used here since this is a regional study with one national trade policy.

- There are likely to be some outliers, especially among the natural resource rich provinces where tradable goods are a high percentage of RGDP.

Alternatively, manufacturing export by ports located in province (as a percentage of RGDP) is also included as an alternative proxy. This also has a limitation. The 'export by ports' concept records exports not only from the province where the commodities originated and the port is located, but also from other provinces. Some provinces do not have major ports which leads them to export their commodities through sea ports in nearby provinces. Therefore exports recorded in Jakarta do not only include the export of goods that originated from Jakarta, but also goods from other nearby provinces (West Java, etc.), which pass through the Jakarta port of Tanjung Priok to be exported.

6.3.5. Natural Resources

The variable used is the share of oil and gas to RGDP which is calculated from the regional accounts. The figures are in real 1983 prices, similarly with RGDP.

6.3.6. Summary of Determinants of Regional Poverty in Indonesia

To give an overview on the distribution of these determinants across groups of provinces, Table 6.1 shows the summary of the determinants of regional poverty in Indonesia, following the Hill province grouping described in detail in Chapter Five. Although average differences were not large, the densely populated provinces recorded the highest Gini inequality on average (30.6 in 1984-2002). This was then followed by the resource rich provinces, settled Outer Islands provinces, and isolated and sparsely populated provinces (Gini index of 31.1; 29.8; 28.3; 27.8; 26.7 respectively).

Human capital indicators were superior in the densely populated provinces, followed by the resource rich provinces, the settled Outer Islands, the sparsely populated and the isolated provinces. As discussed earlier in Chapter Five, the resource rich provinces, except for Papua, have a relatively higher level of human capital, whereas the settled Outer Islands include provinces which are better off in terms of human capital such as West Sumatra, North Sulawesi and South Sulawesi.

The isolated provinces are isolated from both the domestic and international market, as their trade ratio was the lowest, and they also recorded a low score in terms of natural resources. All provinces amongst the resource rich are more open to the external environment due to their oil and gas exports, with a high share of oil and gas to RGDP ratio, at more than 75 per cent. However, as a group, the densely populated provinces had a higher openness indicator, which was mainly because of Jakarta, the national capital city, and Surabaya, the capital city of East Java. There are two major sea ports in these cities, Tanjung Priok in Jakarta and Tanjung Perak in Surabaya. They have become the ports from where commodities are then exported (exports not only originate from Jakarta or Surabaya). For example, the exports which go through Tanjung Priok mostly come from West Java and other provinces (Castles, 1989).

Table 6.1 also shows that the densely populated provinces had the lowest infrastructure indicator (in per capita terms). This does not mean infrastructure in the densely populated provinces is bad. As it is mostly the best in the country. However, population is largest in this group of provinces, so in per capita terms the figure is small.

Table 6.1. Summary of the Determinants of Regional Poverty of the Hill Province Grouping in 1984-2002

No	Provinces	Inequality		Human Capital		Infrastructure		Openness	Natural Resource
		Gini (per cent)	Average Years of Schooling (Years)	Education attainment at least JHS (per cent)	JHS Enrolment Ratio (per cent)	Paved Road Length per capita (km/1000 people)	Total Trade/ RGDP ratio		
1	Aceh	25.4	5.1	30.3	53.7	1.5	76.5	26.0	
4	Riau	26.3	4.9	28.3	47.7	1.1	83.8	73.0	
20	East Kalimantan	31.1	5.4	33.6	55.1	0.9	109.9	37.0	
26	Papua	36.5	3.7	21.8	47.1	1.5	118.2	11.7	
<i>Resource Rich Provinces</i>									
		29.8	4.7	28.5	50.9	1.1	91.9	47.9	
8	Lampung	27.5	4.1	20.8	45.1	0.8	66.0	-	
9	DKI Jakarta	31.7	7.5	52.2	72.4	0.7	127.9	-	
10	West Java	30.8	4.6	22.8	44.8	0.4	69.3	10.5	
11	Central Java	28.7	4.1	19.7	48.6	0.6	91.4	0.0	
12	DI Yogyakarta	34.1	5.6	35.9	67.9	1.1	66.3	-	
13	East Java	31.0	4.1	21.3	51.5	0.6	138.7	0.2	
14	Bali	30.1	4.8	27.1	61.6	1.4	61.1	-	
<i>Densely Populated Provinces</i>									
		30.6	5.0	28.5	56.0	0.6	103.0	3.0	
15	West Nusa Tenggara	28.2	3.3	17.4	44.7	0.9	33.2	-	
16	East Nusa Tenggara	28.5	3.1	14.7	26.7	1.2	53.2	-	
<i>Isolated Provinces</i>									
		27.7	3.2	16.0	35.7	1.0	42.4	-	

Table 6.1. Summary of the Determinants of Regional Poverty of the Hill Province Grouping in 1984-2002, *Continued*

No	Provinces	Inequality		Human Capital		Infrastructure		Openness	Natural Resource
		Gini (per cent)	Average Years of Schooling (Years)	Education attainment at least JHS (per cent)	JHS Enrolment Ratio (per cent)	Paved Road Length per capita (km/1000 people)	Total Trade/RGDP ratio		
2	North Sumatra	27.6	5.4	33.1	61.2	1.1	57.4	1.8	
3	West Sumatra	27.1	4.9	29.4	56.2	1.7	28.6	-	
6	South Sumatra	28.0	4.4	23.4	45.6	1.0	80.3	14.7	
19	South Kalimantan	27.3	4.3	23.0	41.7	1.3	73.2	2.3	
21	North Sulawesi	29.5	5.3	30.9	52.2	1.5	59.6	-	
23	South Sulawesi	30.0	4.3	24.5	44.2	1.2	75.3	-	
Settled Outer Island Provinces		28.2	4.7	27.4	50.2	1.2	64.8	4.7	
5	Jambi	23.5	4.4	23.8	45.4	1.3	111.2	7.9	
7	Bengkulu	25.0	4.5	25.3	49.9	2.0	21.8	-	
17	West Kalimantan	28.1	3.4	18.5	31.9	0.9	94.9	-	
18	Central Kalimantan	25.6	4.6	24.6	46.2	1.2	98.3	-	
22	Central Sulawesi	28.5	4.7	23.7	45.9	1.5	50.3	-	
24	Southeast Sulawesi	29.0	4.3	24.2	46.4	1.5	30.6	-	
25	Maluku	28.0	4.9	26.8	51.7	1.5	42.5	1.0	
Sparsely Populated Provinces		26.7	4.4	23.9	45.4	1.3	74.3	1.3	
National average		28.8	4.6	25.9	49.4	0.8	92.3	11.6	

Source : Author's calculation based on CBS, *National Socioeconomic Survey, 1984-2002*; *Intercensal Population Survey, 1985, 1995*; *Population Census, 1990, 2000*; *Regional Accounts, 1984-2002*.

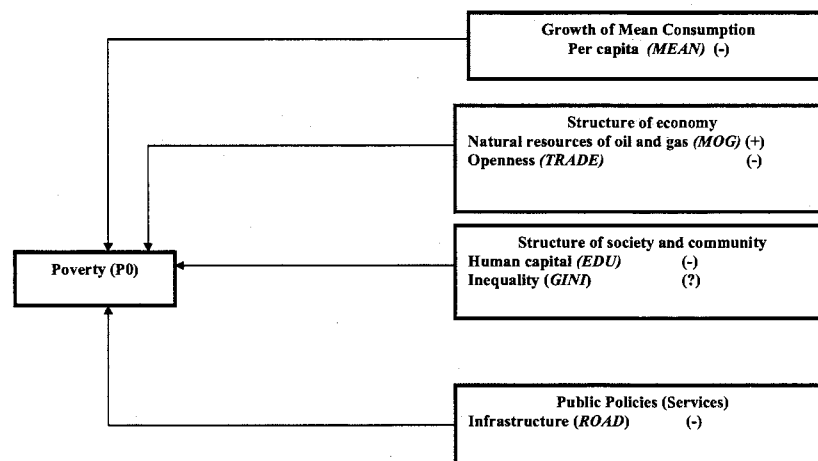
Note : JHS refers to Junior High School. For human capital proxies, since the data available were only for 1985, 1990, 1995 and 2000, data for other years are estimated by interpolation method.

6.4. Empirical Methodology and Approach

Based on the literature, the main argument in this chapter can be summarised as follows: human capital, infrastructure, the presence of oil and gas, inequality and trade have been crucial in influencing growth across Indonesia and these in turn have played an important role in explaining regional poverty. Nevertheless, in addition to the growth channel, these variables may impact directly on regional poverty. Thus, the general postulated relationships are as follows:

Figures 6.1 and 6.2 show the empirical framework for both direct and indirect channels, that the explanatory variables may have an impact on poverty through both channels. The parentheses show the expected relationship between the determinants and poverty, either positive (+), or negative (-), or not clear (?).¹⁰

Figure 6.1. The Determinants of Regional Poverty: Direct Channels
(Common Determinants)¹¹

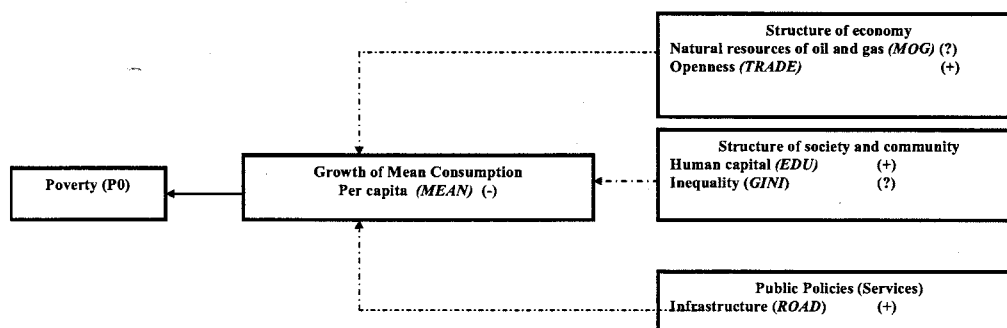


Note : ____ Denotes direct channel

¹⁰ Not clear refers to variables for which they do not have a clear hypothesis

¹¹ The sign of *MOG* can be also ambiguous, i.e., supposes there are good local institutions and effective policy, although this may not be the case for Indonesia.

**Figure 6.2. The Determinants of Regional Poverty: Indirect Channels
(Common Determinants)**



Note :---- Denotes indirect channel
 — Denotes direct channel

The discussion on each of these two general channels will be carried out step by step, following the strategy of Palmer-Jones and Sen (2003). In the estimation, mean consumption per capita as a proxy of income is treated as exogenous (as in Ravallion and Datt in their series of papers, 1996, 1999, 2002; Ravallion and Chen, 1997, and Meng, Gregory and Wang, 2005); the causality runs only one way from mean consumption per capita to the headcount poverty index and not the other way around. The other possible source of endogeneity has already been solved by the fixed effects and the year dummies (due to the nature of panel data).

Miranti and Resosudarmo (2005) tested growth as endogeneous; however, the endogeneity test failed to find the presence of endogeneity in their estimations.

Some of the literature treats growth as endogenous, but this is mainly because the dependent variable is not an absolute poverty measure but a relative one such as the mean income of the bottom 20 per cent of the population (Balisacan, Pernia and Asra, 2003). The relative poverty measure is also an approximation of inequality and the literature acknowledges the two way causality between growth and inequality, as discussed earlier in Chapter Two.

Therefore, both channels are estimated by the reduced form of empirical equation of determinants of regional growth and regional poverty. The objective is to establish the plausibility of the relationships that have been put forward. As a consequence, the magnitude of the total effect (direct plus indirect channel) cannot be quantified.

6.4.1. Regional Growth-Indirect Channels

Growth which is measured as an increase in average mean consumption per capita is expected to have ambiguous relationships with the natural resources oil and gas (*MOG*) and Gini inequality (*GINI*), whereas it is expected to have positive relationships with human capital (*EDU*), availability of infrastructure (*ROAD*), and greater integration with the market (*TRADE*).

To explore the relationship, the simpler model of growth (Mankiw, Romer and Weil, 1992), which is similar to the basic model 3.14 presented in Chapter Three, is estimated as follows:

$$\ln MEAN_{i,t} = \delta_0 + \delta_1 \ln lagMEAN_{i,t-3} + \delta_2 \ln GINI_{i,t} + \delta_3 \ln EDU_{i,t} + \delta_4 \ln ROAD_{i,t} + \delta_5 MOG_{i,t} + \delta_6 \ln TRADE_{i,t} + \sum_{e=1}^6 \lambda_e d_t + \delta_i + \varepsilon_{i,t} \quad (6.1)$$

Where :

- $MEAN_{i,t}$ is a proxy of income of province i at time t, which is Mean Consumption Per capita (Rupiah, 1984 prices)
- $lagMEAN_{i,t-3}$ is the three year lag of mean consumption per capita in province i at time t-3 (Rupiah, 1984 prices)
- $GINI_{i,t}$ is the Gini coefficient of province i at time t
- t is the index for year (t =1984, 1987, 1990, 1993, 1996, 1999, 2002)
- e is the index for 6 dummies (e=1,2,3,4,5,6)
- d are the dummies for time periods of when the National Socioeconomic Survey took place
- $d_{87} = 1$ if t=1987, or 0 otherwise

	$d_{90} = 1$ if $t=1990$, or 0 otherwise
	$d_{93} = 1$ if $t=1993$, or 0 otherwise
	$d_{96} = 1$ if $t=1996$, or 0 otherwise
	$d_{99} = 1$ if $t=1999$, or 0 otherwise
	$d_{02} = 1$ if $t=2002$, or 0 otherwise
	The base period is year 1984.
$EDU_{i,t}$	the main proxy is the average year of schooling of the total population at time t to represent the stock of human capital (years). The alternative proxies are (i) Junior High School Attainment Ratio and (ii) Junior High School Enrolment Ratio in province i at time t .
$ROAD_{i,t}$	is the length of paved road per 1000 population to represent infrastructure (km/1000 population) in province i at time t
$MOG_{i,t}$	is the oil and gas as a share of GDP to represent the natural resources (per cent) in province i at time t
$TRADE_{i,t}$	the main proxy is the ratio of total trade (exports plus imports) to total RGDP in province i at time t to represent openness (per cent). The alternative proxy is the share of manufacturing export by ports to RGDP in province i at time t . ¹²
δ	is the provincial fixed effect (unobserved heterogeneity)
ε	is a white-noise error term that includes errors in the poverty measure.
i	is the index for province ($i=1, \dots, 26$). (Please refer to Appendix 3.B for the list of all the provinces.)

¹² There is an alternative view which treated openness and size separately (Alesina, Spolaore, and Wacziarg, 2004). Alesina, Spolaore, and Wacziarg (2004) found that openness and also size are associated positively with growth. However, the coefficient of the interaction between these two variables are negative since the effects of size will be less important as an economy becomes more open. In this thesis, it was decided to use the ratio of total trade to RGDP as a single variable for two reasons (i) the literature of effects of size on growth is still controversial (Alesina, Spolaore, and Wacziarg, 2004) (ii) to maintain variable consistency in the openness indicators used in both poverty and growth equations.

There are possibilities of two way causalities between inequality, human capital, and openness with income growth, therefore *GINI*, *EDU*, and *TRADE* are estimated as endogenous variables. To produce consistent and efficient estimates of the parameters of the model, as discussed earlier in Chapter Three, estimation 6.1 is carried out with Arellano-Bond Generalized Method of Moment (GMM) estimation.

6.4.2. Regional Poverty - Direct Channels

As pointed out in Chapter Two, Bourguignon (2003) showed that under special conditions, the changes in poverty headcount could be an identity which captures the changes in the poverty line, mean income and income distribution. Nevertheless, in practice, the causal relationship is not straightforward as Meng, Gregory and Wang (2005) argued, as discussed earlier in Chapter Three. Therefore, the objective of this section is to analyse the empirical relationship between poverty, growth and other explanatory variables that may work directly to influence the poverty headcount index.

As these variables are also determinants of growth, the direct impact captures the additional impact of those variables which are not captured by economic growth, as proposed by Roemer and Gugerty (1997) when they tried to estimate the impact of trade and growth on poverty. Initially only inequality is included as an additional determinant, but then other determinants are added.

Therefore, model 4.1 is added with $\ln GINI$, as follows

$$\ln P_{0,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (6.2)$$

Where in addition to previous notations,

$P_{0,i,t}$ is the level headcount index of province i at time t (per cent).

In more detail, empirical equation 6.2 is then expanded in order to analyse (i) the impact of different growth episodes in Indonesia, and (ii) the impact of the regional effect as follows.

The impact of different growth episodes on poverty in Indonesia (equation 6.2a) is examined to check whether the Growth Elasticity of Poverty (GEP) is robust after taking into account the inequality which is not included in Chapter Four. Accordingly there are interactions between the second period of liberalisation ($EPISODE_2$) and the recovery period ($EPISODE_3$) with the growth variable ($\ln MEAN$). The base period is the first period of liberalisation 1984-1990.

$$\ln P_{0,i,t} = \gamma_0 + \rho_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \rho_2 EPISODE_{2,t} * \ln MEAN_{i,t} + \rho_3 EPISODE_{3,t} * \ln MEAN_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (6.2a)$$

Where in addition to previous notation,

$EPISODE_{j,t}$ are the dummies for growth episodes¹³
(only included in the estimation as the interaction variable),
 $j=2,3$

$EPISODE_{2,t} = 1$ if $t=1993$ and 1996 , or 0 otherwise
(the second period of liberalisation)

$EPISODE_{3,t} = 1$ if $t=1999$ and 2002 , or 0 otherwise
(the recovery period)

Then, the GEP across growth episodes is also estimated, by taking into account not only inequality but also natural resources (MOG), openness ($TRADE$), human capital (EDU), and infrastructure ($ROAD$) as follows.

¹³ The dummies of growth episodes are used to capture the macroeconomic conditions and the national policy during the specific growth episodes. Nevertheless, due to the format of the estimation and to match the period of the three yearly National Socioeconomic Survey Consumption Modules, the second liberalisation period only covers 1993 and 1996, while 1990 is included in the first period of liberalisation.

$$\begin{aligned} \ln P_{0,i,t} = & \rho_0 + \rho_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \rho_2 EPISODE_{2,t} * \ln MEAN_{i,t} + \\ & \rho_3 EPISODE_{3,t} * \ln MEAN_{i,t} + \gamma_3 \ln EDU_{i,t} + \gamma_4 \ln ROAD_{i,t} + \gamma_5 MOG_{i,t} + \\ & \gamma_6 \ln TRADE_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \end{aligned} \quad (6.2b)$$

Models 6.2a and 6.2b are carried out to check whether the Growth Elasticity of Poverty across growth episodes are robust.

To analyse the impact of regional effect on the Growth Elasticity of Poverty in Indonesia (equation 6.2.c), accordingly, there are interactions between groups of provinces based on the Hill province grouping, as explained in Chapter Five; the resource rich provinces (*RICH*), the isolated provinces (*ISO*), the settled Outer Islands provinces (*SETT*), and the sparsely populated provinces (*SPAR*) with consumption variable ($\ln MEAN$).

The base category is the densely populated provinces

$$\begin{aligned} \ln P_{0,i,t} = & \gamma_0 + \omega_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \omega_2 SPAR_i * \ln MEAN_{i,t} + \\ & \omega_3 RICH_i * \ln MEAN_{i,t} + \omega_4 ISO_i * \ln MEAN_{i,t} + \omega_5 SETT_i * \ln MEAN_{i,t} + \\ & \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \end{aligned} \quad (6.2.c)$$

Where in addition to the previous notation;

- ISO_i* is dummy of isolated provinces
ISO_i = 1, i=15 and 16 or 0 otherwise
- SPAR_i* is dummy of sparsely populated provinces
SPAR_i = 1, if i=5, 7, 17, 18, 22, 24 and 25 or 0 otherwise
- RICH_i* is dummy of the resource rich provinces
RICH_i = 1, if i=1, 4, 20 and 26, or 0 otherwise
- SETT_i* is dummy for settled Outer Island provinces
SETT_i = 1 if i=2, 3, 6, 19, 21, 23 or 0 otherwise

Further, the Growth Elasticity of Poverty across groups of provinces in Indonesia after taking into account not only inequality but also natural resources (*MOG*), openness (*TRADE*), human capital (*EDU*), and infrastructure (*ROAD*) is also calculated (model 6.2d).

$$\ln P_{0,i,t} = \gamma_0 + \omega_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \gamma_3 \ln EDU_{i,t} + \gamma_4 \ln ROAD_{i,t} + \gamma_5 MOG_{i,t} + \gamma_6 \ln TRADE_{i,t} + \omega_2 SPAR_i * \ln MEAN_{i,t} + \omega_3 RICH_i * \ln MEAN_{i,t} + \omega_4 ISO_i * \ln MEAN_{i,t} + \omega_5 SETT_i * \ln MEAN_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (6.2d)$$

Models 6.2c and 6.2d are estimated to check whether the regional Growth Elasticity of Poverty is robust, after taking into account all common determinants of poverty.

Equation 6.3 can basically be expressed in the same form as equation 6.2, which is expanded as below to analyse whether other explanatory variables have direct impact on headcount poverty.

$$\ln P_{0,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \gamma_3 \ln EDU_{i,t} + \gamma_4 \ln ROAD_{i,t} + \gamma_5 MOG_{i,t} + \gamma_6 \ln TRADE_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (6.3)$$

There are variants of model 6.3 which depend on the different proxies to measure human capital (*EDU*) and openness (*TRADE*).

- Equation 6.3a, *EDU* = average years of schooling;
TRADE = total trade to RGDP ratio
- Equation 6.3b, *EDU* = junior high school and above attainment ratio;
TRADE = total trade to RGDP ratio
- Equation 6.3c, *EDU* = junior high school enrolment ratio;
TRADE = total trade to RGDP ratio
- Equation 6.3d, *EDU* = average years of schooling;
TRADE = manufacturing exports by port/RGDP ratio

Different from the methodology in Chapter Five, where the growth elasticity of poverty was calculated with the assumption that the distribution curve follows the data, in this chapter the growth elasticity of poverty is estimated after being controlled for Gini inequality. Therefore the negative sign of the coefficient of $\ln MEAN$ is expected, whereas Gini coefficient ($\ln GINI$) is expected to have a positive relationship with poverty.

It is also important to note that, different from Chapter Five, here the separate effects of time variant variables of natural resources, human capital and infrastructure to poverty can be assessed.

Therefore, in addition to the recognition of individual provincial fixed effect in panel data estimation, (to take into account the possibility of the different impact of the same variables in different provinces), where possible equation 6.3 is expanded to equations 6.4 and 6.5, adopting the following steps.

- (i) The interaction between groups of provinces based on the Hill province grouping with human capital ($\ln EDU$) (equation 6.4a), or infrastructure ($ROAD$) (equation 6.4b), or openness ($\ln TRADE$) (equation 6.4c) are added. The base category will be the densely populated provinces.

$$\begin{aligned} \ln P_{0,i,t} = & \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \zeta_1 \ln EDU_{i,t} + \zeta_2 SPAR_i * \ln EDU_{i,t} + \\ & \zeta_3 RICH_i * \ln EDU_{i,t} + \zeta_4 ISO_i * \ln EDU_{i,t} + \zeta_5 SETT_i * \ln EDU_{i,t} + \gamma_4 \ln ROAD_{i,t} + \\ & \gamma_5 MOG_{i,t} + \gamma_6 \ln TRADE_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \end{aligned} \quad (6.4a)$$

$$\begin{aligned} \ln P_{0,i,t} = & \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \sigma_1 \ln TRADE_{i,t} + \sigma_2 SPAR_i * \ln TRADE_{i,t} + \\ & \sigma_3 RICH_i * \ln TRADE_{i,t} + \sigma_4 ISO_i * \ln TRADE_{i,t} + \sigma_5 SETT_i * \ln TRADE_{i,t} + \gamma_4 \ln ROAD_{i,t} + \\ & \gamma_5 MOG_{i,t} + \gamma_3 \ln EDU_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \end{aligned}$$

(6.4.b)

$$\ln P_{0,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \phi_1 \ln ROAD_{i,t} + \phi_2 SPAR_i * \ln ROAD_{i,t} + \phi_3 RICH_i * \ln ROAD_{i,t} + \phi_4 ISO_i * \ln ROAD_{i,t} + \phi_5 SETT_i * \ln ROAD_{i,t} + \gamma_3 \ln EDU_{i,t} + \gamma_5 MOG_{i,t} + \gamma_6 \ln TRADE_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t}$$

(6.4c)

- (ii) To analyse the impact of human capital (*EDU*) and openness (*TRADE*) in different growth episodes (equation 6.5a and equation 6.5b) on poverty, interactions are examined between the second period of liberalisation (*EPISODE₂*) and the recovery period (*EPISODE₃*) with $\ln EDU$ and $\ln TRADE$. The base period is the first period of liberalisation 1984-1990.

$$\ln P_{\alpha,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \psi_1 \ln EDU_{i,t} + \psi_2 EPISODE_{2,t} * \ln EDU_{i,t} + \psi_3 EPISODE_{3,t} * \ln EDU_{i,t} + \gamma_4 \ln ROAD_{i,t} + \gamma_5 MOG_{i,t} + \gamma_6 \ln TRADE_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t}$$

(6.5a)

$$\ln P_{\alpha,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \gamma_3 \ln EDU_{i,t} + \chi_1 \ln TRADE_{i,t} + \chi_2 EPISODE_{2,t} * \ln TRADE_{i,t} + \chi_3 EPISODE_{3,t} * \ln TRADE_{i,t} + \gamma_4 \ln ROAD_{i,t} + \gamma_5 MOG_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t}$$

(6.5b)

Another important issue which should be considered is the multicollinearity problem which may exist in the dataset. Although panel data estimation should minimise this multicollinearity problem, a rule of thumb test for multicollinearity is applied: if the correlation matrix between the two independent variables is higher than 0.8, multicollinearity indicates a strong linear and disturbing

relationship (Griffiths, Hill and Judge, 1993).¹⁴ To solve this problem, one of the variables causing this multicollinearity is dropped.

6.5. Empirical Results

6.5.1. Regional Growth-Indirect Channels

The growth estimation as shown in Table 6.2, confirms that only Gini inequality, stock of human capital (average years of schooling) and natural resources significantly explain the variation in regional growth. The findings on human capital, natural resources and inequality confirm the proposed indirect hypotheses.

The average years of schooling is significant and positively associated with growth (0.33). A ten per cent increase in year of schooling increased income by 3.3 per cent.

The presence of natural resources (oil and gas) reduced growth, which confirms the curse of the natural resource as most of the revenue from growth of these mining activities was not invested back to the producing provinces, especially prior to the decentralisation period in 2001.

Interestingly, taking into account the provincial fixed effects, the impact of Gini inequality on growth was positive and significant, confirming the ambiguous relationship between Gini inequality and growth in the empirical literature. This technically confirms the findings of Forbes (2000) who took into account countries' fixed effects in the cross-country growth estimation.¹⁵ Forbes (2000) indicated that the negative impact of inequality on growth is not robust since earlier empirical results did not take account countries' fixed effects. This is also similar with the findings of Balisacan and Fuwa (2004) for the Philippines.

¹⁴ The correlation coefficient can be seen in Appendix (Table 7.G)

¹⁵ Using panel data estimation, Forbes (2000) estimated growth as a function of initial inequality, income, male and female human capital, market distortions, country and period dummy variables. She found a positive relationship between inequality and economic growth. She criticised most empirical works which predict the negative relationship as not robust, as has been found by Deininger and Squire (1998). Nevertheless, this positive impact on inequality to growth may be restricted to short and medium term relationships since it based on 5 year and 10 year panels when compared with the earlier empirical works which covered 25 or 30 years cross-country regression estimates.

Table 6.2. The Determinants of Regional Growth

Explanatory Variable	(1)	
	GMM Estimate	
<i>lnlagMEAN</i>	-0.16 (-1.81)	*
<i>lnGINI</i>	0.37 (2.93)	***
<i>lnEDU</i>	0.33	
-Average Years of Schooling	(1.76)	*
<i>lnROAD</i>	0.01	
	-0.32	
<i>MOG</i>	-0.01 (-2.75)	***
<i>lnTRADE</i>	0.03	
-(Export+Import)/RGDP	(0.73)	
<i>cons</i>	0.0002	
Sargan test of over-identifying restrictions		
chi2 (71)	72.15	
Prob > chi2	0.44	
Arellano –Bond test that average autocovariance in residuals of order 1 is 0 (H0=no autocorrelation)		
z	-3.29	
Pr > z	0.0010	
Arellano –Bond test that average autocovariance in residuals of order 2 is 0 (H0=no autocorrelation)		
z	-0.79	
Pr > z	0.43	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # denotes significance at the 15% level. GMM means Generalized Moments Method estimates. Figures in parentheses are z ratios. The estimation includes year dummies. Number of observations are 127.

The finding on the positive impact of the Gini index on growth may also support the argument that the marginal propensity to save (MPS) of the rich is higher than that of the poor. Household marginal propensity to save in Indonesia was roughly around 10 per cent, as found by Kelley and Williamson (1968) and Robinson (1994).¹⁶ Nevertheless, the positive impact should be limited in the short or medium terms as in Forbes (2000), as the coverage of growth and poverty

¹⁶ In more details Kelley and Williamson (1968) found that the MPS was higher for trader and craftsman (0.43) and owner of business (0.31), based on the sample survey of Yogyakarta by occupational class. It was lower for the farmer (who included the poor) which was around the national average.

estimations was 18 years. The result may change if a longer period is covered such as 25 or 30 years.

An alternative view on this issue is given by Banerjee and Duflo (2003). The positive relationship between Gini inequality and growth may be due to the application of the Arellano and Bond technique of GMM for growth estimation.¹⁷ The data show there are more decreases than increases in inequality therefore, the GMM estimator gives more weight to the effect of decreases (positive coefficient) than increases in inequality (negative coefficient). Therefore it is possible that the relationship between inequality and growth is positive, as shown in Table 6.2.

Nevertheless, empirically the positive relationship is also similar to the findings of Balisacan and Fuwa (2004) for the Philippines.”

The positive impact of Gini inequality on growth may also indicate the existence of some outliers in the inequality data. Provinces such as Jakarta, East Kalimantan, and Papua, which had high income per capita had also high level of inequality (see again Table 6.1), which could possibly disturb the relationship between inequality and growth.¹⁸

The coefficients of infrastructure and openness are not significant but have the correct sign. Similarly, it is interesting to see that there is not a significant impact of openness on growth, which supports the findings of Dollar and Kraay (2002). Dollar and Kraay (2002) argued that openness is not significant due to the small number of observations on which the estimation were based. In this case, it is because the application of GMM growth estimation (which is basically First Difference) which requires additional lags of endogenous explanatory variables as

¹⁷ The GMM estimation, as also the Fixed Effects, imposes a linear structure on the relationship between inequality and growth. As a result, the GMM estimator is the weighted average of negative (increases in inequality) and positive coefficients (decreases in inequality), which can be positive overall if the estimator gives more weight to the positive coefficient. In fact this is the case.

¹⁸ The author is aware of the fact that certain results may be driven by outliers which seems highly plausible given the status of provinces such as DKI Jakarta and Papua. However, due to the small number of observations (N=171), removing the outliers is not a good way to solve the problem. However, a good technique to handle the problem of outliers is discussed in Hadi (1992).

instruments (the total number of observations are 127, instead of 171). In addition, this result is also related to how openness is measured, which covered both international and domestic trade, with several shortcomings as discussed earlier.

The diagnostic tests show that the Sargan test fails to reject the over-identifying restriction which indicates the homoskedasticity of the data set, therefore the coefficients are robust. Using the Arellano Bond test, the null hypothesis of no first-order autocorrelation is rejected meaning that AR(1) presents (with p-value of 0.0010), but the null hypothesis of no second-order autocorrelation is accepted (with p-value of 0.43) to prove that there is no AR (2). So the Sargan test and the second-order serial correlation test indicate that the instruments used in the GMM estimation are valid.

6.5.2. Regional Poverty-Direct Channels

6.5.2.1. The Growth Elasticity of Poverty

Table 6.3 column 1 (model 6.2) shows that after controlling for Gini coefficient and other variables, the growth elasticity of poverty (GEP) was at -2.43 during 1984-2002. This means that a 10 per cent increase in mean consumption per capita reduced the absolute poverty headcount by 24 per cent. This elasticity was higher than the GEP discussed in Chapter Four and the growth was more pro-poor. This elasticity is almost similar to that found by Friedman (2005) for Indonesia over 1984-1999, and this elasticity is also comparable with other countries which also used the absolute poverty measure as the dependent variable. For Bangladesh, Wodon (2002) found a growth elasticity in the range of -1.6 to -2.6, which depended on the various ranges of poverty line used, and this was slightly higher than Thailand which had a growth elasticity of poverty of -2.2 (Deolalikar, 2002).

Table 6.3. The Growth Elasticity of Poverty

Explanatory Variable	GEP Across Growth Episodes			GEP Across Regions Without <i>MOG</i>	
	(1)	(2)	(3)	(4)	(5)
<i>lnMEAN</i>	FE Estimate -2.43 *** (-21.68)	FE Estimate -2.22 *** (-16.44)	FE Estimate -2.17 *** (-15.66)	FE Estimate -2.63 *** (-16.06)	FE Estimate -2.66 *** (-16.40)
<i>EPISODE₂*lnMEAN</i>		*** -0.20 (-2.53)	*** -0.27 (-3.10)		
<i>EPISODE₃*lnMEAN</i>		*** -0.17 (-2.15)	*** -0.26 (-3.08)		
<i>RICH*lnMEAN</i>				0.49 ** (2.21)	0.50 ** (2.27)
<i>ISO*lnMEAN</i>				0.89 ** (2.17)	0.81 ** (1.99)
<i>SETT*lnMEAN</i>				-0.07 (-0.25)	-0.05 (-0.17)
<i>SPAR*lnMEAN</i>				-0.01 (-0.03)	0.01 (0.04)
<i>lnGINI</i>	0.92 *** (5.85)	0.99 *** (6.29)	1.05 *** (6.77)	1.02 *** (6.45)	1.02 *** (6.52)
<i>lnEDU</i>			0.01 (0.05)		0.10 (0.44)
<i>lnROAD</i>			-0.11 (-2.32)		-0.09 * (-1.77)
<i>MOG</i>			-0.0063 (-2.30)		

Table 6.3. The Growth Elasticity of Poverty, Continued

Explanatory Variable	GEP Across Growth Episodes			GEP Across Regions	
	(1)	(2)	(3)	(4)	(5)
	FE Estimate	FE Estimate	FE Estimate	FE Estimate	FE Estimate
<i>lnTRADE</i>			0.07 *		0.09 **
d87	-0.02	-0.01	(1.71)	-0.11	(2.02)
d90	0.02	0.01	-0.06	0.02	-0.01
d93	-0.06 *	2.40 **	0.03	-0.05	0.03
d96	-0.34 ***	2.11 **	3.25 ***	-0.33 ***	-0.04
d99	-0.23 **	1.86 **	2.97 ***	-0.21 ***	-0.32 ***
d02	-0.31 ***	1.77 **	3.05 ***	-0.31 ***	-0.20 ***
cons	29.94 ***	27.19 ***	2.95 ***	-0.31 ***	-0.29 **
R-sq within ¹⁹	0.89	0.90	26.10 ***	30.50 ***	30.38 ***
			0.91	0.90	0.91

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # Denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. Number of observations are 171.

¹⁹ Different from cross sectional or time series analysis, for panel data, R-sq does not measure the goodness of fit as discussed in http://teaching.fec.anu.edu.au/EMET8002/emet8002_2006_panel_notes.pdf. In panel data, R-sq is rather high since a dummy variable for each cross sectional unit *i* is included, explaining the variation in the data (Wooldridge, 2003). Accordingly high R-sq within in this case does not indicate the possibility of spurious regression as in the time series analysis.

The impact of the Gini coefficient on poverty was small with a positive elasticity of 0.9 to 1, which was lower compared to that found by Friedman (2005), which ranged between 1.3-1.9 (even after excluding the role of other determinants and retaining growth and the Gini coefficient as the only determinants). It means that a ten per cent increase in the Gini index reduced the poverty headcount index by 9 per cent. The Gini elasticity of poverty in Indonesia was much smaller compared to other countries. Thailand (Deolalikar, 2002) recorded a Gini elasticity of poverty of 3 which is around three times higher. It is, in fact, a plausible result that inequality elasticity on poverty in Indonesia was low, which also highlights the fact that during the 30 years of Suharto's government, inequality in Indonesia was considered low.

After taking into account other determinants, the growth elasticity of poverty was also robust at around -2.47, similarly with Gini elasticity of poverty at around 0.9 (as indicated in Table 6.4 column 1).

Across growth episodes (the growth episodes effects)

Following Chapter Four, what happened to Growth Elasticity of Poverty across periods? Taking into account changes in Gini inequality, there are more significant variations in the Growth Elasticity of Poverty across time periods, as indicated in Table 6.3 columns 2 and 3 (models 6.2a and 6.2b). Different from the results in Table 4.4 column 2, all interactions between growth episode dummies and $\ln MEAN$ are significant at a 1% level. Growth had higher effect on the poverty headcount index during the second period of trade liberalisation. The GEP was around -2.2 during the first period of liberalisation, it increased to -2.4 during the subsequent second period and then it was slightly lower (although the magnitude is almost similar) during the recovery period.²⁰ Although the strongest liberalisation period occurred in 1984-1990, there was a possible lag in the impact

²⁰ It is important to note that, Table 6.3 columns 2 and 3 (models 6.2a and 6.2b) show the coefficient of $\ln MEAN$ as the P0 GEP during 1984-1990, the base period. The coefficients for the other periods are interpreted as deviations from the period of 1984-1990. For example, the coefficient of $\ln MEAN$ is -2.22. This was P0 GEP for 1984-1990. Then the coefficient of $EPISODE2 * \ln MEAN$ is -0.20, and statistically significant, so P0 GEP for 1993-1996 was equal to -2.42 (-2.22-0.20). A ten per cent increase in mean consumption per capita reduced the poverty headcount index by 24.2 per cent.

of it on poverty. It is possible that during the first trade liberalisation only those whose consumption was concentrated around the poverty line took advantage of growth in the labour intensive manufacturing sector. The growth impact was stronger only during the second period of liberalisation, and was also enjoyed by those whose consumption were located well below the poverty line. Finally, the results of the GEP across growth episodes are robust as indicated in columns 2 and 3, although the magnitude is slightly higher in column 3.

Across the Hill province grouping (the regional effects)

In Chapter Five, as can be seen in Table 5.10, the Hill province grouping found that the sequence of the P0 GEP was the densely populated, the settled Outer Islands, the sparsely populated, the resource rich and the isolated provinces, although the difference is only statistically significant for the resource rich provinces. After taking into account the changes in Gini inequality, more significant variations are found. Table 6.3 column 4 shows that the P0 GEP in Java-Bali was -2.63 which is significantly different only from the resource rich provinces and the isolated provinces. Nevertheless, the sequence was slightly different from the results in Chapter Five. The sequence of the P0 GEP was the settled Outer Islands followed by both the densely and sparsely populated provinces, the resource rich provinces and the lowest the isolated provinces.

The proposed hypothesis discussed earlier in Chapter Five that the P0 GEP was lower in the resource rich provinces is confirmed. Nevertheless the hypothesis that the P0 GEP should have been high in isolated provinces due to a convergence is rejected. The P0 GEP in the isolated provinces was the lowest in contrast with high P0 GEP in the densely populated provinces. These facts reflect the two extreme conditions among the province groups, where the relatively better and worse economic and social conditions obtain. The significant P0 GEP in the densely populated provinces, natural resource rich and the isolated provinces are robust (Table 6.3 columns 4-5). Due to the multicollinearity problem between the $RICH*lnMEAN$ and oil and gas indicator (MOG) with a correlation coefficient of 0.8, Table 6.3 column 5 only presents the result of the estimation 6.2d without

MOG.²¹

6.5.2.2. All common determinants of poverty

Table 6.4 (models 6.3a-6.3d) shows the variations in the poverty estimations, especially in the variation of proxies of human capital and openness variables. There are three proxies for human capital; (i) the average years of schooling (model 6.3a), (ii) the junior high school attainment ratio (model 6.3b), and (iii) the junior high school enrolment ratio (model 6.3c).

The first two represent the human capital stock whereas the third represents flow rather than stock. Openness use two proxies of (i) the total Export plus Import (Trade) as a share of Regional GDP, taken from the Regional Accounts (model 6.3c), and (ii) the manufacturing product exports by port as a share of Regional GDP (model 6.3d).

The most plausible results are given by growth, the Gini index and infrastructure coefficients which confirm the proposed direct hypotheses.

Growth elasticity of poverty was robust at around -2.5, similar to the Gini elasticity of poverty at around 0.9. It is interesting to see that in separate estimations, the Gini Index contributed positively to both growth and poverty.

Given other determinants, the paved road length per capita is significant although it only had a small elasticity (-0.10). Thus, a 10 per cent increase in length of paved road per capita (km per 1000 persons) would reduce poverty headcount by only 1 per cent. Other studies also confirmed the negative impact of road variables on poverty incidence, regardless of what kind of measurement used. This result is lower than the impact of road length per capita on poverty (based on the \$1 per day poverty line for cross-country studies), which was -0.35 (Jalilian and Weiss, 2006). The finding also supports Jalan and Ravallion (2002) who found that rural roads as one of geographic characteristics which is important to overcome the

²¹ The result of model 6.2d with *MOG* can be seen in Appendix 6.A, although in magnitude the coefficient is almost similar with the results of estimation 6.2d without *MOG*.

poverty traps.

Table 6.4. The Determinants of Regional Poverty with all Common Determinants²²

Explanatory Variable	(1)	(2)	(3)	(4)
	FE Estimate	FE Estimate	FE Estimate	FE Estimate
lnMEAN	-2.47 *** (-22.15)	-2.45 *** (-21.94)	-2.46 *** (-22.16)	-2.46 *** (-21.07)
lnGINI	0.94 *** (6.01)	0.94 *** (6.01)	0.94 *** (6.03)	0.98 *** (6.02)
lnEDU Average Years of Schooling	0.17 (0.74)			0.04 (0.19)
JHSA School Attainment		0.20 (1.02)		
JHS Enrolment Ratio			-0.08 (-0.69)	
lnROAD	-0.10 ** (-1.96)	-0.11 ** (-2.05)	-0.10 * (-1.90)	-0.10 * (-1.76)
MOG	-0.0021 (-0.84)	-0.0024 (-0.93)	-0.0017 (-0.65)	-0.0021 (-0.78)
lnTRADE (Export+Import)/ RGDP	0.09 ** (2.02)	0.09 ** (2.05)	0.08 * (-1.86)	
Manufacturing export by port/RGDP				0.00 (0.43)
d87	-0.03	-0.05	-0.09	-0.02
d90	0.01	-0.03	0.05	0.00
d93	-0.08	-0.12	-0.01	-0.03
d96	-0.36 ***	-0.42 ***	-0.27 ***	-0.30 ***
d99	-0.24 **	-0.30 **	-0.14 **	-0.17
d02	-0.33 ***	-0.39 ***	-0.22 ***	-0.26 ***
cons	29.78 ***	29.23 ***	30.27 ***	30.03 ***
R-sq within	0.90	0.90	0.90	0.90

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # Denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios.. Number of observations are 171. JHS means Junior High School. JHSA means Junior High School and Above.

Using a different methodology, another study on Indonesia found that the availability of paved roads increased the average incomes (through the economic

²² As in Chapter Five, as for P0, only mean consumption per capita and gini inequality which have a significant impact on P1 and P2 with a negative growth elasticity of poverty and a positive gini elasticity of poverty.

growth), with an estimated elasticity of 0.05, but there was no significant direct impact on the welfare of the poor (Balisacan, Pernia and Asra, 2003).

The finding of the direct impact of infrastructure on poverty rather than through economic growth indicated that the existence of good infrastructure is important as a channel for employment of the poor and also in creating indigenous entrepreneurship in rural Indonesia, in which the rural traders can expand their business to take advantage of inter-regional trades (Hayami and Kawagoe, 1993). Better infrastructure also facilitates regional integration through both domestic and international trade.

The component of oil and gas (*MOG*) as a share of Regional Gross Domestic Product has a negative relationship with poverty but was not significant in all specifications. This result fails to confirm the proposed positive relationship between this variable and poverty. However, these results confirm the finding of Balisacan, Pernia and Asra (2003) on Indonesia, that the variable representing natural wealth is not significant, which does not necessarily transfer to poverty reduction.²³

Unexpected direct effects on poverty are found for human capital and openness. Human capital (with different proxies) has no significant impact on poverty, as indicated in Table 6.4 columns 1, 2 and 3. In addition to Pritchett's (2001) argument that the proxies used did not capture the quality of education, another explanation is possible: the proxy used is an average, therefore it hides the large variation that may exist across provinces. Therefore the impact of an improvement in the average years of schooling will be mainly reflected among the already better educated provinces as a group. For the junior high school enrolment, the sign is negative, although it is still not significant. This also indicates that level of education in the country had been relatively uniform in 1984 (particularly for

²³ These natural resource rich provinces, together with a few provinces including Jakarta, Central Java, East Java and Bali (19 districts in total) which are classified by Tadjoeeddin, Suharyo and Misra (2003) as 'enclave' regions, produced very high output per capita and could be considered as outliers. The natural resource rich provinces are enclaves driven by their endowments. Nevertheless enclaves in Java and Bali are mostly driven by other non-natural resource factors, which are mainly the centre of manufacturing industry for Java and tourism for Bali, which is rooted in the comparative advantages of location infrastructure.

primary education) as argued by Garcia Garcia and Soelistianingsih (1998), although in the latter, they examined the relationship between human capital and economic growth.²⁴ Nevertheless, the finding is similar with what Balisacan and Pernia's (2002) findings for the Philippines and Balisacan, Pernia and Asra (2003) for Indonesia, that education itself is not significantly directly related to poverty. However, the average years of schooling had a significant influence on overall growth, which suggests that human capital reduces poverty headcount indirectly through economic growth. The human capital variable will be analysed more carefully in estimations 6.4 and 6.5 later on. It is possible that there are different impacts of human capital on poverty in different regions (equation 6.4) or for different growth episodes (equation 6.5).²⁵

Openness with the total trade as a share of RGDP as a proxy has an adverse positive robust relationship with poverty which is small and significant, as indicated in Table 6.4 columns 1-3 (0.08 – 0.09). Changing the proxy to the share of manufacturing exports (by ports) to RGDP does not improve the estimated coefficient (the coefficient becomes zero), although the coefficient is no longer significant. There are several explanations for these findings. First, it may be related to the way openness is measured, as discussed earlier. Second, the direct impact of openness on poverty captures the two other channels of influence which are (i) prices, household incomes and markets, and (ii) wages and employment. In the Indonesia context, it seems the wages and employment channel might have had an adverse impact, although the trade liberalisation was labour intensive and created a lot of new jobs and employment (Krueger, 1983).

It is possible that only those who had certain endowments and only those who were semi skilled workers and wage earners could take advantage of the new opportunities. Although the manufacturing sector is the main engine of growth in Indonesia, in terms of employment, most people still worked in the agricultural

²⁴ A decomposition based on the regional effects and growth episodes will be carried out in the next section to deal with this issue.

²⁵ The interaction power between human capital and infrastructure which was significant on poverty as in Balisacan and Fuwa (2002) cannot be applied in this case, due to a multicollinearity problem between the interaction and the explanatory variables.

sector, including those who were poor and lived in the isolated regions.²⁶ Friedman (2000) found that poor rural households in Indonesia, benefited the least from liberalisation and their real income also declined. As they were not wage earners, consequently they might not have benefited directly from openness (Winters, McCulloch and McKay, 2004).²⁷ Furthermore, the rapid growth in the manufacturing sector (in the large and medium scale manufacturing) which took place in both Java and the Outer Islands was predominantly strong in urban areas but not in rural areas (Manning, 1998).

However, this finding is similar to that of Dollar and Kraay (2002). Their cross-country study found that there is either an insignificant or negative impact from the openness variable on the average income of the poor (the bottom 20 per cent of the population)

Another channel which has not yet been discussed is the fact that openness through price may affect the poor, depending on whether they are net consumers or producers. Further analysis is necessary. As a consequence, openness is not directly poverty reducing.

Across the Hill province grouping (the regional effects)

To investigate whether those explanatory variables have different impacts between regions, the estimation is then expanded by incorporating the impact of different groups of provinces based on the Hill province grouping. It will be interesting, especially to know whether human capital, infrastructure and openness have different impacts in the densely populated provinces, the isolated provinces, the resource rich provinces, the settled Outer Islands provinces and the sparsely populated provinces. The analysis of regional effects is not carried out for oil and gas, since not every province has these natural resources.

²⁶ Unless, there is a massive sectoral transformation of these poor people moving out from agriculture to the formal sector, so that it increases the wage of the poor people who still stay in the agriculture sector.

²⁷ Other studies also highlighted the small employment effects of trade liberalisation, as summarised in Winters, McCulloch and McKay (2004).

The methodology to assess this regional effect was discussed in section 6.4. Interactions are observed between the explanatory variables and the groups of provinces dummies based on the Hill province grouping. As the base category is the densely populated provinces, the coefficient of $RICH*lnEDU$ for example is interpreted as the deviation from the coefficient of $lnEDU$ in case of the densely populated provinces. Based on the results in Table 6.4, only the main proxies of human capital (the average years of schooling) and openness (the share of total trade to RGDP) are used in this section. The results are presented in Table 6.5.

Nevertheless, the analysis could only be carried out partially for each of the variables of interest, since there is multicollinearity between the explanatory variables and the provincial grouping adopted for identifying regional effects, for example between $RICH*lnEDU$ and $RICH*lnTRADE$.

Except for column 2, which is the estimation of the regional effects of infrastructure, Table 6.5 shows the results without the variable MOG (natural resources), as there are multicollinearity problems between $RICH*lnEDU$ and MOG and $RICH*lnTRADE$ and MOG (the correlation coefficients are 0.8 for both relationships). The results are comparable with and without MOG . The results for Table 6.5 with MOG (for human capital and openness) are presented in Appendix 6.B. Therefore, although the estimation of regional effects of infrastructure is free from the multicollinearity problem, for consistency, the best model is the estimation which excludes MOG .²⁸

In general, the coefficients of growth and Gini inequality, support the proposed hypotheses, and their impact is also significant in relation to poverty. Comparing columns 1-4 in Table 6.5, the GEP and Gini elasticity of poverty results are robust.

²⁸ In Chapter Six, It is worth noting when the cases of regional effects of infrastructure and openness are analysed for P1 and P2, the human capital coefficient becomes significant for reducing poverty. Education may be more crucial for those who lived far below the poverty line to access to regional infrastructure and the benefit from regional openness (See appendix 6.C and 6.D).

Table 6.5. The Determinants of Regional Poverty – Regional Effects

Explanatory Variable	Regional Effects of Human Capital		Regional Effects of Infrastructure		Regional Effects of Infrastructure		Regional Effects of Openness	
	Without <i>MOG</i>		With <i>MOG</i>		Without <i>MOG</i>		Without <i>MOG</i>	
	(1)		(2)		(3)		(4)	
	FE Estimate		FE Estimate		FE Estimate		FE Estimate	
<i>lnMEAN</i>	-2.53	***	-2.49	***	-2.49	***	-2.49	***
	(-22.72)		(-22.72)		(-22.80)		(-22.17)	
<i>lnGINI</i>	1.05	***	0.98	***	0.98	***	0.99	***
	(6.63)		(6.39)		(6.41)		(6.16)	
<i>lnEDU</i>	0.14		0.08		0.08		0.08	
	(0.58)		(0.32)		(0.33)		(0.32)	
<i>RICH*lnEDU</i>	0.15							
	(0.9)							
<i>ISO*lnEDU</i>	0.39	*						
	(-0.94)							
<i>SETT*lnEDU</i>	-0.27	**						
	(-1.91)							
<i>SPAR*lnEDU</i>	-0.09							
	(-0.74)							
<i>lnROAD</i>	-0.10	**	-0.01		-0.01		-0.10	*
	(-1.92)		(-0.09)		(-0.06)		(-1.88)	
<i>RICH*lnROAD</i>			-0.01		-0.02			
			(-0.06)		(-0.21)			
<i>ISO*lnROAD</i>			-0.02		-0.02			
			(-0.14)		(-0.13)			
<i>SETT*lnROAD</i>			-0.24	***	-0.24	***		
			(-2.74)		(-2.78)			
<i>SPAR*lnROAD</i>			-0.10		-0.10			
			(-1.26)		(-1.27)			
<i>MOG</i>			0.0006					
			(0.14)					
<i>lnTRADE</i>	0.08	*	0.07	#	0.07	*	-0.02	
	(1.77)		(1.61)		(1.62)		(-0.24)	
<i>RICH*lnTRADE</i>							0.27	*
							(1.80)	
<i>ISO*lnTRADE</i>							-0.10	
							(-0.73)	
<i>SETT*lnTRADE</i>							0.17	
							(1.40)	
<i>SPAR*lnTRADE</i>							0.11	
							(0.93)	
cons	30.30	***	30.07	***	30.08	***	29.93	***
R-sq within	0.91		0.91		0.91		0.90	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # Denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. Includes all year dummies. Number of observations are 171.

As indicated in Table 6.5 column 1, the regional effects of human capital are interesting. Average years of schooling in the densely populated provinces are not significant, indicating that the stock of human capital in this group of provinces has been steady and high, especially after 1984. However, average years of schooling in the isolated provinces had a positive and significant relationship with the headcount index (0.53, as indicated in Table 6.6 which summarises the elasticities). This finding is not surprising, since the average years of schooling was relatively the lowest amongst this group of provinces. In contrast, the stock of human capital was significant in reducing the headcount index in the settled Outer Islands, which includes better off provinces in terms of education indicators, such as North Sulawesi, South Sulawesi and West Sumatra (-0.13).

For the resource rich provinces, the relationship between human capital and poverty was positive although not significant. Although the stock of human capital was considered higher, the average years of schooling conceals the variation between provinces in the group, especially for Papua which lagged behind other provinces in the natural resource rich group. At around 3.7 years, the average years of schooling in Papua, was even lower than the national average in 1984-2002 (see Table 6.1). The crucial role of interprovincial migration where people move to relatively better off provinces (such as to Java islands for education and economic reasons) will be discussed in more detail in Chapter Seven. Although as a group the stock of human capital in the resource rich provinces was considered high, it did not necessarily aid to poverty reduction in this group of provinces. Similarly the stock of human capital in the sparsely populated provinces had a positive relationship with poverty.

Table 6.6. Summary of Determinant Elasticities of Poverty for the Hill Province Grouping 1984-2002

Hill Province Grouping	Growth		Human capital	Infrastructure		Openness
1. Resource rich provinces	-2.16	*)	0.29	-0.02		0.25
2. Densely populated provinces	-2.66	*)	0.14	-0.01		-0.02
3. Settled Outer Island provinces	-2.71		-0.13	*)	-0.25	*)
4. Sparsely populated provinces	-2.65		0.05		-0.11	0.09
5. Isolated provinces	-1.85	*)	0.53	*)	-0.03	-0.12

Source : Author's summary

Note :*) significant

Among infrastructure indicators, only paved road length (km per 1000 people) in the settled Outer Islands had a significant, negative and relatively higher elasticity with respect to poverty (-0.25 as indicated in Table 6.6). It is surprising that infrastructure in the densely populated provinces did not have a significant impact on poverty. This is probably related to the fact that paved road length (per 1000 people) is used as a proxy, so that each person in the densely populated provinces actually only has a tiny portion of the total paved road length in the regions. Or, as in the case of education, the failure to obtain a significant relationship may also be because paved roads were already extensively built in the densely populated provinces by 1984. Returning to Table 5.4 in Chapter 5, 62.6 per cent of total roads in this group of provinces had been paved by 1984.

Further, none of the coefficients of the interactions between the regional dummies and openness is significant for poverty, except for the resource rich provinces, where the impact is positive. This is in line with the discussion regarding the impact of natural resources on poverty. The sign of the openness variable is negative only for the densely populated provinces, where labour intensive manufacturing industries are concentrated. This shows there is an indication that trade liberalisation can be beneficial for poverty reduction with limited regional impact, although in this case, the variable is not significant in the econometric analysis.

Across growth episodes (the growth episodes effects)

The adverse impact of human capital and openness on poverty is further analysed through analysis over different time periods, focusing on the growth episodes proposed in Chapter Four. Openness, is also closely related to the growth episodes, especially during the liberalisation periods in Indonesia.

Surprisingly, education had a negative and significant impact on poverty, only during the second period of liberalisation (Table 6.7 column 1).

Table 6.7. The Determinants of Regional Poverty – Growth Episodes Effects

Explanatory Variable	Growth Episodes Effects of Human Capital		Growth Episodes Effects of Openness	
	(1)		(2)	
	FE Estimate		FE Estimate	
<i>lnMEAN</i>	-2.44	***	-2.45	***
	(-21.70)		(-21.43)	
<i>lnGINI</i>	0.99	***	0.93	***
	(6.31)		(5.92)	
<i>lnEDU</i>	0.09 a)		0.17	
	(0.41)		(0.75)	
<i>EPISODE₂*lnEDU</i>	-0.24	*		
	(-1.93)			
<i>EPISODE₃*lnEDU</i>	0.01			
	(0.08)			
<i>lnROAD</i>	-0.09	*	-0.10	**
	(-1.76)		(-1.97)	
<i>MOG</i>	-0.0020		-0.0027	
	(-0.78)		(-1.02)	
<i>lnTRADE</i>	0.08	*	0.11 a)	*
	(1.72)		(2.11)	
<i>EPISODE₂*lnTRADE</i>			-0.03	
			(-0.59)	
<i>EPISODE₃*lnTRADE</i>			-0.03	
			(-0.76)	
<i>d87</i>	-0.02		-0.03	
<i>d90</i>	0.03		0.01	
<i>d93</i>	0.31		0.04	
<i>d96</i>	0.05		-0.25	
<i>d99</i>	-0.23		-0.10	
<i>d02</i>	-0.32		-0.20	
cons	29.47	***	29.52	***
R-sq within	0.91		0.90	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. b) refers to the first period of liberalisation (1984-1990). Number of observations are 171.

This finding might be related to the policies during this growth episode, and the announcement of Presidential Instruction No. 1/1994 on the Compulsory Elementary Education Program (*Wajib Belajar*), requiring students to study longer in school.

The impact of education is positive during the recovery period, although it is still not significant. As indicated in Table 6.8 on the summary of the determinants elasticity on poverty across growth episodes, the education elasticity of poverty was -0.15 during the second period of liberalisation: that is a 10 per cent increase in average years of schooling reduced poverty by 1.5 per cent.

Does the impact of openness on poverty differ across growth episodes (Table 6.7 column 2)? As shown previously, the total effect is positive and has an adverse impact on poverty. Openness during the first period of liberalisation actually had a stronger and significant adverse impact on poverty. However, as shown in Table 6.8, the impact was not significantly different from that in the second period of liberalisation or the recovery period.

Table 6.8. Summary of Determinant Elasticities of Poverty Across Growth Episodes 1984-2002

	Growth	Human capital	Openness
1. The first period of liberalisation	-2.17 *)	0.09	0.11 *)
2. The second period of liberalisation	-2.44 *)	-0.15 *)	0.08
4. The recovery period	-2.43 *)	0.1	0.08

Source : Author's summary

Note :*) significant

It is interesting to note that whereas the impact of trade has a positive effect on poverty, the growth elasticity of poverty across the trade liberalisation episodes was negative. Perhaps this confirms the argument that openness mainly works through economic growth, and does not have a direct effect on poverty. Only those provinces with certain endowments could take advantage of the employment effects created by the manufacturing sector, in response to trade policy liberalisation. Nevertheless, through growth of the manufacturing sector, the

average impact of growth during the liberalisation period was then poverty reducing.

6.6. Conclusions

Following Chapter Five, this chapter examines the determinants of regional poverty in Indonesia. Several possible determinants of poverty were examined: economic growth, inequality, abundance of natural resources, human capital, and infrastructure. It was expected that the inclusion of these variable would enable a more rigorous analysis of the determinants of poverty.

The following important findings can be reported. First, the growth elasticity of poverty, measured by mean consumption per capita in Indonesia, was -2.5 with a robust Gini elasticity of poverty at 0.9. While the growth elasticity of poverty is comparable in cross-country literature and single country studies, the Gini elasticity of poverty was much smaller, which may relate to the fact that the Gini coefficient in Indonesia has been low and relatively stable for the past 30 years.

Second, there are regional variations were found in terms of the growth elasticity of poverty. The growth elasticity of poverty, from an econometric point of view, was significantly higher in the densely populated provinces and lower in the isolated provinces. To some extent this may reflect the larger gap between these two groups of provinces in terms of development indicators.

Third, the impact of the determinants on poverty occurs via the two channels: direct and indirectly through economic growth, as summarised in Table 6.9. Several findings are ambiguous, only providing some confirmation of the hypotheses.

The finding of no significant relationship for natural resources confirms the previous literature that being rich in natural resources does not necessarily transfer to poverty reduction. Furthermore, the findings show that in 1984-2002, Gini inequality contributed positively to growth and poverty. Human capital only

contributed indirectly to poverty alleviation through economic growth whereas infrastructure only contributed directly to reduce poverty.

Unexpected results were obtained for openness. The expected impact of trade reform on poverty through a hypothesised stimulus for labour intensive sectors cannot be confirmed. It is suggested that greater openness in international trade might have limited affect on the income of the least skilled poor who are heavily represented among the poor and who live in isolated regions and rely mostly on the agricultural sector.

Fourth, some regional variations in terms of the impact of human capital, infrastructure and openness on poverty are found. For example, both human capital and infrastructure had a higher negative elasticity with respect to poverty in the settled Outer Islands.

Fifth, across growth episodes, human capital had a stronger effect on poverty during the second period of liberalisation which, which might relate to the specific education policy during that period. Surprisingly, openness had a stronger and significant adverse effect on poverty during the first period of liberalisation, whereas the positive relationship between openness and poverty during the second period of liberalisation and the recovery period was not significant. In general, openness did not emerge as having a significant effect on poverty alleviation.

Table 6.9. Summary of the Impact of Each Determinant in the Growth and Poverty Estimations 1984-2002

Explanatory Variables	Indirect Effect		Direct Effect		Total
	sign	Confirm Hypothesis?	sign	Confirm Hypothesis?	Confirm Hypotheses ?
Natural resources	- (s)	yes	- (ns)	no	Ambiguous
Openness	+ (ns)	no	+ (s)	no	Unexpected (limited regional and growth episode impact)
Human capital	+ (s)	yes	+/- (ns)	no	Ambiguous (limited regional and growth episode impact)
Infrastructure	+ (ns)	no	- (s)	yes	Ambiguous (limited regional impact)
Gini inequality	+ (s)	yes	+ (s)	yes	Expected

Source : Author's summary

Note :

+ = has positive impact; - = has negative impact

(s) = significant; (ns) = not significant

yes - if the findings confirm the proposed hypothesis with significant and correct sign

no - if the findings do not confirm the proposed hypothesis with significant sign

Expected - if the findings confirm all of the proposed hypotheses (for total hypotheses)

Ambiguous - if the findings confirm some of the proposed hypotheses (for total hypotheses)

Unexpected - if the findings do not confirm all of the proposed hypotheses (for total hypotheses)

Appendix 6.A.

Table 6.A. Supplement to Table 6.3 (Estimation of model 6.2d with *MOG*)

Explanatory Variable	GEP Across Regions With <i>MOG</i>	
	(1)	
	FE Estimate	
<i>lnMEAN</i>	-2.66 (-16.26)	***
<i>EPISODE₂*lnMEAN</i>		
<i>EPISODE₃*lnMEAN</i>		
<i>RICH*lnMEAN</i>	0.48 (2.14)	**
<i>ISO*lnMEAN</i>	0.82 (1.99)	**
<i>SETT*lnMEAN</i>	-0.05 (-0.19)	
<i>SPAR*lnMEAN</i>	0.01 (0.03)	
<i>lnGINI</i>	1.03 (6.52)	***
<i>lnEDU</i>	0.10 (0.46)	
<i>lnROAD</i>	-0.09 (-1.80)	*
<i>MOG</i>	-0.0012 (-0.46)	
<i>lnTRADE</i>	0.09 (1.98)	**
<i>d87</i>	-0.01	
<i>d90</i>	0.03	
<i>d93</i>	-0.05	
<i>d96</i>	-0.33	***
<i>d99</i>	-0.20	
<i>d02</i>	-0.30	**
<i>cons</i>	30.36	***
<i>R-sq within</i>	0.91	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios.

Appendix 6.B.

Table 6.B. Supplement to Table 6.5 (P0, Models 6.4a and 6.4c with *MOG*)

Explanatory Variable	Regional Effects of Human Capital		Regional Effects of Openness	
	(1)		(2)	
	FE Estimate		FE Estimate	
<i>lnMEAN</i>	-2.54	***	-2.49	***
	(-22.20)		(-22.08)	
<i>lnGINI</i>	1.05	***	0.99	***
	(6.61)		(6.15)	
<i>lnEDU</i>	0.14		0.09	
	(0.59)		(0.36)	
<i>RICH*lnEDU</i>	0.21			
	(0.75)			
<i>ISO*lnEDU</i>	0.39	*		
	(1.71)			
<i>SETT*lnEDU</i>	-0.27	*		
	(-1.85)			
<i>SPAR*lnEDU</i>	-0.10			
	(-0.77)			
<i>lnROAD</i>	-0.10	**	-0.10	*
	(-1.93)		(-1.91)	
<i>RICH*lnROAD</i>				
<i>ISO*lnROAD</i>				
<i>SETT*lnROAD</i>				
<i>SPAR*lnROAD</i>				
<i>MOG</i>	0.0013		-0.0011	
	(0.27)		(-0.38)	
<i>lnTRADE</i>	0.08	*	-0.02	
	(1.79)		(-0.23)	
<i>RICH*lnTRADE</i>			0.25	#
			(1.59)	
<i>ISO*lnTRADE</i>			0.10	
			(0.71)	
<i>SETT*lnTRADE</i>			0.16	
			(1.36)	
<i>SPAR*lnTRADE</i>			0.11	
			(0.96)	
<i>d87</i>	-0.01		-0.01	
<i>d90</i>	0.04		0.04	
<i>d93</i>	-0.03		-0.03	
<i>d96</i>	-0.32	***	-0.31	**
<i>d99</i>	-0.19		-0.19	
<i>d02</i>	-0.27	**	-0.29	**
<i>cons</i>	30.32	***	29.92	***
<i>R-sq within</i>	0.91		0.90	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios.

Appendix 6.C.

Table 6.C. Supplement to Table 6.5 (P1)

Explanatory Variable	Regional Effects of Human Capital		Regional Effects of Infrastructure		Regional Effects of Openness	
	Without <i>MOG</i>		Without <i>MOG</i>		Without <i>MOG</i>	
	(1)		(2)		(3)	
	FE Estimate		FE Estimate		FE Estimate	
<i>lnMEAN</i>	-2.63	***	-2.56	***	-2.59	***
	(-11.64)		(-11.54)		(-11.60)	
<i>lnGINI</i>	1.92	***	1.83	***	1.88	***
	(5.96)		(5.87)		(5.92)	
<i>lnEDU</i>	-0.71	#	-1.16	**	-0.84	*
	(-1.49)		(-2.32)		(-1.78)	
<i>RICH*lnEDU</i>	0.10					
	(0.30)					
<i>ISO*lnEDU</i>	-0.19					
	(-0.42)					
<i>SETT*lnEDU</i>	-0.64	**				
	(-2.19)					
<i>SPAR*lnEDU</i>	-0.26					
	(-1.01)					
<i>lnROAD</i>	0.10		0.25		0.15	
	(0.94)		(1.41)		(1.41)	
<i>RICH*lnROAD</i>			-0.04			
			(-0.21)			
<i>ISO*lnROAD</i>			-0.38	#		
			(-1.50)			
<i>SETT*lnROAD</i>			-0.41	**		
			(-2.33)			
<i>SPAR*lnROAD</i>			-0.13			
			(-0.77)			
<i>MOG</i>						
<i>lnTRADE</i>	0.03		0.02		-0.02	
	(0.35)		(0.20)		(0.14)	
<i>RICH*lnTRADE</i>					0.08	
					(0.28)	
<i>ISO*lnTRADE</i>					-0.25	
					(-0.86)	
<i>SETT*lnTRADE</i>					0.37	#
					(1.57)	
<i>SPAR*lnTRADE</i>					-0.05	
					(-0.23)	
cons	28.61		28.35		28.03	
R-sq within	0.87		0.88		0.87	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. The estimation includes all year dummies.

Appendix 6.D.

Table 6.D. Supplement to Table 6.5 (P2)

Explanatory Variable	Regional Effects of Human Capital		Regional Effects of Infrastructure		Regional Effects of Openness	
	Without <i>MOG</i>		Without <i>MOG</i>		Without <i>MOG</i>	
	(1)		(2)		(3)	
	FE Estimate		FE Estimate		FE Estimate	
<i>lnMEAN</i>	-3.07 *** (-10.35)		-2.97 *** (-10.28)		-3.00 *** (-10.22)	
<i>lnGINI</i>	2.62 *** (6.20)		2.53 *** (6.23)		2.57 *** (6.15)	
<i>lnEDU</i>	-0.94 # (-1.51)		-1.58 ** (-2.42)		-1.02 * (-1.64)	
<i>RICH*lnEDU</i>	0.18 (0.41)					
<i>ISO*lnEDU</i>	-0.52 (-0.88)					
<i>SETT*lnEDU</i>	-0.98 ** (-2.57)					
<i>SPAR*lnEDU</i>	-0.28 (-0.83)					
<i>lnROAD</i>	0.18 (1.31)		0.38 # (1.64)		0.27 * (1.92)	
<i>RICH*lnROAD</i>			-0.01 (-0.03)			
<i>ISO*lnROAD</i>			-0.59 * (-1.81)			
<i>SETT*lnROAD</i>			-0.58 ** (-2.52)			
<i>SPAR*lnROAD</i>			-0.14 (-0.66)			
<i>MOG</i>						
<i>lnTRADE</i>	0.07 (0.56)		0.05 (0.40)		0.04 (0.20)	
<i>RICH*lnTRADE</i>					-0.11 (-0.27)	
<i>ISO*lnTRADE</i>					-0.44 (-1.15)	
<i>SETT*lnTRADE</i>					0.48 # (1.54)	
<i>SPAR*lnTRADE</i>					-0.09 (-0.31)	
cons	30.73		30.31		29.77	
R-sq within	0.85		0.86		0.85	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. The estimation includes all year dummies.

Appendix 6.E. The Descriptive Statistics

Table 6.E. The Descriptive Statistics

	Obs	Mean	Std.Dev	Min	Max
<i>lnP0</i>	174	3.08	0.53	0.88	4.13
<i>lnMEAN</i>	179	12.28	0.30	11.72	13.43
<i>lnGini</i>	179	3.35	0.12	3.00	3.65
<i>MOG</i>	182	7.63	16.95	0.00	82.68
<i>lnEDU</i> (average years of schooling)	182	1.49	0.25	0.80	2.13
<i>lnROAD</i>	182	0.03	0.50	-1.15	1.04
<i>lnTRADE</i> (trade share of RGDP)	182	4.14	0.51	2.92	5.13

Appendix 6.F. Correlation Coefficient

Table 6.F. Correlation Coefficient for Estimations of Model 6.1, 6.2 and 6.3 (the general model)

	lnP0	lnMEAN	lnGINI	lnEDU	lnEDUa	lnEDUb	lnROAD	MOG	lnTRADE	lnTRADEa
lnP0	1.00									
lnMEAN	-0.74	1.00								
lnGINI	-0.04	0.17	1.00							
lnEDU	-0.73	0.54	0.08	1.00						
lnEDU a)	-0.59	0.38	0.13	0.84	1.00					
lnEDU b)	-0.69	0.56	0.10	0.98	0.83	1.00				
lnROAD	-0.18	0.05	-0.16	0.43	0.34	0.49	1.00			
MOG	-0.05	0.36	-0.08	0.04	-0.04	0.04	-0.17	1.00		
lnTRADE	-0.24	0.39	0.25	0.18	0.04	0.12	-0.29	0.24	1.00	
lnTRADE c)	-0.40	0.40	-0.17	0.45	0.33	0.45	0.15	0.09	0.45	1.00

Note: a) refers to Junior High School and above Attainment Ratio

b) refers to Junior High School Enrolment Ratio

c) refers to Manufacturing Exports by Port/RGDP Ratio

Chapter Seven

The Determinants of Regional Poverty in Indonesia 1984-2002:

The Role of Interprovincial Migration and Intergovernmental Transfers

7.1. Introduction

Chapter Six verified that long run growth was still a key determinant of the absolute poverty reduction in Indonesia. The growth elasticity of poverty was robust at -2.5, controlling for other variables of inequality, human capital, infrastructure, natural resources, and openness.

In general, the findings from other explanatory variables are mostly ambiguous, confirming some but not all of the proposed hypotheses. While infrastructure had a direct impact on poverty, the stock of human capital only had an indirect impact through growth, whereas natural resources reduced growth and had no significant direct impact on poverty. Unexpected results were obtained for the openness variable, which suggests a direct positive relationship with poverty. Chapter Six also concludes that, in addition to growth, the availability of infrastructure was a direct poverty alleviation strategy across Indonesian regions. This is also in line with the poverty traps literature highlighted earlier in Chapter Six. As was noted, Jalan and Ravallion (2002) also specified that in addition to building infrastructure, labour migration to the better endowed regions are also crucial for poverty alleviation..

Therefore, Chapter Seven expands the analysis in Chapter Six by adding two new variables: interprovincial migration and intergovernmental transfers while these are usually ignored in the analysis of poverty but are important in discussing regional development in Indonesia. Interprovincial migration is classified into assisted, non-assisted in-migration, and out-migration.

The other distinguishing feature of this chapter from the previous literature is that it provides not only an analysis of the impact of migration on poverty in the regions of origin but also the impact of migration on poverty in the destination regions, which is often ignored in the literature.

Lastly, the robustness of the findings for explanatory variables analysed in Chapter Six is also investigated, after being controlling for migration and intergovernmental transfers.

Two main hypotheses are advanced with regard to the relationship between the role of the two new determinants discussed above in poverty alleviation.

First, it is argued that there is a positive relationship between assisted in-migration and poverty, similar for out-migration, with a negative relationship between non-assisted in-migration and poverty. Second, there is a negative relationship between intergovernmental transfers and poverty.

Earlier hypotheses refer to the direct channel on the impact of these determinants on poverty. This chapter also analyses whether these determinants have an indirect impact on poverty through economic growth which is then associated with poverty.¹ A more detailed analysis of the impact of the regional effect is carried out, based on Hill's (1989) classification of provinces in Indonesia.²

As with the previous chapters, the analysis will be based on data for 26 provinces from 1984-2002, mainly collected by the Central Board of Statistics of Indonesia (CBS) discussed earlier in Chapter Six. The migration data, relies heavily on the Population Census (*SENSUS*) and the Intercensal Population Survey (*SUPAS*).

The rest of the chapter is organised as follows. The next section reviews the literature covering the topics in the introduction. Section three discusses interprovincial migration in Indonesia. Section four discusses intergovernmental

¹ The hypothesis regarding the indirect impact is discussed in section 6 of this chapter.

² See Chapter Five of this thesis.

transfers in Indonesia. Section five presents the data and measurements. Section six outlines the empirical methodology and approach, and section seven analyses the empirical results. Section eight summarises the findings and concludes the chapter.

7.2. Literature of Determinants of Poverty: Migration and Intergovernmental Transfers

7.2.1. Population Mobility (Migration)

Despite a proliferation of migration studies, very few of these examine the impact of migration on poverty. Surprisingly, migration is commonly neglected in discussions of poverty, although currently the impact of international migration, measured in terms of remittances, is frequently discussed as a determinant of poverty reduction in the cross country literature (Adams and Page, 2003, 2005).³ Internal migration, which is important in the development process, has surprisingly been ignored in assessing the determinants of poverty. As de Haan (2006) argued, ignoring the presence of migration may cause an underestimation of the impact of growth on poverty in India.⁴ He further argued that this phenomenon, which he called the marginalisation of migration, might also help to explain the 'missing link' between labour markets and employment and links to poverty (Islam, 2004). Accordingly, a theoretical framework is presented for analysing these relationships. The discussion will only be limited to permanent migration. Following the 'official' Central Board of Statistics definition, a migrant is defined as a person who moves to the region of destination and lives in that destination region for at least sixth months (Muhidin, 2002).

7.2.1.1. The impact of migration on poverty in the destination regions

There are two effects of migration on poverty in the destination regions; a direct effect and an indirect effect.

³ There are three types of migration or population mobility which are usually a focus of the literature, rural-rural, rural-urban, and international migration, although urban-urban and urban rural migration are also topics of discussion.

⁴ The critical literature review on the role of migration can be read in de Haan (1999).

1. *Direct effect.* The literature usually does not discuss the direct effect which depends on the income status of the in-migrants, whether they are above or lower than the poverty line in the destination regions.
2. *Indirect effect.* The discussion is based on growth literature which analyses the impact of migration on growth (Barro and Sala-i-Martin, 1992; Funke and Strulik, 1999; Shioji, 2001). Migration affects poverty through growth, since, when people move, goods and money also move (Skeldon, 2002). There are two possible indirect effects through increasing income or growth.
 - a) First is *the quantity effect of migration*. As a migration process is usually demand-oriented, when migrants can utilise the available resources and opportunities in the destination areas, they augment the labour supply and, through the labour market, expand the production function, then increasing income.
 - b) In addition, the growth literature specifies *the composition effects of migration* (endogenous human capital model). As the migrants bear with them 'human capital' which affects human capital in the destinations, in-migration expands the production function, creating growth and then reducing poverty. This will occur as long as the human capital varies across regions.

7.2.1.2. The impact of migration on poverty in the regions of origin⁵

1. *Direct effect.* The literature usually does not discuss the direct effect which depends on the income status of the out-migrants, whether they are above or lower than the poverty line in the regions of origin.
2. *Indirect effect.* Similarly, based on the migration-growth literature, there are three possible indirect effects for growth. While the following arguments are discussed more comprehensively in the international migration setting, the same framework can apply for internal migration where, instead of discussing two countries, two regions are discussed.
 - a) First is *the quantity effect of migration*.⁶ Out-migration means loss of the labour supply, which then reduces income.

⁵ There is a proposition that out-migration reduces inequality in the sending provinces but potentially raises national inequality. This could be a subject for further research.

- b) In addition, the growth literature specifies *the composition effects of migration* (endogenous human capital model). As out-migrants bear 'human capital', and they move from poorer to richer regions, this causes a brain drain, thereby lowering the return of capital and gross capital formation for growth in the regions of origin (Rappaport, 2005).⁷ This will work as long as the human capital varies across regions.
- c) The impact of *remittances*, determining whether the negative effects of out-migration are offset to some extent by remittances sent home by out-migrants. Remittances may offset either the quantity effect of out-migration only, or the human capital effect only, or both. Faini (2003) found that remittances are an increasing function of the stock of migrants and that remittances may offset the loss of labour supply. Furthermore, within a human capital framework, brain drain could become brain gain (usually occurring through return migration or induced increases in the supply of education in areas of origin). Interestingly, the conclusion of the empirical work seems ambiguous. There is only limited evidence that remittances tend to increase with the level of human capital, especially in the case of urban- rural migration (Johnson and Whitelaw, 1974; Rempel and Lobdell, 1978). Indeed some studies found the educational level of migrants has no effect on the amount

⁶ The migration-growth literature focuses a lot on whether migration creates income convergence within a single country; therefore the quantity effects of migration on growth will be negative as there are diminishing returns to labour. Nevertheless the composition effects will offset the diminishing return to labour. This chapter does not focus on convergence. Therefore quantity effects and composition effects move in the same direction to increase income.

⁷ The 'brain drain' phenomenon, is popular in the literature on international migration (Docquier and Rapoport, 2004), as cited in de Haan (2006). This focuses on the negative impact of out-migration on incomes in the sending countries (areas of origin). Nevertheless, although Adams and Page's (2005) results supported the brain drain phenomenon as mobility across country involved better educated and skilled labour, they further argued that the international migration elasticity with respect to poverty was very small, at only -0.2, even after taking into account the endogeneity problem and control variables. A 10 per cent increase in the share of international migrants in a country's population decreases poverty by two per cent. Unfortunately work on brain drain has largely been carried out in the cross country context and is limited in studies of regional poverty.

of remittances (Rodriguez and Horton, 1994, and Faini, 2003, 2006).

7.2.2. Public Policies/Services

Another important determinant of poverty under the public services category in addition to infrastructure are intergovernmental transfers as part of fiscal decentralisation.

7.2.2.1. Intergovernmental transfers

As discussed in Chapter Two, decentralisation is important mainly because it is considered an effective tool to increase efficiency in public expenditure, since the local government is regarded as being in a better position to deliver public services (Oates, 1993). Decentralisation is also seen as a way to overcome the failure of a centralised regime by shifting fiscal authority to sub-national levels of government (Vazquez and McNab, 2003). In addition, decentralisation matters for poverty alleviation strategies as different regions may have different needs and preferences.

Intergovernmental transfers are an important element of centre-region relations. Although the intergovernmental transfer objective is not for poverty alleviation per se, failure to provide such public services to the population, due to lack of fiscal capacity, will have an impact on poverty. If local governments are left to make decisions on expenditure, disparities in service delivery can have impacts on poverty alleviation strategies, especially in providing services related to education or health facilities which are important in empowering the poor (Hofman and Guerra, 2004). The capacity to finance services out of their own resources varies between regions. In short, as discussed by Rao, Bird and Litvack (1998), intergovernmental transfers are potentially important in alleviating poverty.

It is surprising that the growth literature rarely discusses the specific impact of intergovernmental transfers on economic growth (Vazquez and McNab, 2003). Usually, the growth literature discusses the bigger picture of intergovernmental transfers in the context of the effect of fiscal decentralisation on growth. The

assumption is that a higher level of financial decentralisation in a province leads to a more efficient allocation of public resources (Davoodi and Zou, 1998) and also promotes a better local preference in the development process (Oates, 1993). Some of the studies which analyse the impact of government consumption on growth found mixed results, for example Ram (1986) found a positive impact whereas Barro (1990) found the reverse. Ambiguous results also occur in the empirical studies. Zhang and Zou (1998) found that fiscal decentralisation leads to a reduction on growth in China while, in contrast, Lin and Liu (2000) found it had a positive impact on growth, similar to the finding in India (Zhang and Zou, 1997).

7.2.2.2. The impact of intergovernmental transfers on poverty

Based on the literature, there are two channels through which intergovernmental transfers affect poverty

1. *Direct effect.* It is expected that intergovernmental transfers reduce poverty, providing they are 'needs based', as the main idea of intergovernmental transfer is to deliver a certain standard of public services which are important for the poor.
2. *Indirect effect.* If intergovernmental transfers to a province lead to a more efficient allocation of public resources and promote a better local preference in the development process, this is expected to induce growth and is negatively associated with poverty.

Around 80-90 per cent of the local government budget in many developing countries comes from central government transfers (Boex et al., 2005). These grants typically incorporate needs and fiscal capacity to reduce inequalities among local governments, in order to enable a certain minimally acceptable level of public services. The transfer is also intended to guarantee that even the poor localities can provide the basic packages for the poor (Rao, Bird and Litvack, 1998).

There are two purposes of transfers, as follows. First, there are transfers to close vertical fiscal imbalances, which are transfers from higher levels of government to lower levels of government. One major objective is to close the fiscal gap to

ensure there are adequate funds available to local governments to undertake the functions assigned to them. The second type of transfers is targeted to close the horizontal fiscal imbalance. This is a distribution of resources transferred between the same levels of government, or what is usually referred to as equalisation (Bird and Smart, 2002). This horizontal revenue sharing can be counter-equalising (Boex et al., 2005).

Thus, in general there are two types of transfers. General purpose transfers (to overcome horizontal imbalance) intended to equalise revenues between regions and specific purpose transfers often given in the form of matching grants (conditional grants) to provide certain services at specified levels, regardless of their fiscal capacity, especially for important services such as education and health (Bird and Smart, 2002).

7.3. Interprovincial Migration in Indonesia

The motivations, patterns and coverage of interprovincial migration are discussed to give some insight into how migration can affect poverty in Indonesia. In the case of Indonesia, it is transmigration mobility which is most likely to be induced by poverty conditions in the region of origin, since most transmigrants were poor farmers in Java (World Bank, 1988). Whereas for non assisted in-migration, the reasons to move are not solely migrating out of poverty.

Migration is important for Indonesia not only because it influences the distribution and growth of population, but also because it plays a substantial role both in social and economic change (Hugo, 1987). According to the population census definition, there are three types of internal migration: lifetime migrants, defined as persons whose current residence is different from the place of birth at the time of census; recent migrants, as persons whose current residence is different from their place of residence five years ago; and return migrants defined as persons who had migrated from area A, to the area B and then returned to area A. Due to data availability, the type of migration which is the focus of this chapter is restricted to recent migration, which peaked in 1985.

7.3.1. Motivations of Interprovincial Migration in Indonesia

The purpose of this section is to gain some insights into the likely impact of both in-migration on areas of destination and out-migration on the regions of origin. This is important in order to derive specific hypotheses on the impact of migration on poverty.

Only the 1985 and 1995 Intercensal Population Surveys recorded the reasons why migrants moved to destination areas. Family reunion was the main reason given for migration by 66.1 per cent of total in-migrants in the Intercensal Population Survey 1985, and 55.4 per cent in the Intercensal Population Survey 1995.⁸ Family and others reasons included marriage, following parents, siblings and others. This supports the findings of the literature that a migration decision is usually a family decision and not an individual decision (Stark, 1991). The second highest reason given was economic, by 23 per cent of total in-migrants in the Intercensal Population Survey 1985 increasing to 25.8 per cent in the Intercensal Population Survey 1995. This finding is similar to that for out-migration; that family and economic reasons were the top two reasons why migrants moved out from the regions of origin.

Only the 1985 Intercensal Population Survey contained information on the population movement due to a government assisted population mobility, which is referred to as the *transmigration* program. This group accounted for only 4.2 per cent of total (national) recent in-migration figures. Across provinces, only Jambi, Bengkulu, Lampung, South Kalimantan, Central Sulawesi and Southeast Sulawesi recorded more than 15 per cent of the transmigrant share of recent in-migrants in 1985.⁹ The 1995 Intercensal Population Survey erased the transmigration program as one of the reasons since this slowed down after reaching its peak in 1985. Another important reason given for migration was for education accounting for 6.6 and 8.6 per cent of total recent in-migrants in 1985 and 1995, respectively.¹⁰

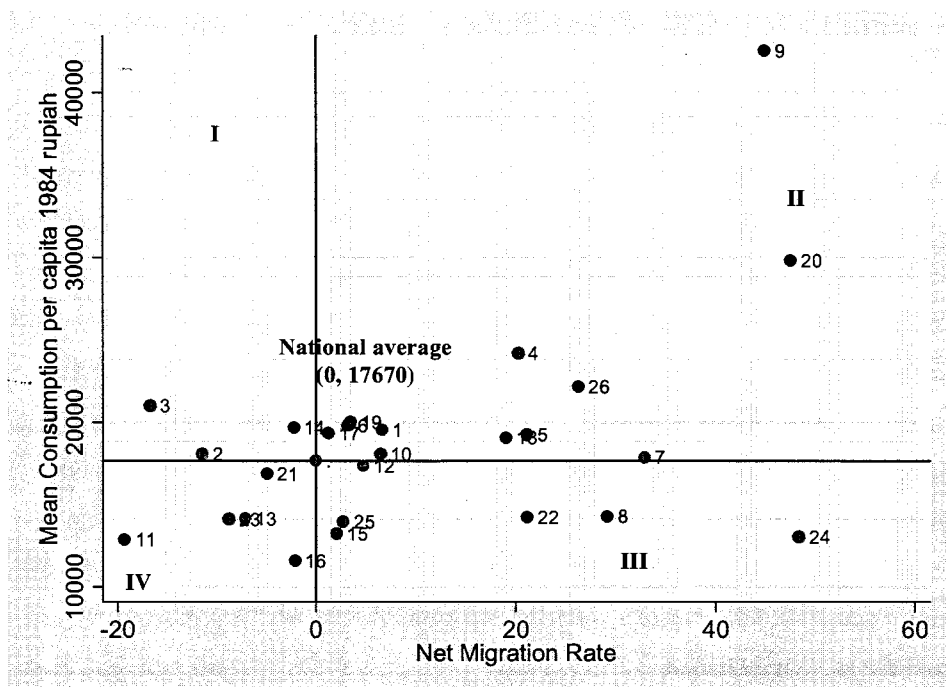
⁸ It is based on Table 2.26 p.70 in Muhidin (2002).

⁹ *ibid.*, p.209.

¹⁰ *ibid.*, p.209.

Figure 7.1. examines the correlation between provincial income (measured by real mean consumption per capita in 1984 Rupiah) and net migration (in and out) over the period 1984-2002.

Figure 7.1. Income and Net Migration Rates by Provinces 1984-2002



Source : Author's calculation based on CBS, *National Socioeconomic Survey*, 1984-2002; *Intercensal Population Survey*, 1985 and 1995 and *Population Census*, 1990 and 2000.

Note :

- Net Migration Rate (Rate in 1000 population)
- Quadrant I (top left quadrant) : above average income, net out-migration (out-migration>in-migration)
- Quadrant II (top right quadrant) : above average income, net in-migration (in-migration<out-migration)
- Quadrant III (bottom right quadrant) : below average income, net in-migration
- Quadrant IV (bottom left quadrant) : below average income, net out-migration
- The List of the Provinces (as in Appendix 3.B)

1 Aceh	14 Bali
2 North Sumatra	15 West Nusa Tenggara
3 West Sumatra	16 East Nusa Tenggara
4 Riau	17 West Kalimantan
5 Jambi	18 Central Kalimantan
6 South Sumatra	19 South Kalimantan
7 Bengkulu	20 East Kalimantan
8 Lampung	21 North Sulawesi
9 DKI Jakarta	22 Central Sulawesi
10 West Java	23 South Sulawesi
11 Central Java	24 Southeast Sulawesi
12 DI Yogyakarta	25 Maluku
13 East Java	26 Papua

Twelve of Indonesia's 26 provinces fell into the top right quadrant (quadrant II) which were characterised with higher than average income and experienced net in-migration. This includes Jakarta, West Java and the four natural resource rich provinces. Migrants mostly moved to these high income provinces for economic reasons. Six provinces fell into the bottom right quadrant. They had low average income but still experienced net in-migration.

This includes Yogyakarta where students usually go to pursue tertiary education, and Lampung which was one of the transmigration destinations. It is interesting that West Nusa Tenggara and Maluku fell into this category, even with their low income per capita they still recorded net in-migration. Apart from the fact that they were also transmigration locations, people still come to these provinces due to official assignments, for example as civil servants.

Furthermore, there are just three provinces which fell into quadrant I and five into quadrant IV. Migrants from provinces in quadrant I include those likely to migrate for the cultural and social reasons (*merantau*) such as North Sumatra, West Sumatra, although these provinces had high income per capita. People from Bali also often migrate to the neighbouring island of Java. The last quadrant (IV) also includes migrants who moved out for the cultural and social reasons (North and South Sulawesi) and those who migrated because the province of origin was really poor such as in the case of East Nusa Tenggara.

According to some of the reasons for internal migration in Indonesia discussed earlier, based on Muhidin (2002), Ananta and Arifin (2005) and ILO (2004), two patterns of migration are emphasised, i.e., assisted migration (transmigration) and non-assisted migration and will be discussed in detail in the following section.

7.3.2. Patterns of Interprovincial Migration

7.3.2.1. Assisted migration (transmigration)

The first pattern of migration is transmigration, which began in the Dutch colonial era reaching a peak in 1985 (Tirtosudarmo, 1997, cited in Ananta and Arifin, 2005). It was initially intended to resettle the population from the densely populated provinces of Java and Bali to the less densely populated Outer Islands.

The transmigration program tended to resettle these relatively poorer people in more land abundant locations.

The initial destination of the transmigration program was Sumatran provinces especially Riau, South Sumatra and Lampung. Later, other regions of origin were selected to include the isolated provinces of West and East Nusa Tenggara, and the destination provinces were expanded to include Kalimantan, Sulawesi and Papua (then Irian Jaya) (Muhidin, 2002; Ananta and Arifin, 2005).

These transmigrants were mostly the landless or nearly landless farmers from Java (World Bank, 1988). Almost all transmigrants were provided with land and hence resettled initially to work in the agricultural sector in rural areas. Most of the transmigrants were also provided with financial assistance from the central government for the first two years of their resettlement period, although the amount of assistance was reduced in the second year. These transmigrants usually received no special assistance from the third year of their resettlement period.

The sponsored transmigration program which was fully funded by the government (*transmigran umum*) reached a peak in REPELITA III (Third Five Year Development Plan) 1979-1983 affecting 366, 000 families but then numbers decreased, while numbers of partially assisted migrants (*transmigran swakarsa*) increased, especially during REPELITA IV (Fourth Five Year Development Plan) 1984-1988.

The transmigration program did not involve only the movement of the transmigrants but also of capital which was invested in these transmigration sites. One of the most important factors was the capital to construct and maintain the roads which were important for the integration of transmigrant activities and the regional economy. There were also substantial increases of the amount of government expenditure allocated to the program (either under general government transfers or specially targeted expenditure) which mostly covered logistics, administration, and preparation of the transmigration sites (Hugo, 1987). For example, the government expenditure to cover the cost per family was estimated to be around US\$11,000 (nominal price) in 1983/1984 (World Bank, 212

1988).

This transmigration program was not free from difficulties, such as the poor quality of land and settlement sites, environment degradation as the Public Works used heavy equipment which resulted in heavy destruction of the top soil, and inappropriate farming systems which tried to transfer the Javanese system of rice wet cultivation which was not always suitable for the Outer Islands (Hardjono, 1986; Bakir and Humaidi, 1989). In addition, there were difficulties faced by the Javanese transmigrants, since they were not equipped with the knowledge and expertise to grow food and cash crops under the different land conditions in the Outer Islands.

Nevertheless, despite many problems, the income levels of a significant proportion of the transmigrants increased. Their welfare had improved after joining the transmigration program, although it was still lower than the average income in Java and the destination areas in the Outer Islands (World Bank, 1988).

7.3.2.2. Non-assisted migration

The term non-assisted migration refers to spontaneous migration, which covers (i) economic induced migration, (ii) education induced migration, and (iii) migration for social and cultural reasons. These migrants mostly move for "pull" reasons. The "pull" models refer to the impact on the demand side which is usually selective of migrants in their place of origin. Thus these migrants are usually better educated or skilled than local people in areas of origins and destination, and these better-off migrants are more likely to move. They are pulled out from their origins to search for jobs or further education opportunities available wherever they are available.

Economic induced migration (Demand oriented migration)

The first "pull" type migration is the movement to regions which offer economic opportunities. Relatively rich regions are likely to attract more migrants. As shown by the Intercensal Population Surveys 1985 and 1995 (above), movement because of economic factors ranked second after family reunion reasons. Especially based on the Intercensal Population Survey 1985 in Java, more than 55

per cent of total recent in-migrants in each province in Java moved to Java for economic reasons.¹¹ The fall in oil prices followed by the trade liberalisation which began in the mid 1980s brought more investment to Indonesia and reversed the migration pattern, which had been initially from Java to the Outer Islands, and there back to Java as the centre of the rapidly growth of the export oriented manufacturing industry (Hugo, 1997 and ILO, 2004).

It is not surprising to find economic reasons attracted people to move mostly to Java and Bali in the 1980s (see Appendix 7.A also for the patterns of migration rate across time).¹² Java provinces, especially Jakarta and West Java, attracted a lot of in-migrants. One is a capital city and the other is as nearest neighbour, both have many socio-economic advantages compared with other Indonesian provinces. People migrated to Jakarta in the expectation of a better life by accessing job opportunities. And a high spillover effect from Jakarta to West Java occurred especially in the nearby municipalities (Bogor, Tangerang, and Bekasi, known as BOTABEK).

Nevertheless the patterns changed in the 1990s when Jakarta became a sending province. This phenomenon does not mean Jakarta did not attract migrants anymore, but this is evidence that some people who used to live in Jakarta had chosen to live in the greater metropolitan of BOTABEK while commuting to work in Jakarta from Bekasi, Bogor or Tangerang. Therefore this group of people was not counted as Jakarta residents at the time of census.

Following Hill's province grouping in Table 7.1, patterns of interprovincial migration are summarised for the periods of 1984-2002.

¹¹ *ibid.*, p.209.

Table 7.1. The Migration Rate of the Hill Province Grouping 1984-2002

Provinces	Non assisted	Assisted	Total
	In-migration	In-migration	Out-migration *)
(Rate in 1000 population)			
Aceh	10.3	0.2	22.4
Riau	78.2	0.9	26.1
East Kalimantan	74.7	3.5	27.6
Papua	37.6	0.4	16.6
Resource Rich Provinces	50.2	1.2	23.2
Lampung	26.6	1.6	21.5
Jakarta	88.8		94.4
West Java	35.9		16.5
Central Java	11.2		32.3
Yogyakarta	55.1		39.8
East Java	8.1		15.5
Bali	22.0		16.2
Densely Populated Provinces	35.4	1.6	33.7
West Nusa Tenggara	12.3	0.5	10.7
East Nusa Tenggara	12.1		13.2
Isolated Provinces	12.2	0.5	12.0
North Sumatera	10.3	0.1	25.6
West Sumatera	27.5	0.7	45.2
South Sumatera	27.2	0.8	27.9
South Kalimantan	28.8	2.4	24.2
North Sulawesi	16.3	0.1	22.5
South Sulawesi	12.7	0.6	20.8
Settled Outer Island Provinces	20.5	0.8	27.7
Bengkulu	50.1	5.4	24.0
Jambi	44.3	3.6	30.0
West Kalimantan	12.2	0.1	11.4
Central Kalimantan	51.2	1.4	21.4
Central Sulawesi	33.3	3.2	14.3
Southeast Sulawesi	52.8	6.1	20.0
Maluku	23.1	0.4	39.7
Sparsely Populated Provinces	38.2	2.9	22.9
National	25.5	0.4	25.5

Source : Author's calculation based on CBS, *Intercensal Population Survey*, 1985 and 1995 and *Population Census*, 1990 and 2000.

Note :

Since the data on migration rates are only available for 1985, 1990, 1995 and 2000, the migration rates for other years are estimated based on linear interpolation method. See Appendix 7.B. for the adjustment carried out to separate the non-assisted and assisted in migration rates.

x) out migration rates are total rates which cover both assisted and non-assisted out migration (due to data limitations, we cannot separate them)

¹² This was true of the 1970s as well, but the spillover to Botabek occurred only in the 1980s when labour intensive manufacturing during the exports oriented period, made a difference especially in 1986-1997.

The rate of in-migration was the highest in the resource rich provinces, followed by the densely populated, sparsely populated, settled Outer Islands, and the isolated provinces.

In contrast, the out-migration rate was the highest from the densely populated provinces, followed by the settled Outer Islands, the resource rich, the sparsely populated, and the isolated provinces. It is not surprising that in-migration was the lowest in the isolated provinces. The characteristics of these less developed provinces which did not encourage people to migrate voluntarily. In more detail, both in-migration and out-migration rates were higher than the national average in the densely populated provinces. Further, in the resource rich provinces the rate of non assisted in-migration was much higher than the national average and more than double the out-migration rate from this group of provinces.

After Java and Bali, the Outer Islands, especially Sumatra, become the second most favourite destination of these migrants. Based on the Hill province grouping, the Outer Islands attracted migrants for three reasons. First, the relatively more skilled migrants were attracted to the extraction and processing of natural resources such as oil and gas, other minerals, and palm oil in the natural resource rich provinces.

Second, people also moved to the sparsely populated provinces because of the rapid development of the palm oil sector which was labour intensive and provided employment opportunities (Casson, 2000). Among the provinces are Jambi and West Kalimantan where most of the oil palm plantation area is concentrated. In addition, there are marginal oil palm plantations in Central Kalimantan and Central Sulawesi (Casson, 2000).

Third, these sparsely populated provinces also attracted people to move because of the chain migration following earlier migration and the transmigration program.¹³ As argued by the World Bank (1988), there is a strong indication that

¹³ As Stark and Bloom (1985) showed, new migrants are usually helped by previous migrants.

spontaneous recent migrants moved to provinces where transmigrants were sent earlier, although the causality for this is not clear.

Following the period of the crisis, there was a movement of people from Java-Bali back to the Outer Islands, with the decline in urban employment opportunities in Java-Bali as a result of the economic crisis, which is discussed by ILO (2004).

*Education induced migration*¹⁴

Education is also a reason why Jakarta, West Java, and Yogyakarta attracted large numbers of in-migrants in the 1980s. The rate of in-migration for people who came and stayed in Jakarta, West Java and Yogyakarta was high. The major educational centres, especially at the upper secondary and tertiary level, are located in Jakarta, Bandung (capital of West Java), and Yogyakarta.

The Intercensal Population Surveys 1985 and 1995 also showed Yogyakarta was the province with the highest percentage of in-migrants because of education reasons (21.8 per cent in 1985, rising to 36.6 per cent in 1995).¹⁵ Yogyakarta is famous in Indonesia as a centre of education.

Migration for social and cultural reasons

Third, among some ethnic groups, migration occurred for strong cultural and social reasons which encouraged people to move from their homeland to look for work and experience or “*merantau*” (migrating out), as happened among the Minangkabau ethnic group in West Sumatra, the Batak in North Sumatra, the Minahasa in North Sulawesi as well as the Buginese and Makasarese in South Sulawesi.¹⁶

These provinces are among the settled Outer Islands provinces, based on the Hill province grouping. It is interesting to see that although they are more developed and settled, due to social-cultural reasons, people tend to move out of these

¹⁴ Stark and Bloom (1985) argued that this is one type of migration behaviour based on individual considerations (not as a group).

¹⁵ This is based on Table 2.26 p.70 in Muhidin (2002).

¹⁶ The Minangkabau have historically been the most mobile ethnic group in Indonesia (Hugo, 1982).

provinces. Therefore, as indicated in Table 7.1, the settled Outer Islands recorded the second lowest in-migration rate among other groups of provinces, but it ranked second in terms of out-migration. These provinces typically recorded negative net migration.

7.3.3. Coverage: Who migrates ?

Data on inter-provincial migration in Indonesia tend not to cover population mobility among the poorest of the population which are usually captured in non permanent and circular migration, in which workers leave their families for short term periods, from a week to two years, and then return to their place of origin or move on to other destinations (ILO, 2004). Many of these temporary migrants are not enumerated as migrants in the census, and return to their places of origin on census day (Hugo, 1987). So data is limited on such migration, defined here as a mere survival strategy of the poor, although the decision to migrate can be assumed to be mainly economic, which involves comparing utility in the place of origin with anticipated utility in place of destination.¹⁷ Migration owing to poverty (being “pushed” to become a migrant) from the sending areas is considered difficult, as the poor cannot afford to move since migration not only involves costs but there are also considerable risks attached (Skeldon, 2002).¹⁸

Table 7.2 below shows a comparison of average years of schooling between the total population in the destination regions and migrants (both in- and out-migrants) by provinces in Indonesia, as well as based on the Hill province grouping.¹⁹

¹⁷ Chotib (2006) showed there was a high percentage of people who have migrated to provinces which have low Regional Gross Domestic Product per capita, based on the 2000 Population Census. Moreover, his paper also indicates the high percentage of people who move from less urbanised to more urbanised provinces.

¹⁸ Current development of the literature shows that if migration is caused by poverty, it is usually not caused by absolute poverty but more by relative poverty, the feeling of being poor relative to others.

¹⁹ The average years of schooling (ASY) is calculated based on the formula of Barro and Lee (1993). $ASY = \sum_{i=1}^8 Duration_i * PopShare_i$, where $Duration_i$ is the effective duration in years

of the i th level of schooling and $PopShare_i$ is the fraction of the population for which the i th level of schooling i is the highest attained ($i=1$ for no schooling; 2 for not yet completed primary school; 3 for completed primary school; 4 for completed junior high school; 5 for completed senior high school; 6 for completed diploma I/II; 7 for completed academy/ diploma III and 8 for completed university level).

The national figure for average years of schooling in- and out-migrants was around 7 years, which is equivalent with Junior High School Level 1. This figure is higher compared with the total population average years of schooling which is equivalent with Elementary School Level 4-5.²⁰

This phenomenon at least shows that those with higher education tend to be more mobile and move across provinces, as in the theoretical framework. Accordingly, there may be human capital migration in Indonesia.

Table 7.2 shows in more detail that, following the Hill province grouping, although there is only a small difference in terms of magnitude, the stock of human capital of in-migrants was higher than out-migrants in the densely populated provinces but was similar in the resource rich provinces, which may reflect demand-oriented migration. Demand for labour attracts these migrants to move to the big cities such as Jakarta and Bandung (West Java). In contrast, the stock of human capital is higher for out-migrants than in-migrants for the other groups.

It is not surprising that for the isolated provinces those who are better educated decided to move out to seek opportunities elsewhere. Better educated people usually only move to these provinces because of reassignment, for example as civil servants.

²⁰ The average years of schooling in Indonesia is lower than other big-4 ASEAN countries: Philippines (8 years), Singapore (7 years), Malaysia (6.8 years), and Thailand (6.5 years).

Table 7.2. The Comparison of Stock of Human Capital (Average Years Of Schooling) between the Total Population, In-migrants and Out-migrants of the Hill province grouping 1984-2002

	Provinces	Total Population	In-migrants	Out-migrants
1	Aceh	5.1	7.0	7.0
4	Riau	4.9	7.0	6.8
20	East Kalimantan	5.4	7.1	6.8
26	Papua	3.7	7.0	7.4
	Resource Rich Provinces	4.8	7.0	7.0
8	Lampung	4.1	6.0	6.1
9	Jakarta	7.5	8.0	7.5
10	West Java	4.6	7.5	6.7
11	Central Java	4.1	6.6	7.2
12	Yogyakarta	5.6	9.4	8.9
13	East Java	4.1	7.1	7.1
14	Bali	4.8	7.8	7.3
	Densely Populated Provinces	5.00	7.5	7.3
15	West Nusa Tenggara	3.3	7.3	7.6
16	East Nusa Tenggara	3.1	6.8	7.6
	Isolated Provinces	3.2	7.0	7.6
2	North Sumatera	5.4	7.0	7.7
3	West Sumatera	4.9	6.4	7.7
6	South Sumatera	4.4	5.9	6.9
19	South Kalimantan	4.3	6.1	6.3
21	North Sulawesi	5.3	8.0	8.0
23	South Sulawesi	4.3	6.9	6.7
	Settled Outer Island Provinces	4.8	6.7	7.2
5	Jambi	4.4	6.6	5.7
7	Bengkulu	4.5	6.2	6.8
17	West Kalimantan	3.4	6.8	6.8
18	Central Kalimantan	4.6	6.0	6.3
22	Central Sulawesi	4.7	5.9	6.6
24	Southeast Sulawesi	4.3	5.3	6.7
25	Maluku	4.9	6.6	7.0
	Sparsely Populated Provinces	4.4	6.2	6.6
	National	4.6	7.3	7.1

Source :Author's calculation based on CBS, *Intercensal Population Survey*, 1985 and 1995 and *Population Census*, 1990 and 2000.

Note : Since the data on human capital are only available for 1985, 1990, 1995 and 2000, data for other years are estimated by the linear interpolation method. Human capital data for total population and in- and out-migrants refer only to population aged 10+.

7.3.4. The Impact of Migration on Regional Poverty in Indonesia

Based on the previous discussion, the hypothesised relationship between in-migration (both assisted and non-assisted in-migration and out-migration) and regional poverty is analysed in greater detail below.

7.3.4.1. The impact of assisted in-migration (transmigration) on poverty in the provinces of destination

1. *Direct effect.* It is expected that the assisted migration would contribute to higher levels of poverty since the transmigrants were likely to have higher levels of poverty than the population in the areas of destination. The transmigration program moved poor people (and less skilled migrants) from the poorest part of the country. The World Bank (1988) also argued that, on average, the Outer Islands' residents, where the transmigration sites are located, had a higher income than the transmigrants.²¹
2. *Indirect effect.* Labour supply is augmented (quantity effect dominated) and these transmigrants usually worked hard. Question arises whether, after being independent of government assistance (after two years), these transmigrants were able to replace the loss of government assistance by expanding their production or whether there is more opportunity which enables the migrants to keep working. If most of the transmigrants were not be able to do this (and since there were a lot of difficulties faced by the transmigrants), clearly it would have lead adverse impact on growth and an associated increase in poverty.

7.3.4.2. The impact of non assisted in-migration on poverty in the provinces of destination

1. *Direct effect.* Non-assisted in-migration is expected to have a negative relationship with poverty since migrants usually have a higher educational level than the population in the destination region; therefore they have a higher opportunity of working in activities which give higher returns.
2. *Indirect effect.* The assumption is that migration augments labour supply with increasing capital or/and human capital in destination areas, therefore

²¹ But it is also possible that the impact was not clear since these transmigrants received government assistance during the first two years of the resettlement period.

migration contributes to economic growth in these regions, which is, in turn, negatively associated with poverty.

7.3.4.3. The impact of out-migration on poverty in the provinces of origin (sending provinces)

1. *Direct effect.* Out-migration is expected to have a positive relationship with poverty since out-migrants usually have higher educational levels than the population in the areas of origin and therefore a higher income status than those who remain.
2. *Indirect effect.* The assumption is that migration contracts the labour supply because of a brain drain; but the possible offsetting impact of remittances contributes to an ambiguous impact from out-migration on growth in the regions of origin.

Due to data limitations, especially since the data on remittances for each province in Indonesia are not available, the impact of in-migration, out-migration and transmigration on growth or poverty is only an estimate of the total effect since the proxy used is aggregate migration data. Therefore, the contribution of each channel through which migration influences poverty cannot be identified separately. Separation of different channels of influence should be a subject for further research.

Another important data limitation relates to the fact that although out-migration data actually covers both assisted and non-assisted out-migration, its interpretation will only cover the impact of those who are represented by this proxy. As mentioned by Muhidin (2002), the proportion of transmigration as a percentage of out-migration is very small, at less than five per cent nationally. In addition, the impact of transmigration is more relevant for poverty in the destination areas and not in the regions of origin.

7.4. Intergovernmental Transfers in Indonesia

In order to understand the potential implications of transfers for poverty alleviation, a brief survey of the evolution of fiscal transfer mechanisms in Indonesia is discussed below, focussing on the 18 year period 1984-2002.

7.4.1. The Types of Intergovernmental Transfers in Indonesia

In Indonesia, intergovernmental transfers accounted for more than 70 per cent of all regional government revenue in the mid 1990s (Silver, Azis and Schroeder, 2001). From the 1970s through 1998, there were two types of government transfers. The first was an Autonomous Regional Subsidy (*Subsidi Daerah Otonom* or SDO) which comprised about 75 per cent of the transfer. SDO was used mainly to finance the regional routine and recurrent expenditures. Around 95 per cent was used to pay the salaries and allowances of local government officials (regional civil servants). Three quarters of SDO was given to the provincial government and the remaining 25 per cent to the district governments. SDO was allocated on the basis of actual salaries of all civil servants decided uniformly by the central government, regardless of the financial capacity of the respective regions and the work performance of the respective officers (Sidik et al., 2002). All local government officials were employees on the central government payroll. This SDO was a type of special grant, since it was decided by the central government.

The second type of transfer was a Presidential Instruction (*Instruksi Presiden* or *INPRES*) which was usually about 29 per cent of the total transfers in 1987, and around 43 per cent in the 1990s. INPRES was used to finance regional development expenditure in less developed provinces. The objective of INPRES was to nourish the financial capacity of regional governments and promote more balanced regional development.²²

There were two types of INPRES. The first was the general purpose transfer (block *INPRES*) which covered Provincial INPRES grants, District INPRES

²² A more detailed discussion on INPRES can be found in Azis (1990, 1992).

grants, and Rural INPRES grants (*INPRES Desa*). Provincial INPRES was the largest sector within the block grant INPRES group. The allocation of block grants was based on two criteria: (i) specific/fixed components, and (ii) a discretionary component. The specific components were required to be spent on programs identified by the central government or ministry, while the discretionary component was decided at the lower level of government. Since the district INPRES was allocated mainly based on population criteria, the block INPRES in Java, the most populous island in Indonesia, accounted for around two thirds of the total INPRES, whereas elsewhere the block INPRES accounted for only around one third of the total INPRES.

The second form of INPRES was the specific purpose (non-block or categorical) INPRES allocated for specific activities, such as the elementary school INPRES, the health INPRES, the environmental development and greening INPRES, the road development INPRES, and the market restoration and development INPRES. All of these areas are relevant to poverty reduction. In contrast to the general purpose INPRES, the specific purpose INPRES was primarily based on central government targets, for example, in this context, the aim was to reduce poverty.²³ Local government could only make some minor choices regarding the location of the projects.

Based on Law 25/1999 and beginning in 2001, intergovernmental transfers took another form, where SDO and INPRES changed to the General Allocation Fund (*Dana Alokasi Umum* or *DAU*) which gave full autonomy to local governments in spending and managing grants. With this autonomy, districts and municipalities became responsible for delivering public services which neither central government nor provincial government provided (for example, the central government still retains responsibility for higher education).

Central government programs and projects (sectoral project allocation) which were initially under the central government budget, are now directly transferred

²³ Unfortunately for empirical purposes, there is no breakdown of INPRES into categories which are considered important for poverty alleviation. Therefore the total INPRES is used as the proxy of intergovernmental transfers.

through the specific allocation fund (*Dana Alokasi Khusus* or *DAK*). This is an intergovernmental transfer, to be included in local government budgets. Local governments were expected to understand local needs better than the central ministries.

Besides DAU and DAK, the other forms of intergovernmental transfers are natural resource revenue and tax revenue sharing. Natural resource revenue sharing was an important development for a relatively resource rich country such as Indonesia, where natural resources are concentrated in a few regions. There was virtually no resource revenue sharing before 2001, where almost 100 per cent of the revenue went to the central government, although later some of this revenue was returned as part of the general system of development grants. Currently 15 per cent of oil revenue goes to the respective oil producing provinces, and 30 per cent for gas and 80 per cent for other general mining activities, as set out in Law No 25, 1999. Similarly, 80 per cent of the forestry sector revenue (forest product royalties and forest concession licences) and 60 per cent of reforestation funds go to the producing provinces, whereas in fisheries, 80 per cent of the revenue is distributed to all districts and municipalities in Indonesia.

DAU is allocated according to a clearer and more comprehensive formula compared with the earlier transfers and is directly related to poverty measures by taking into account the numbers of poor in the population (Lewis, 2001). The DAU allocation followed the INPRES principle that was in practice based on equalisation objectives (Silver, Azis and Schroeder, 2001).

In most local governments, the role of discretionary spending (under DAU) became more dominant in local government budgets. The share of DAU to the total local government budgets in Indonesia was more than 80% on average in 2002 and it contributed to 69% of total transfers from the central government.

7.4.2. The Impact of Intergovernmental Transfers on Poverty

This section discusses the relationship between intergovernmental transfers and poverty in Indonesia and mainly covers the role of INPRES (and later on DAU), rather than the total transfers, since SDO which was used to pay local government

officials' salaries and allowances is therefore not directly relevant to poverty analysis.

Based on the existing literature, therefore, it is hypothesised that there will be two channels by which transfers impact on poverty. These are:

1. *Direct effect.* Theoretically, the direct impact should reduce poverty since INPRES is a development grant which is used to deliver services to the poor.
2. *Indirect effect.* The objective of intergovernmental transfers in Indonesia (INPRES) is to bring more balanced regional development, therefore intergovernmental transfers are expected to contribute positively to economic growth and then be negatively associated with poverty.

7.4.3. Criteria for Allocation of INPRES

To understand whether there is reverse causality from poverty to INPRES allocation, which is important in setting up the empirical framework later on, this section discusses several indicators used as criteria for allocating INPRES in Indonesia. The objective is to examine whether an absolute poverty indicator is also included as one of the determinants of INPRES allocation. Bird and Smart (2002) argued that transfers per capita appear to have a close correlation with poverty levels in Indonesia. Nevertheless, the facts and empirical outcomes are still far from clear.

Initially, INPRES (Municipal INPRES) was allocated based on population size. This type of allocation caused INPRES to favour the more populous provinces of Western Indonesia, especially Java (Booth, 1996, Sidik et al., 2002).

Nevertheless, since the mid 1980s, INPRES became less reliant on population size criteria and used other criteria such as land area, amount of own revenue, and equal shares in allocating the transfer (Booth, 1996, Sidik et al., 2002). Implicitly, the equal share allocation would benefit the less populous provinces (Booth, 1996). Similarly, in terms of specific purpose transfers which did not have population as one of the criteria, the INPRES grants were biased in favour of the less densely populated areas in the Outer Islands and especially in parts of Eastern

Indonesia (Outer Islands minus Sumatra). As argued by Balisacan, Pernia and Asra (2003), in practice INPRES was an instrument to promote growth in the Outer Islands.

Accordingly, Eastern Indonesia then received higher INPRES grants per capita than the more populous provinces in Western Indonesia, thereby countering criticism of a “Java bias” and reducing regional income disparities (since Eastern Indonesia covers mainly the less prosperous provinces). Table 7.3 shows that Eastern Indonesia received around 2.2, 2.6 and 2.1 times of INPRES per capita (Rupiah in 1983 prices) higher than Western Indonesia in 1984, 1996 and 2002, respectively. In contrast, Jakarta was then always the lowest recipient in terms of INPRES per capita.

Table 7.3. Land Size, Population and Distribution of INPRES per capita for the Hill Province Grouping

Provinces	Land size (km2)	Population '000)			INPRES per capita (Rupiah 1983 price)					
		1984	1996	2002	1984	Comp to nat. ave.	1996	Comp to nat. ave.	2002 **)	Comp to nat. ave
Aceh	55,390	2,903	3,863	4,077	13,372	185	20,415	221	43,270	108
Riau	94,561	2,441	4,090	5,155	12,108	168	24,916	270	88,789	222
East Kalimantan	210,985	1,468	2,341	2,535	40,048	555	25,524	277	71,249	178
Papua	421,981	1,318	1,994	2,309	25,555	354	31,923	346	142,429	355
<i>Resource rich provinces</i>	<i>782,917</i>	<i>8,130</i>	<i>12,289</i>	<i>14,075</i>	<i>19,785</i>	<i>274</i>	<i>24,754</i>	<i>268</i>	<i>81,245</i>	<i>203</i>
Lampung	35,385	5,686	6,673	6,929	8,301	115	8,403	91	37,652	94
Jakarta	664	7,544	8,957	8,574	3,479	48	2,588	28	7,721	19
West Java	43,177	30,047	38,484	44,950	4,317	60	5,307	57	22,243	56
Central Java	32,549	26,614	29,961	31,942	4,587	64	5,235	57	32,631	81
Yogyakarta	3,186	2,922	2,957	3,144	6,559	91	6,266	68	43,377	108
East Java	47,923	30,660	34,026	35,175	4,224	59	5,060	55	28,848	72
Bali	5,633	2,604	2,945	3,215	15,450	214	8,136	88	63,542	159
<i>Densely populated provinces</i>	<i>168,517</i>	<i>106,077</i>	<i>124,003</i>	<i>133,929</i>	<i>4,874</i>	<i>68</i>	<i>5,282</i>	<i>57</i>	<i>27,810</i>	<i>69</i>
East Nusa Tenggara	47,349	2,968	3,625	3,940	11,351	157	20,502	222	87,983	220
West Nusa Tenggara	20,153	2,980	3,716	4,127	8,731	121	10,371	112	44,034	110
<i>Isolated provinces</i>	<i>67,502</i>	<i>5,948</i>	<i>7,341</i>	<i>8,067</i>	<i>10,038</i>	<i>139</i>	<i>15,374</i>	<i>167</i>	<i>65,497</i>	<i>163</i>
North Sumatra	71,680	9,217	11,218	12,037	7,646	106	7,805	85	39,855	99

Table 7.3. Land Size, Population and Distribution of INPRES per capita for the Hill Province Grouping, *Continued*

Provinces	Land size (km ²)	Population ('000)			INPRES per capita (Rupiah 1983 price)			
		1984	1996	2002	1984	Comp to nat. ave.	1996	Comp to nat. ave.
West Sumatra	42,898	3,613	4,308	4,361	11,661	162	10,527	114
South Sumatra	109,254	5,245	7,145	8,095	9,182	127	13,305	144
South Kalimantan	36,535	2,242	2,911	3,058	11,139	154	14,411	156
North Sulawesi	27,488	2,321	2,504	5,593	8,635	120	17,461	189
South Sulawesi	62,483	6,489	7,654	8,280	4,813	67	12,346	134
Settled Outer Islands	350,338	29,126	35,741	41,424	8,137	113	11,420	124
Bengkulu	19,789	900	1,439	1,615	22,423	311	19,977	216
Jambi	53,436	1,668	2,377	2,487	15,278	212	18,180	197
Central Kalimantan	153,564	1,100	1,670	1,923	23,063	320	22,380	242
West Kalimantan	146,807	2,746	3,709	4,148	10,139	141	15,998	173
Central Sulawesi	63,689	1,486	1,983	2,239	15,524	215	24,822	269
Southeast Sulawesi	38,140	1,053	1,631	1,889	32,943	457	26,039	282
Maluku	77,871	1,586	1,857	1,959	15,346	213	27,231	295
Sparsely populated provinces	553,296	10,538	14,666	16,260	17,172	238	21,201	230
Western Indonesia	615,525	130,395	156,067	169,267	5,974	83	7,168	78
Eastern Indonesia	3,845,140	27,756	35,596	42,000	13,105	182	18,413	199
National	3,845,140	27,756	35,596	42,000	7,212	100	9,231	100

Source : Author's calculation based on CBS, *Yearbook of Statistics*, and LPEM, *Regional Budgets*, various years. Comp.nat.ave= compared to national average;

*) not INPRES, but DAU (general allocation funds), since 2002 was already in the decentralisation period.

Although INPRES was allocated more generously mostly to Eastern Indonesia, only a small portion was allocated to relatively low income and less developed provinces in the East. The allocation initially still tended to favour provinces with a relatively high per capita RGDP, for example provinces in Kalimantan, as opposed to low per capita RGDP provinces elsewhere in Eastern Indonesia (Booth, 1996). Table 7.3 presents the allocation of INPRES following the Hill province grouping. On average, the natural resource rich provinces received higher total INPRES grants in 1984-2002, followed by the sparsely populated provinces. The isolated provinces coming third.

The INPRES program which was initially dominated by block programs changed in the 1990s to a predominantly non block program (Silver, Azis and Schroeder, 2001). Nevertheless, the equal share principle gradually fell from around 35 per cent in 1988 to 22 per cent in 1993, while the weight given to the length and condition of roads, the land size area, discretionary principles and RGDP share increased (although the weight for the RGDP was very small at around three per cent).

Only in the mid 1990s did INPRES expenditure tend to be allocated to less developed provinces such as East and West Nusa Tenggara. These are usually also categorised as poor provinces with low income per capita and coincidentally a high absolute poverty headcount.²⁴

INPRES per capita in East Nusa Tenggara surpassed INPRES per capita in East Kalimantan and Aceh for the first time in 1994, (in real 1983 terms). The top four recipients were Southeast Sulawesi, Papua, Central Sulawesi and Central Kalimantan. However, following the Hill province grouping, the isolated provinces still ranked third as a group after the natural resource rich and the sparsely populated provinces.

²⁴ Provinces usually referred to as poor are less developed and not necessarily provinces which had a high absolute poverty indicator, although it is possible to score high on both.

To give some insight into whether there is any correlation between INPRES per capita and absolute poverty, the rank of INPRES per capita recipients and the province poverty headcount is compared. From 1984 to 2002, fewer than five of the top 10 provinces with the highest headcount ratio were included in the top ten INPRES per capita recipients for each National Socioeconomic Survey consumption module year. These included Maluku, Papua and Southeast Sulawesi. All of these provinces are where the headcount ratio was consistently higher than the national average. East and West Nusa Tenggara, which were always among the provinces with a high headcount index, surprisingly only ranked 13 and 17 in 1984, 13 and 16 in 1987, 16 and 15 in 1990, and 14 and 15 in 1993, respectively. It was only in 1996 (according to the National Socioeconomic Survey consumption module year, although it actually began in 1994/1995) that East Nusa Tenggara ranked at 8 and improved its rank to no 4 in 2002.

This might also be related to the specific INPRES grant intended to be a rural poverty alleviation strategy, through the Less Developed Village INPRES (IDT), that began in 1994/1995 (till 1996/1997). IDT was primarily aimed at overcoming rural poverty outside Java (Silver, Azis and Schroeder, 2001).

Therefore, the evidence shows that there is no simple positive correlation between poverty headcount and the INPRES allocation. There is only weak evidence for a reverse causality from poverty headcount to the INPRES allocation. The number of poor was only explicitly included in the allocation criteria of DAU when decentralisation was introduced in 2001.

7.4.4. Empirical Evidence on the Determinants of INPRES Allocations

After briefly discussing the literature and the data, the empirical evidence will now be discussed. Interestingly the empirical work gives ambiguous results on whether INPRES was biased in favour of poor provinces (given that the term poor here can refer to poor either in terms of income/RGDP or an absolute poverty indicator). Ravallion (1988) only found a modest tendency for the poorer provinces (poor here is measured in terms of mean consumption expenditure per

capita) to receive a higher INPRES allocation than the richer provinces.²⁵ Modelling the INPRES per capita for 1985/1986 as the dependent variable with mean consumption expenditure per capita (income) to represent welfare, population and population density as independent variables (these two indicators are argued to be empirically important), Ravallion found that the smaller the population and population density, the higher the provincial INPRES allocation, which may exclude the poor provinces since they usually have a higher population density.²⁶ Other variables, such as the regional cost of living index, the expenditure share of the poorest 40% of the population (which represents a relative poverty measure), the Gini index, net primary school enrolment, private investment per capita, and physical quality of life indicator were not significant in influencing the INPRES allocation. The findings also confirm the literature that in the mid 1980s, the INPRES allocation still favoured the small but relatively better-off provinces, and it seems that poverty measures still did not have an impact on the allocation.

In contrast, Booth (1996) found the INPRES allocations in 1993-1994 were not only biased to the small and less densely populated provinces, but also to regions with a high absolute poverty headcount. She found that poverty headcount was positive and significant in explaining the INPRES allocation (as a ratio of household consumption expenditures). This might relate to the Less Developed Village INPRES (IDT) program introduced during that period, which was specifically aimed at reducing poverty in rural areas. IDT contributed to 30 per cent of Indonesia's spending on anti-poverty programs during the periods 1994/1995 and 1997/1998. It was mostly allocated to job creation programs (Daly and Fane, 2002).

In another study on the determinants of INPRES, Mahi and Adriansyah (2002) argued that, in addition to population size, the length of roads and own revenue are important indicators of INPRES allocation, based on INPRES data in 1992.

²⁵ Ravallion (1988) further added that the central government still cares about regional inequality but is willing to accept the fact that there are regional income disparities in Indonesia.

²⁶ In his empirical study, he also argued the possibility of simultaneity between income and INPRES per capita.

Population size had a positive correlation with the INPRES allocation, especially for Provincial INPRES, health INPRES and schooling INPRES. Length of roads also had a significant positive correlation with all types of INPRES. Only the ratio of own revenue/RGDP had a negative correlation with INPRES, especially the Provincial INPRES. The higher the own revenue, the lower the transfers; therefore it is not surprising that own revenue for those provinces in Western Indonesia was higher than the INPRES grant. In contrast, it was less than the INPRES grant in Eastern Indonesia, especially at a provincial level (Booth, 1996).

To conclude this section, there is evidence that underdevelopment is one of the determinants used in allocating INPRES, although this depends on the time period. Further, the empirical evidence gave weak and ambiguous results on reverse causality from the absolute poverty headcount to INPRES allocation.

7.5. Data and Measurement

The measurements (proxies) used in this chapter are similar to the proxies of explanatory variables (poverty, income, inequality, human capital, infrastructure, openness and natural resources) discussed in Chapter Six. Nevertheless, for human capital and openness, only average years of schooling and share of total trade to RGDP, respectively, are used as the proxies. The following discussion presents the measurement for interprovincial migration variables and intergovernmental transfer.

7.5.1. In Migration (Non assisted and assisted) and Out Migration

This variable covers non-assisted and assisted migration (transmigration). The data on interprovincial migration are only available from each population census and the Intercensal Population Survey which is run only once every five years. Therefore the interprovincial recent migration data used in this thesis are only available for 1985, 1990, 1995 and 2000, based on the 1990 and 2000 Population Census and the 1985 and 1995 Intercensal Population Survey.

The data have the limitation that they may cover only 20 per cent of all permanent movement in Indonesia (only inter-provincial flow), and does not include non-permanent migration (Hugo, 1997). Since the data on recent migration captures population mobility within five years prior to the census, so the 1985 Intercensal Population Survey data captures population movement from 1980-1985, the 1990 Census data captures the population movement from 1985-1990, the 1995 Intercensal Population Survey data captures the population movement from 1990-1995, and the 2000 Census data captures the population movement from 1995-2000.

Given the need to match recent migration data with the three year period of poverty data, the migration data are estimated based on the proportion of migrants to the total population (in provinces of destination for in-migration and provinces of origin for out-migration), or the rate of migration (Rogers and Castro, 1986; Muhidin, 2002).²⁷ Accordingly, recent in-migration data for the National Socioeconomic Survey consumption module years of 1984, 1987, 1990, 1993, 1996, 1999 and 2002 are estimated.

As stated earlier, the purpose of this chapter regarding in-migration is to examine the separate impact of both assisted and non-assisted in-migration on poverty in the destination regions. To get both figures, the number of transmigrants needs to be excluded from the recent in-migration data. The information available regarding transmigration comes from two sources; first, from the Intercensal Population Survey 1985 and also from the data provided by the Department of Manpower and Transmigration on the placements of transmigrant families each year. Unfortunately the numbers for the latter source do not match the recent migration data calculated from the Census or Intercensal Population Survey. When the transmigration program was at its peak in 1985, the reported numbers of total transmigrants for that year outnumbered the total recent in-migrants, which is impossible. One point that should be noted is that the transmigration data provided by the Department of Manpower and Transmigration recorded only the

²⁷ By using the rate of in-migration, the incomparability of Census and SUPAS data in reflecting the volume of recent migration because of differences in sample size is solved (Muhidin, 2002).

placement of the transmigrant families but there was no record of the number of transmigrants who returned to regions of origin or moved to other provinces.

The adjustment made for this anomaly was as follows. Transmigrant numbers were estimated by calculating “the staying rate” of migrants in the provinces of destination, based on the Intercensal Population Survey 1985 of transmigration share to total in-migration and assuming that the rate did not change over time. It is also assumed that number of migrants who gave transmigration as their reason for moving is a good approximation of the share of those migrants who still remained at the same transmigration destination. The complete procedure of how the transmigration is estimated from total recent in-migration data can be seen in Appendix 7.B.

Unfortunately there is no information available on the decomposition of migrants who moved out because of transmigration by provinces of origin. Therefore the variable total out-migration data by provinces, which theoretically covers both assisted and non-assisted out-migration, is used for out-migration (sending provinces). Due to the fact that (i) the transmigration history is more interesting for poverty in the destinations provinces (where the quantity effect is large in some areas) and (ii) the transmigration share of total out-migration is very small, the discussion of the results for the out-migration data focuses on factors affecting non-assisted out-migration.

7.5.2. Intergovernmental Transfers

The variable used for representing intergovernmental transfer is INPRES per capita which is calculated from the regional budgets at provincial and municipal or district level (*Anggaran Pendapatan dan Belanja Daerah*). These data are then combined to create INPRES per capita for provincial level, (including both block and specific purpose INPRES) divided by the population based on the Population Census and Intercensal Population Survey. INPRES per capita is then deflated by the RGDP deflator to calculate this variable in real terms (1983 rupiah).²⁸ Due to

²⁸ The RGDP deflator may not be the best one to deflate the intergovernmental transfers. Capital expenditure deflator if available should be a better proxy.

the decentralisation which started in 2001, instead of INPRES, DAU the Equalisation Fund is used as a proxy for INPRES in this period.

7.6. Empirical Methodology and Approach

As in Chapter Six, a panel data estimation of Fixed Effects is used to estimate the poverty equations, and the Arellano-Bond Generalized Method of Moment (GMM) is used to estimate the growth equation.

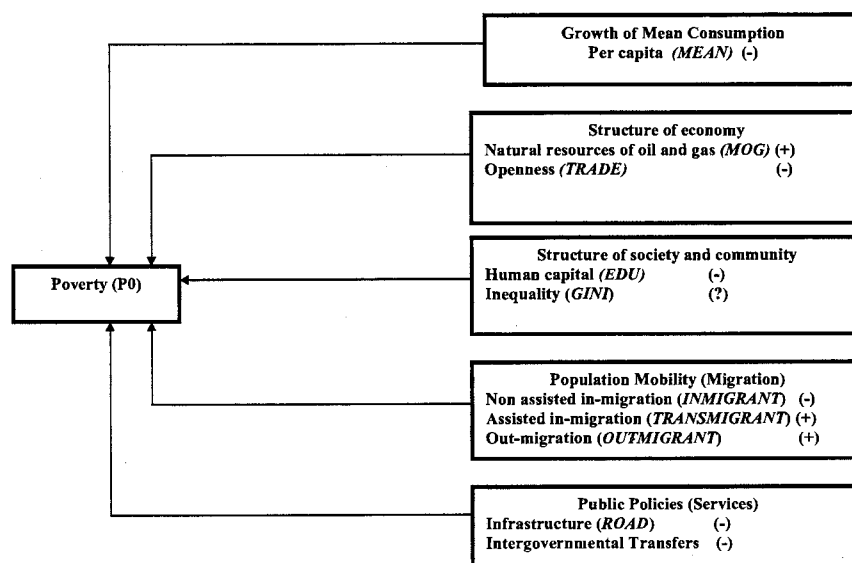
The main argument in this chapter can therefore be summarised as follows: education, infrastructure, the presence of oil and gas, interprovincial migration, intergovernmental transfer, inequality, and trade have been crucial in influencing growth across Indonesia and all these variables have in turn played an important role in explaining regional poverty. In addition to influencing poverty through growth, these variables may have a direct impact on regional poverty. Thus, the general postulated relationships are as follows:

1) Regional Poverty-Direct Channels

Figure 7.2 shows the direct channel where the explanatory variables may have an impact on regional poverty. The parentheses show the expected relationship between the determinants and poverty, whether positive (+), negative (-) or not clear (?).²⁹

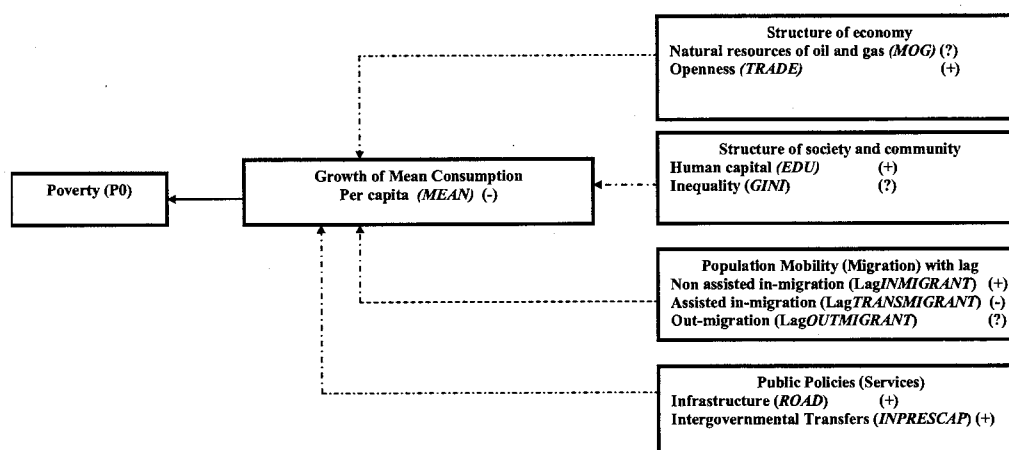
²⁹ Not clear refers to variables for which there is no clear hypothesis.

Figure 7. 2. The Determinants of Regional Poverty: Direct Channels



2) Regional Growth-Indirect Channels

Figure 7.3. The Determinants of Regional Poverty: Indirect Channels



Note :---- Denotes indirect channel

___ Denotes direct channel

Figure 7.3 shows the indirect channels, where the determinants may have impact indirectly on regional poverty through growth. Similarly, as for Figure 7.2, the

parentheses show the expected relationship between the determinants and growth, whether it is positive (+), negative (-) or not clear (?).³⁰

The discussion of the dynamic interaction through two general channels will be carried out step by step, similar to the approach adopted in Chapter Six (cross reference section 6.4 in Chapter Six) following the strategy of Palmer-Jones and Sen (2003). Therefore, both channels are estimated by the reduced form empirical equations of the determinants of regional growth and regional poverty. The magnitude of the total effect (direct plus indirect channel) cannot be quantified.

7.6.1. Regional Growth - Indirect Channels

Growth which is measured as an increase in average mean consumption per capita is approximately associated with the natural resources of oil and gas (*MOG*), Gini inequality (*GINI*) and out-migration (in lagged form, *lagOUTMIGRANT*) although the sign of the impact is still not clear. Growth is expected to be associated with an increase in government transfers (*INPRESCAP*), better human capital (*EDU*), availability of infrastructure (*ROAD*), an increase in the number of non-assisted in-migration rate (in lag, *lagINMIGRANT*), and greater integration with the market (*TRADE*). In contrast growth is expected to be associated with a decline in the number of transmigrants (in lagged form, *lagTRANSMIGRANT*).

The impact of non-assisted and assisted in-migration and out-migration on growth occurs with a lag, since it takes a while for non-assisted migrants to find a job and work in the destination provinces. Similarly for out-migration, with regard to the remittances, it is assumed that it takes some time to find jobs, to save their money and send it back to their home provinces.

³⁰ *ibid.*, p.236.

In addition, one period lag (three years according to the National Socioeconomic Survey consumption modules) is also needed for transmigrants, since they needed time to make returns from the agricultural employment in transmigration sites after government assistance ceased.³¹

To explore the relationship, a simple model of growth (Mankiw, Romer and Weil, 1992) is estimated as follows:

$$\begin{aligned} \ln MEAN_{i,t} = & \delta_0 + \delta_1 \ln lagMEAN_{i,t-3} + \delta_2 \ln GINI_{i,t} + \delta_3 \ln EDU_{i,t} + \delta_4 \ln ROAD_{i,t} + \\ & \delta_5 MOG_{i,t} + \delta_6 lagINMIGRANT_{i,t-3} + \delta_7 lagTRANSMIGRANT_{i,t-3} + \delta_8 lagOUTMIGRANT_{i,t-3} + \\ & \delta_9 \ln INPRESCAP_{i,t} + \delta_{10} \ln TRADE_{i,t} + \sum_{e=1}^{e=6} \lambda_e d_e + \delta_i + \varepsilon_{i,t} \end{aligned} \quad (7.1)$$

Where :

$MEAN_{i,t}$	is a proxy of income of province i at time t, which is Mean Consumption Per capita (Rupiah, 1984 prices)
$lagMEAN_{i,t-3}$	is the three year lag of mean consumption per capita in province i at time t-3 (Rupiah, 1984 prices)
$GINI_{i,t}$	is the Gini coefficient of province i at time t
t	is the index for year (t =1984, 1987, 1990, 1993, 1996, 1999, 2002)
e	is the index for 6 dummies (e=1,2,3,4,5,6)
d	are the dummies for time periods of when the National Socioeconomic Survey took place
	$d_{87} = 1$ if t=1987, or 0 otherwise
	$d_{90} = 1$ if t=1990, or 0 otherwise
	$d_{93} = 1$ if t=1993, or 0 otherwise
	$d_{96} = 1$ if t=1996, or 0 otherwise
	$d_{99} = 1$ if t=1999, or 0 otherwise
	$d_{02} = 1$ if t=2002, or 0 otherwise
	The base period is year 1984.

³¹ Most transmigrants were not only provided with land but also with financial assistance and basic necessities (e.g. rice, sugar, salt) during the first two years.

$EDU_{i,t}$	is the average years of schooling of the total population at time t to represent the stock of human capital (years)
$ROAD_{i,t}$	is the length of paved road per 1000 population to represent infrastructure (km/1000 population) in province i at time t
$MOG_{i,t}$	is the oil and gas as a share of GDP to represent the natural resources (per cent) in province i at time t
$lagINMIGRANT_{i,t-3}$	is the three year lag of the rate of recent non assisted in-migration (1/1000) in province i at time t-3
$lagTRANSMIGRANT_{i,t-3}$	is the three year lag of the rate of recent assisted in-migration (transmigrant) (1/1000) in province i at time t-3
$lagOUTMIGRANT_{i,t-3}$	is the three year lag of the rate of recent out-migration (1/1000) in province i at time t-3.
$INPRESCAP_{i,t}$	is real INPRES per capita (Rupiah in 1983 prices) in province i at time t to represent intergovernmental transfers
$TRADE_{i,t}$	is the ratio of total trade (exports plus imports) to total RGDP in province i at time t to represent openness (per cent).
δ	is the provincial fixed effect (unobserved heterogeneity)
ε	is a white-noise error term that includes errors in the poverty measure.
i	is the index for province (i=1,....., 26). Please refer to Appendix 3.B for the list of all provinces

There is a possibility of two way causality between the inequality, human capital, and openness with consumption growth. Therefore *GINI*, *EDU*, and *TRADE* are treated as endogenous variables. Equation 7.1 is estimated with an Instrumental Variable (IV) Estimation in which one period lag of its own variable is used as the instrument. Model 7.1 is estimated with the Arellano-Bond Generalized Method of Moment (GMM) estimation, as it is basically a dynamic First Difference

estimation with a lagged dependent variable as one of the explanatory variables (as discussed earlier in Chapters Three and Six).

7.6.2. Regional Poverty - Direct Channels

As discussed earlier in Chapter Six, the objective of this section is to empirically analyse the relationship between the poverty headcount index, inequality, consumption growth and other explanatory variables that may work directly on the poverty headcount index.

Model 7.2 only examines the impact of independent variables discussed earlier in the empirical equation 6.3, plus migration variables, while equation 7.3 analyses not only migration but also intergovernmental transfers variables.

$$\ln P_{0,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \gamma_3 \ln EDU_{i,t} + \gamma_4 \ln ROAD_{i,t} + \gamma_5 MOG_{i,t} + \gamma_6 \ln TRADE_{i,t} + \gamma_7 INMIGRANT_{i,t} + \gamma_8 TRANSMIGRANT_{i,t} + \gamma_9 OUTMIGRANT_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (7.2)$$

$$\ln P_{0,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \gamma_3 \ln EDU_{i,t} + \gamma_4 \ln ROAD_{i,t} + \gamma_5 MOG_{i,t} + \gamma_6 \ln TRADE_{i,t} + \gamma_7 INMIGRANT_{i,t} + \gamma_8 TRANSMIGRANT_{i,t} + \gamma_9 OUTMIGRANT_{i,t} + \gamma_{10} \ln INPRESCAP_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (7.3)$$

Where in addition to previous notations,

$P_{0,i,t}$ is the level of poverty measured by the headcount index of province i at time t (per cent)

$INMIGRANT_{i,t}$ is recent non assisted in-migration rates (1/1000) in province i at time t.

$TRANSMIGRANT_{i,t}$ is recent assisted in-migration rates (transmigration rates) (1/1000) in province i at time t.

$OUTMIGRANT_{i,t}$ is recent out-migration rates (1/1000) in province i at time t.

As in Chapter Six, the negative sign of the coefficient of mean consumption per capita is expected, whereas the Gini index is expected to have a positive relationship with poverty.

Therefore, in addition to the recognition of individual fixed effect in the panel data estimation, equation 7.3 is expanded to take into account the possibility of the different impact of the same variables in different groups of provinces. The following interactions are examined.

The interactions between groups of provinces based the Hill province grouping; the resource rich provinces (*RICH*), the isolated provinces (*ISO*), the settled Outer Island provinces (*SETT*), and the sparsely populated provinces (*SPAR*) and non-assisted in-migration (*INMIGRANT*), assisted in-migration (*TRANSMIGRANT*) and out-migration (*OUTMIGRANT*) are added to equation 7.3 to examine whether there are regional effects in relation to the role of migration on poverty, after controlling for other variables (equations 7.4-7.6).

For the analysis of the regional impact of *INMIGRANT* and *OUTMIGRANT* (models 7.4 and 7.5), the base category is the densely populated provinces (ϑ_1 = is the coefficient of *INMIGRANT* for densely population provinces in equation 7.4 and ξ_1 = is the coefficient of *OUTMIGRANT* for densely population provinces in equation 7.5).

$$\begin{aligned} \ln P_{0,i,t} = & \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \gamma_3 \ln EDU_{i,t} + \gamma_4 \ln ROAD_{i,t} + \gamma_5 MOG_{i,t} + \\ & \gamma_6 \ln TRADE_{i,t} + \vartheta_1 INMIGRANT_{i,t} + \vartheta_2 SPAR * INMIGRANT_{i,t} + \vartheta_3 RICH * INMIGRANT_{i,t} + \\ & \vartheta_4 ISO * INMIGRANT_{i,t} + \vartheta_5 SETT * INMIGRANT_{i,t} + \gamma_8 TRANSMIGRANT_{i,t} + \\ & \gamma_9 OUTMIGRANT + \gamma_{10} \ln INPRESCAP_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \epsilon_{i,t} \end{aligned} \quad (7.4)$$

$$\ln P_{0,i,t} = \gamma_0 + \gamma_1 \ln MEAN_{i,t} + \gamma_2 \ln GINI_{i,t} + \gamma_3 \ln EDU_{i,t} + \gamma_4 \ln ROAD_{i,t} + \gamma_5 MOG_{i,t} + \gamma_6 \ln TRADE_{i,t} + \gamma_7 INMIGRANT + \xi_1 OUTMIGRANT_{i,t} + \xi_2 SPAR * OUTMIGRANT_{i,t} + \xi_3 RICH * OUTMIGRANT_{i,t} + \xi_4 ISO * OUTMIGRANT_{i,t} + \xi_5 SETT * OUTMIGRANT_{i,t} + \gamma_9 TRANSMIGRANT_{i,t} + \gamma_{10} \ln INPRESCAP_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (7.5)$$

For analysis of the regional impact of transmigrants (equation 7.6), the number of observations is limited to the Outer Islands since there was no transmigration program in the densely populated Java-Bali region. Therefore the base category is Lampung (θ_1 = is the coefficient of *TRANSMIGRANT* for Lampung).

$$\ln P_{0,i,t} = \phi_0 + \phi_1 \ln MEAN_{i,t} + \phi_2 \ln GINI_{i,t} + \phi_3 \ln EDU_{i,t} + \phi_4 \ln ROAD_{i,t} + \phi_5 MOG_{i,t} + \phi_6 \ln TRADE_{i,t} + \phi_7 INMIGRANT + \theta_1 TRANSMIGRANT_{i,t} + \theta_2 SPAR * TRANSMIGRANT_{i,t} + \theta_3 RICH * TRANSMIGRANT_{i,t} + \theta_4 ISO * TRANSMIGRANT_{i,t} + \theta_5 SETT * TRANSMIGRANT_{i,t} + \phi_9 OUTMIGRANT_{i,t} + \phi_{10} \ln INPRESCAP_{i,t} + \sum_{e=1}^{e=6} \beta_e d_t + \delta_i + \varepsilon_{i,t} \quad (7.6)$$

As in Chapter Six, a rule of thumb test for multicollinearity is applied (Griffiths, Hill and Judge, 1993).

7.7. Empirical Results

7.7.1. Regional Growth-Indirect Channels

The growth estimation, as shown in Table 7.4, confirms the hypotheses that Gini equality, human capital and natural resources are significant in explaining regional growth. It also confirms the results presented in Table 6.1 are robust.

The results most consistent with the hypotheses are given by the human capital, natural resources, the Gini coefficient, in-migration, transmigration and out-migration variables.

**Table 7.4. The Determinants of Regional Growth
(with Migration and Intergovernmental Transfers)**

Explanatory Variable	(1)	
	GMM Estimate	
<i>lnlagMEAN</i>	-0.19 (-2.03)	*
<i>lnGINI</i>	0.36 (2.90)	***
<i>lnEDU</i>	0.38 (1.97)	*
<i>lnROAD</i>	0.02 (0.38)	
<i>MOG</i>	-0.01 (-2.92)	***
<i>lnTRADE</i>	0.02 (0.46)	
<i>lagINMIGRANT</i>	0.0016 (1.80)	*
<i>lagTRANSMIGRANT</i>	-0.011 (-1.43)	#
<i>lagOUTMIGRANT</i>	0.0034 (2.54)	**
<i>lnINPRESCAP</i>	-0.03 (-0.82)	
cons	-0.01 (-0.59)	
Sargan test of over-identifying restrictions		
chi2 (71)	72.43	
Prob > chi2	0.43	
Arellano –Bond test that average autocovariance in residuals of order 1 is 0 (H0=no autocorrelation)		
z	-2.99	
Pr > z	0.0028	
Arellano –Bond test that average autocovariance in residuals of order 1 is 0 (H0=no autocorrelation)		
z	-1.15	
Pr > z	0.25	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # denotes significance at the 15% level. GMM means Generalized Moments Method estimates. Figures in parentheses are z ratios. The estimation includes year dummies. Number of observations are 127.

Thus the finding on the coefficient of human capital discussed earlier is robust, in that the average years of schooling is significant and positively associated with growth (0.38). Given migration and transfers, the coefficient is slightly higher than the coefficient of this variable in Table 6.1 (0.33). This is probably due to the

impact of the human capital of in-migrants which contributed to the stock of human capital of the total population. Moreover, in-migrants bring their 'workforce experience', provided by years in the workforce.

The sign of the coefficient of natural resources is negative and significant, although the impact is small. As we noted above, the negative coefficient can be explained by the fact that most of the revenue of these mining activities was not invested back to the producing provinces, especially prior to the decentralisation period in 2001.

Similarly, in connection with the ambiguous nature of the proposed hypothesis on the sign of Gini inequality on growth, the estimated positive and significant sign for the Gini coefficient confirms the finding of Forbes (2000),³² as argued earlier in Chapter Six. It is possible the growth rate in Indonesia in the medium term period (here, 18 years) was directly related to the proportion of income that was saved, with the rich tending to save and consume more than the poor. Furthermore, as discussed earlier in Chapter Six, the positive relationship between inequality and growth might also be due to the presence of several outliers.

A positive sign for the relationship between non assisted in-migration and economic growth is found through both quantity and the human capital channels, as these migrants brought their human capital with them (which is higher than the human capital on average in the destination provinces) to seek higher incomes in the destination regions. These migrants increased labour supply, and contributed to economic growth, with a lag. An increase in the non-assisted in-migration rate by one per cent raised income by 0.16 per cent.

³² Using cross country panel data estimation, Forbes (2000) estimated growth as a function of initial inequality, income, male and female human capital, market distortions, country and period dummy variables. She found a positive relationship between inequality and economic growth. She criticised most empirical works which predict this negative relationship as not being robust, as had also been found by Deininger and Squire (1998). Nevertheless, this positive impact of inequality on growth may be restricted to short and medium term relationships since the findings were based on 5 year and 10 year panels, when compared with the earlier empirical works which covered 25 or 30 years.

In contrast to the non-assisted in-migration, the human capital channel is not expected to play a role in assisted in-migration, since it is assumed that most of transmigrants were low skilled. Although there were some spillover effects from the transmigration to local residents and the environment (World Bank, 1988), in the longer term the impact did not appear to be conducive to growth. An increase in the transmigration rate decreased growth by 1.1 per cent.

It has been argued earlier that at least two years were needed to see whether the transmigrants independent from the central government. Nonetheless, as revealed in Table 7.4, the impact was income reducing, indicating that not enough of these transmigrants were successful.

The story of Lampung as a transmigration destination can be cited as an example of these phenomena. Transmigration to Lampung adversely affected the economy not only because of the difficulties faced by the transmigrants themselves (for example, poor settlement sites) but also because the socioeconomic indicators in this province deteriorated following the transmigration, which caused transmigrants to experience even poorer conditions than in their previous situation in Java (Hill, 2000). As Bakir and Humaidi (1989) argued, health and education facilities in this province were poor. Lampung was still agricultural based, with a low manufacturing share to total RGDP and employment. Therefore the impact was to diminish growth in the destination provinces, which then in turn associated with an increase in absolute poverty.

The impact of out-migration is positive and significant on growth, which suggests the impact of the remittances outweighed any the brain drain effects from migration. It may also indirectly indicate, that higher educated migrants tended to send the remittances back home more regularly, contrary to what Faini (2003) found. The positive impact of out-migration on growth in provinces of origin (or the less developed regions) shows the possible impact of remittances to reverse the negative geographic externalities that the less developed regions have.

The findings are not significant for infrastructure, openness and intergovernmental transfers of INPRES per capita. However, the sign of the coefficients of openness

and infrastructure confirm the proposed indirect hypotheses, but not for INPRES. It is possible that INPRES did not lead to a more efficient allocation of public resources. This finding supports the earlier literature on the impact of fiscal decentralisation which led to slower growth in China (Zhang and Zou, 1998).

It is surprising that there is no significant impact of openness on growth, although the sign is as expected. These findings are similar to the findings in Chapter Six and support Dollar and Kraay (2002) who argued that their finding lack of association between openness and growth was based on the smaller observations; given the requirement that for GMM estimations (which is basically First Difference), there are additional lags of endogenous variables used as instruments. This also applies to the finding here, that the total number of observations in the growth estimation is 127, instead of 171 for all observations. However, the lack of significance of the openness variable may also be related to how this variable is measured with various shortcomings, as discussed in Chapter Six.

The diagnostic tests show that the Sargan test fails to reject the over-identifying restriction which indicates the homoskedasticity of the data set, therefore the coefficients are robust as in Chapter Six. Using the Arellano Bond test, the null hypothesis of no first-order autocorrelation is rejected meaning that AR(1) presents (with p-value of 0.0028), but the null hypothesis of no second-order autocorrelation is accepted (with p-value of 0.25) to prove that there is no AR (2). So the Sargan test and the second-order serial correlation test indicate that the instruments used in the GMM estimation are valid.

7.7.2. Regional Poverty-Direct Channels

The findings indicated in Table 7.5 also support the previous discussion in Chapter Six (see again Table 6.4) on the role of the common determinants of poverty, since their sign and coefficients are stable and almost similar in magnitude even after being controlled for migration and intergovernmental transfers variables.

Table 7.5, column 1 (estimation for equation 7.2) and column 2 (estimation for equation 7.3) show that, after controlling for the Gini coefficient and other

variables, the growth elasticity of poverty (GEP) was at around -2.5 during 1984-2002, which means that a 10 per cent increase in mean consumption per capita would reduce the absolute poverty headcount by 25 per cent, which is comparable and consistent with the findings from other countries.

Table 7.5. The Determinants of Regional Poverty - Fixed Effects
(with Migration and Intergovernmental Transfers)³³

Explanatory Variable	With Migration		With Migration and Intergov. Transfers	
	(1)		(2)	
	FE Estimate		FE Estimate	
<i>lnMEAN</i>	-2.48 *** (-21.93)		-2.45 *** (-21.03)	
<i>lnGINI</i>	0.95 *** (6.04)		0.93 *** (5.92)	
<i>lnEDU</i>	0.14 (0.59)		0.11 (0.47)	
<i>lnROAD</i>	-0.10 ** (-1.95)		-0.11 ** (-2.14)	
<i>MOG</i>	-0.0020 (-0.78)		-0.0020 (-0.76)	
<i>lnTRADE</i>	0.08 * (1.82)		0.09 * (1.93)	
<i>INMIGRANT</i>	0.0015 # (1.45)		0.0014 (1.36)	
<i>TRANSMIGRANT</i>	-0.0027 (-0.28)		-0.0058 (-0.57)	
<i>OUTMIGRANT</i>	0.0002 (0.14)		-0.0002 (-0.15)	
<i>lnINPRESCAP</i>			0.05 (1.02)	
<i>d87</i>	-0.03		0.01	
<i>d90</i>	0.00		0.01	
<i>d93</i>	-0.07		-0.07	
<i>d96</i>	-0.35 ***		-0.34 ***	
<i>d99</i>	-0.24 *		-0.22 *	
<i>d02</i>	-0.34 ***		-0.40 ***	
<i>cons</i>	29.88 ***		29.15 ***	
<i>R-sq within</i>	0.90		0.90	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # Denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios.

³³ As in Chapter 6, for P1 and P2, only mean consumption per capita and gini inequality which have a significant impact on P1 and P2 with negative growth elasticity of poverty and positive gini elasticity of poverty.

The impact of the Gini index to poverty was small with a positive elasticity at around 0.9, which is lower than Friedman's (2005) finding of a coefficient between 1.3-1.9 (even after excluding the role of other determinants, leaving growth of income and the Gini coefficient as the only determinants). This means a ten per cent increase in Gini increased the poverty headcount by 9 per cent. In contrast to the GDP, the Gini elasticity of poverty was much smaller than that reported in cross country and other single country literature.

Intuitively then, combining the GDP and the Gini elasticity of poverty, the net impact of the growth elasticity of poverty was around -1.60 ($-2.5+0.9$) after the adjustment for inequality.

Apart from growth and Gini inequality, the most plausible direct result is given by infrastructure. Given other determinants, Table 7.5 shows the paved road length per capita is significant although it only has a small elasticity (-0.10 to -0.11). Thus, a 10 per cent increase in the length of paved roads per capita (km per 1000 persons) reduced poverty headcount by only 1 – 1.1 per cent. Other studies also confirmed the negative impact of road variables on poverty, regardless of what kind of measurement was used. This result is lower than the impact of road length per capita on poverty based on the \$1 per day poverty line for cross country studies which was found to be -0.35 (Jalilian and Weiss, 2006).

As found in Chapter Six, the component of oil and gas (MOG) as a share of Regional Gross Domestic Product is negative but not significant.

Further, the other determinants - the coefficient of human capital, openness, non assisted and assisted in-migrations variables and intergovernmental transfers - have opposite signs.

The coefficient for stock of human capital, which is represented by (average years of schooling, is surprisingly positive although it has no significant impact on poverty, as indicated in Table 7.5.

This finding is similar to that in Chapter Six (refer to Table 6.4). Similar explanations as in Chapter Six apply: in addition to Pritchett's (2001) criticism that the average years of schooling do not capture the quality of education, it is also possible that (i) the average years of schooling measure does not pick up the distribution of this variable across provinces, or that (ii) there are some regional or growth episodes effects related to this variable as discussed earlier in Chapter Six. Earlier analysis in Chapter Six found human capital had a negative relationship with poverty during the second period of liberalisation. This result also holds for Table 7.5, if interactions between growth episodes and human capital are incorporated (see Table 7.C.2 in Appendix 7.C, cross reference with Table 6.7 or 6.8). Similarly, the results on the regional effect of human capital presented in Tables 6.5 and 6.6 also hold in Table 7.5 if the interactions between the Hill province grouping and education are incorporated (see Table 7.C.1 in Appendix 7.C). The results show that human capital in the settled Outer Island provinces had a significant impact and higher elasticity in reducing poverty.

Nevertheless, the finding on the lack of a statistically significant relationship between education and poverty is similar with Balisacan and Pernia (2002) for the Philippines and Balisacan, Pernia and Asra (2003) for Indonesia, that education itself is not directly related to poverty. As in Chapter Six, the impact of investment in human capital is indirect through economic growth.

Openness has an adverse positive robust relationship with poverty even though the coefficient is small, as indicated in Table 7.5 (0.08-0.09). Similar to Chapter Six, there are several explanations for this finding. It confirms the impact of openness on poverty, like schooling, is likely to work indirectly, through economic growth (although in this case, as indicated in Table 7.4, openness also fails to support the link to growth). Yet it is possible that only those who had certain minimum human capital endowments or semi-skilled workers and wage earners could take advantage of new opportunities created by more intensive trade. Those who were poor, who worked in the subsistence agriculture sector and lived in the isolated regions and were not wage earners and consequently may not

benefit directly from openness (Winters, McCulloch and McKay, 2004).³⁴ As discussed earlier in Chapter Six, Friedman (2000) found the poor in rural areas in Indonesia benefited least from the liberalisation. Controlling for a range of other factors, openness does not have an independent effect on poverty.

As a consequence, openness was not a direct poverty alleviation strategy, a finding which is supported by the work of Dollar and Kraay (2002) in cross-country analysis, who found that there is either an insignificant impact or a negative impact of the openness variable on the average income of the poor (bottom 20 per cent of the population).

What is the direct impact of interprovincial migration on poverty? Surprisingly, the results are the opposite to our expected findings for the migration variables. Non-assisted in-migration contributes positively to poverty in the destination province, and the coefficient is significant (Table 7.5 column 1). There is a direct contribution of this variable to absolute poverty. The positive sign shows that although in-migration in Indonesia was dominated by migrants who were better educated, in the short term, they might have become a burden in the destination provinces if they could not find job immediately, especially as most of these in-migrants moved to big cities.

The regression suggests that an increase in the non-assisted in-migration rate raised poverty by 0.15 per cent.³⁵ Nevertheless, the in-migration variable was not significant, after being controlled for intergovernmental transfers (column 2 in the table). In this case the coefficient is not robust. The impact of non-assisted in-migration on poverty is therefore inconclusive.

Contrary to the role of non-assisted migration, the sign for the coefficient for assisted migration or transmigration is negative. This might be explained by the

³⁴ Other studies also highlighted the small employment effects of trade liberalisation, as summarised in Winters, McCulloch and McKay (2004).

³⁵ This is a log lin (semilog) model interpretation for the coefficient of non-assisted in-migration variable. It is a percentage change in poverty for an absolute change in non-assisted in-migration if multiplied by 100 (Gujarati, 1995). Similar interpretations applied for assisted in-migration (transmigration), out-migration and natural resources.

fact that transmigrants came to the destination provinces with financial government assistance. Nevertheless, the impact is not significant.

In contrast, the impact of out-migration on poverty is also inconclusive, since it has a positive sign in Table 7.5 in column 1 but a negative (although not significant) in column 2. In general, the coefficient is not stable. The impact of non-assisted in-migration, transmigration and out-migration on poverty seems to be mainly indirect (through growth). As shown earlier in Table 7.4, transmigration has a negative impact on growth which can then be associated positively with poverty whereas for out-migration, the impact on growth is positive.

Of course, the unstable coefficient of non-assisted in-migration and the lack of a significant relationship between transmigration and out-migration and poverty may indicate different effects across regions. This point is pursued in more detail in the next section.

Apart from its effect through growth (although not significant), transfers per capita proxied by INPRES per capita have an unexpected positive sign, although not significant, as shown in Table 7.5. Several explanations might be relevant. First, there is the problem of data comparability. As discussed, prior to 2002 INPRES was the transfer mechanism whereas, in the decentralisation period, the General Equalisation Fund (DAU) data are used in 2002.³⁶ The data are not directly comparable for two reasons. There was a huge jump in terms of per capita DAU compared with INPRES per capita for each province after 2001, and most of the DAU was used to pay the government officials' salaries. Unfortunately, no decomposition of DAU data is available (that is, separating out salary payments from more general purpose grants).

Second, the findings support Booth (2000) that INPRES was not designed specifically as a poverty alleviation strategy, but more for development purposes. This might relate to the fact that not all types of INPRES are relevant for poverty alleviation. As discussed earlier, some types of INPRES, such as INPRES for

³⁶ The author tries to drop year 2002 from the estimation, but it does not change the finding on INPRES.

elementary schooling, health, and road development, were more important for poverty reduction. Nevertheless, details of the composition are not available for all periods of analysis. This issue deserves further investigation.

Third, intuitively, examination of the relationship between INPRES and the level of poverty (P0) might not give the best estimate, since it is unlikely that an instantaneous allocation of INPRES will have an instant impact on the level of poverty for each year under analysis. Especially, for provinces which had a consistently high absolute poverty headcount, an INPRES allocation in a specific year might not have an impact on the level of poverty in that year.

Therefore, as argued by Wooldridge (2003), an alternative estimation of First Difference (FD) which is commonly used to analyse the impact of one specific policy across time and cross sectionally is also carried out. The question becomes whether the changes in the poverty rate are explained by the change in the INPRES allocation (equation 7.7).

$$\begin{aligned}
 d \ln P_{0,i,x} = & \lambda_0 + \gamma_1 d \ln MEAN_{i,x} + \lambda_2 d \ln GINI_{i,x} + \lambda_3 d \ln EDU_{i,x} + \lambda_4 d \ln ROAD_{i,x} + \lambda_5 d \ln MOG_{i,x} + \\
 & \lambda_6 d \ln TRADE_{i,x} + \lambda_7 d \ln INMIGRANT_{i,x} + \lambda_8 d \ln TRANSMIGRANT_{i,x} + \lambda_9 d \ln OUTMIGRANT_{i,x} + \\
 & \lambda_{10} d \ln INPRESCAP_{i,x} + \sum_{e=1}^{e=6} \beta_e dy_t + \delta_i + \varepsilon_{i,t}
 \end{aligned}
 \tag{7.7}$$

Where in addition to previous notation,

$x = t_{+3} - t$ where if 1984 is t and 1987 is t_{+3} , therefore

$d \ln P_{0,i,87-84} = \ln P_{0,i,87} - \ln P_{0,i,84}$ and similar relationship for the explanatory variables.

However, surprisingly, the results of FD in Table 7.6 column 1 (model 7.7) do not improve the estimation by FE in Table 7.5 column 2.

**Table 7.6. The Determinants of Regional Poverty - First Difference
(The Role of Intergovernmental Transfers)**

Explanatory Variable	1984-1990		1993-2002	
	(1) FD Estimate	(2) FD Estimate	(3) FD Estimate	
dlnMEAN	-2.19 *** (-15.77)	-2.19 *** (-11.39)	-2.12 *** (-11.17)	
dlnGINI	0.99 *** (6.2)	1.21 *** (6.2)	0.79 *** (3.44)	
dlnEDU				
-Average Years of Schooling	0.18 (1.02)	-1.02 (1.31)	0.36 (0.72)	
dlnROAD	-0.10 * (-1.76)	0.05 (0.43)	-0.13 ** (-2.10)	
dMOG	0.0070 (1.02)	0.0180 * (1.73)	0.0053 (0.64)	
dlnTRADE				
-(Export+Import)/RGDP	0.04 (0.80)	0.02 (0.27)	0.06 (0.87)	
dINMIGRANT	0.0016 (1.10)	0.0003 (0.08)	0.0023 (1.33)	
dTRANSMIGRANT	0.0150 (0.67)	0.0105 (0.52)	-0.0140 (-0.27)	
dOUTMIGRANT	-0.0007 (-0.03)	-0.0035 (-0.57)	0.0013 (0.47)	
dlnINPRESCAP	0.03 (0.62)	-0.13 (-0.64)	0.05 (0.39)	
d87		-0.20		
d90	-0.02			
d93	-0.10 #			
d96	-0.28 ***		-0.16 ***	
d99	0.14 ***		0.23 ***	
d02	-0.18		-0.11	
cons	0.01 (0.21)	0.26 # (1.45)	-0.1044 * (-1.63)	
R-sq within	0.83	0.83	0.80	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # denotes significance at the 15% level. FD means First Difference estimates. Figures in parentheses are t ratios. d means delta.

There is still a positive impact from the change in INPRES on the change in the poverty index although, similar to Table 7.5 column 2, that the impact is not significant. The results on FE in Table 7.5 column 2 are comparable with Table 7.6 column 1, showing that growth, the Gini and infrastructure give robust findings with expected signs, although in terms of magnitude, the growth elasticity of poverty (GEP) given by FD was lower than GEP by FE.

The periods of INPRES allocation are divided into two periods: (i) 1984-1990, as shown in Table 7.6 column 2, when INPRES was not yet focused on the small and less developed provinces, and (ii) 1993-2002, as indicated in Table 7.6 column 3, the periods when there was specific Less Developed Village INPRES which was aimed at reducing rural poverty and the period when INPRES began to be more oriented towards less prosperous provinces.

Whereas the growth elasticity of poverty is stable across two periods, the impact of Gini inequality on poverty was higher during the first period ($1.2 > 0.8$). Nevertheless the impact is still lower compared to cross country and other countries' findings. Infrastructure was only significant during the periods 1993-2002.

Interestingly, for the variable of interest, the intergovernmental transfers, the finding from FD could not validate the hypotheses. The coefficient of this variable is still not significant, and although it gives "a correct" sign during 1984-1990, it does not do so in 1993-2002. The finding is puzzling and there is still no clear explanation. To conclude, FD does not give different results compared to FE. The second explanation provided by Booth (2000) earlier and the fact that not all INPRES are relevant for poverty reduction seems to be the best explanations as to why INPRES is not significant.

Across the Hill province grouping (The Regional Effects)

To see whether migration has different impacts between regions, the estimation (model 7.3) is expanded by incorporating the impact of different groups of provinces based on the Hill province grouping (in order to analyse whether non-assisted in-migration and out-migration have different impacts in the densely populated provinces, in isolated and the resource rich provinces, in the settled Outer Islands, and in the sparsely populated provinces). The methodology to assess this regional effect has been discussed in section 7.6, where there are interactions between non assisted in-migration and the groups of provinces (*RICH*INMIGRANT*, *ISO*INMIGRANT*, *SPAR*INMIGRANT*, *SETT*INMIGRANT*). The base category is the densely populated provinces. Thus, the coefficient of *RICH*INMIGRANT* for example is interpreted as the

deviation from the coefficient of *INMIGRANT* in the densely populated provinces. As discussed earlier, the estimation for transmigration is only limited to the Outer Islands, since the densely populated provinces did not accept any transmigrants. Accordingly the base category is Lampung, which is the only Outer Islands province in the densely populated category.

The results are presented in Table 7.7 columns 1-3 (with *MOG*=oil and gas) and columns 4-6 (without *MOG*), since there are multicollinearity problems between *RICH*INMIGRANT*, *RICH*TRANMIGRANT* and *RICH*OUTMIGRANT* with *MOG*. Although, the results in columns 1-3 are comparable with the results in columns 4-6, the interpretation and discussion will be based on the best form of estimations in columns 4-6.

For the following results (equations 7.4-7.6), the Fixed Effect (FE) rather than the First Difference (FD) model is presented again, mainly for following reasons :

1. FD does not give different estimation results compared to FE (see Table 7.6)
2. FE is more efficient than FD since it uses all the information available (no missing observations)

In general, the coefficients of growth, Gini inequality, and infrastructure are significant and supporting the proposed hypotheses. The coefficient of natural resources is not significant and does not support the proposed hypothesis on the positive relationship between the presence of oil and gas and poverty.

As in earlier discussions, human capital gives an unexpectedly insignificant result. Similarly, openness gives an opposite result to that hypothesised and has a significant impact on poverty.

The unexpected direct result for non-assisted in-migration is analysed more thoroughly through its regional impact. In-migration in the resource rich, densely populated and settled Outer Island provinces, contributed positively to poverty, although the relationship was not statistically significant.

Table 7.7. The Determinants of Regional Poverty – The Regional Effects

Explanatory Variable	Transmigration- OI			Transmigration- Without MOG			Transmigration- Without MOG		
	In-migration		Out-migration	In-migration		Out-migration	In-migration		Out-migration
	With MOG	Without MOG		With MOG	Without MOG		With MOG	Without MOG	
	(1)	(2)	(3)	(4)	(5)	(6)			
	FE Estimate	FE Estimate	FE Estimate	FE Estimate	FE Estimate	FE Estimate			
<i>lnMEAN</i>	-2.44 *** (-20.63)	-2.45 *** (-21.14)	-2.3 *** (-17.01)	-2.44 *** (-20.69)	-2.45 *** (-21.02)	-2.31 *** (-17.06)			
<i>lnGINI</i>	0.96 *** (6.04)	1.03 *** (6.51)	0.89 *** (5.15)	0.95 *** (6.03)	1 *** (6.36)	0.88 *** (5.06)			
<i>lnEDU</i>	0.02 (0.08)	0.16 (0.68)	0.01 (0.05)	-0.004 (-0.01)	0.14 (0.58)	0 (-0.01)			
<i>lnROAD</i>	-0.1 * (-1.94)	-0.12 * (-2.33)	-0.15 * (-2.67)	-0.1 ** (-1.91)	-0.11 * (-2.16)	-0.14 * (-2.55)			
<i>MOG</i>	-0.0014 (-0.52)	-0.0039 (-1.50)	-0.004 (-1.37)						
<i>lnTRADE</i>	0.07 # (1.55)	0.05 (1.08)	0.1 ** (2.21)	0.08 * (1.62)	0.06 (1.28)	0.11 ** (2.23)			
<i>INMIGRANT</i>	0.00246 (1.1)	0.0015 (1.48)	0.00071 (0.65)	0.00246 (1.1)	0.0015 # (1.47)	0.00067 (0.6)			
<i>RICH*INMIGRANT</i>	-0.0007 (-0.29)			-0.0007 (-0.26)					
<i>ISO*INMIGRANT</i>	-0.0012 (-0.12)			-0.0025 (-0.25)					
<i>SETT*INMIGRANT</i>	0.0041 (0.96)			0.004 (0.93)					

Table 7.7. The Determinants of Regional Poverty – The Regional Effects, *Continued*

Explanatory Variable	In-migration		Out-migration		Transmigration-OI		In-migration		Out-migration		Transmigration-OI	
	With MOG		With MOG		With MOG		Without MOG		Without MOG		Without MOG	
	FE Estimate	(1)	FE Estimate	(2)	FE Estimate	(3)	FE Estimate	(4)	FE Estimate	(5)	FE Estimate	(6)
<i>SPAR*INMIGRANT</i>	-0.0047	#					-0.0049	**				
	(-1.56)						(-1.64)					
<i>TRANSMIGRANT</i>	-0.0068		-0.0087		-0.0155		-0.006		-0.0063		-0.0108	
	(-0.67)		(-0.87)		(-0.39)		(-0.60)		(-0.64)		(-0.27)	
<i>RICH*TRANSMIGRANT</i>					0.0187						-0.0326	
					(0.21)						(0.4)	
<i>ISO*TRANSMIGRANT</i>					0.4837						0.4278	
					(1.37)						(1.22)	
<i>SETT*TRANSMIGRANT</i>					0.1048	*					0.0968	*
					(1.84)						(1.7)	
<i>SPAR*TRANSMIGRANT</i>					0.0028						0.0011	
					(0.07)						(0.03)	
<i>OUTMIGRANT</i>	-0.001		-0.0014		0.0009		-0.0088		-0.0018		0.0008	
	(-0.60)		(-0.59)		(0.42)		(-0.52)		(-0.78)		(0.38)	
<i>RICH*OUTMIGRANT</i>			-0.0042						-0.0034			
			(-0.99)						(-0.81)			
<i>ISO*OUTMIGRANT</i>			0.0104	**					0.0313	*		
			(1.59)						(1.87)			
<i>SETT*OUTMIGRANT</i>			0.008	**					0.0077	**		
			(1.99)						(1.91)			

Table 7.7. The Determinants of Regional Poverty – The Regional Effects, *Continued*

Explanatory Variable	Transmigration-OI			
	In-migration	Out-migration	Transmigration-OI	
	With MOG (1)	With MOG (2)	With MOG (3)	Without MOG (6)
	FE Estimate	FE Estimate	FE Estimate	FE Estimate
<i>SPAR*OUTMIGRANT</i>		0.0041 (1.23)		0.0038 (1.15)
<i>lnNPRESCAP</i>	0.04 (0.79)	0.03 (0.7)	0.06 (0.97)	0.05 (0.92)
d87	0.02	-0.01	0.04	0.05
d90	0.03	-0.02	0.1	0.11
d93	-0.04	-0.09	-0.03	-0.01
d96	-0.31 **	-0.37 ***	-0.31 *	-0.28 **
d99	-0.18	-0.26 **	-0.15	-0.13 *
d02	-0.34 *	-0.44 ***	-0.35 **	-0.33 **
cons	29.16 ***	29.09 ***	27.48 **	27.67 ***
R-sq within	0.9	0.91	0.91	0.91

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # Denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios. OI is Outer Islands. Results are robust even if INPRES is excluded. The impact of regional effect on in-migrants, out-migrants and transmigrants cannot be incorporated in one estimation due to (i) transmigrant destinations are only valid in the Outer Islands, and (ii) there is a multicollinearity problem between the interaction of the regional dummies and in-migration with the interaction of the regional dummies and out-migration. Number of observations are 171 for columns (1), (2), (4) and (5) while they are 127 for columns (3) and (6).

As can be seen in Table 7.7 column 4 (which excludes the variable mining, oil and gas from the equation), an increase in the non-assisted in-migration rate increased the poverty headcount in provinces by 0.18 per cent in the resource rich provinces, 0.25 per cent in the densely populated provinces, and 0.65 in the settled Outer Island provinces (as also can be seen in Table 7.8 on the Summary of Migration Elasticity on Poverty).

Table 7.8. Summary of the Migration Elasticity of Poverty by the Hill Province Grouping 1984-2002

Hill Province Grouping	In-migration	Out-migration	Transmigration Outer Islands
1. Resource rich provinces	0.18	-0.52	-4.34
2. a) Densely populated provinces	0.25	-0.18	
b) Lampung			-1.08
3. Settled Outer Islands provinces	0.65	0.59	*) 8.6
4. Sparsely populated provinces	-0.24	*) 0.38	-0.97
5. Isolated provinces	-0.004	2.95	*) 41.7

Source : Author's summary

Note : *) significant

The inducements for in-migration are mainly economic in these groups of provinces, especially for the resource rich and densely populated provinces. However, the results suggest non-assisted in-migrants who move to the densely populated provinces might have had difficulty in finding jobs even though they were better educated than the average among the local population in the destination provinces, especially in big cities such as Jakarta and Bandung (West Java).³⁷

This finding is supported by the fact that there was a high unemployment rate in the resource rich, densely populated and settled Outer Islands provinces. As indicated in Table 7.9, the unemployment rate was high in these groups of provinces at more than four per cent.

³⁷ In addition, the positive contribution of in-migrants in the densely populated provinces may also be because there were a lot of returned migrants who were unsuccessful.

Table 7.9. The Unemployment Rate by Provinces 1984-2002

No	Provinces	Unemployment rate ³⁸ (per cent)
1	Aceh	4.1
4	Riau	4.8
20	East Kalimantan	5.8
26	Papua	3.0
Resource Rich Provinces		4.4
8	Lampung	2.6
9	DKI Jakarta	9.4
10	West Java	5.7
11	Central Java	3.1
12	DI Yogyakarta	2.9
13	East Java	3.0
14	Bali	2.1
Densely Populated Provinces		4.1
15	West Nusa Tenggara	2.0
16	East Nusa Tenggara	1.6
Isolated Provinces		1.8
2	North Sumatra	4.2
3	West Sumatra	3.9
6	South Sumatra	3.5
19	South Kalimantan	2.9
21	North Sulawesi	5.6
23	South Sulawesi	4.4
Settled Outer Islands Provinces		4.1
5	Jambi	2.9
7	Bengkulu	2.6
17	West Kalimantan	2.4
18	Central Kalimantan	2.6
22	Central Sulawesi	3.2
24	Southeast Sulawesi	2.7
25	Maluku	3.9
Sparsely Populated Provinces		2.9
National average		4.3

Source : Author's calculation based on CEIC data

In contrast, the impact is poverty reducing in the sparsely populated provinces where an increase in the non-assisted in-migration rate of 10/1000 in the sparsely populated provinces reduced the poverty headcount by 0.24 (0.25-0.49).

³⁸ The unemployment rate is not a very useful indicator of the comparative labour market condition (Manning, 1998). Nevertheless, in this case the unemployment rate does have some relationship with migration and poverty. Although the unemployment rate was lowest in the isolated provinces, other factors prevented people coming to these provinces.

This finding might be related to the fact that the unemployment rate in the sparsely populated provinces was relatively low in 1984-2002 (2.9 per cent). Moreover, non-assisted in-migration may have been poverty reducing through the impact of rapid expansion of the labour intensive palm oil sector in these regions.

The relationship between out-migration and poverty in the resource rich and densely populated provinces is negative although not significant. In contrast, the relationship is positive and significant for both the settled Outer Islands and the isolated populated provinces, whereas it is not significant for the sparsely populated provinces. For the latter, this might indicate the existence of brain drain, assuming those who moved had relatively higher human capital (as shown in Table 7.2, the level of stock of human capital of out-migrants was higher than that of in-migrants in these groups of provinces). Therefore, those who moved out already had a higher income status than the population who chose to stay, contributing to higher poverty in these groups of provinces. An increase in out-migration rate in the settled Outer Islands increased the poverty headcount by 0.59 per cent, 2.95 per cent in the isolated provinces, and 0.38 per cent in the sparsely populated provinces. For the isolated provinces, the brain drain impact was even more severe, as these provinces consistently had a consistently higher poverty headcount index.

It is also found that the direct impact of transmigration in Lampung, the base category, and the resource rich provinces is associated negatively with poverty although the impact is not significant. This might reflect the existence of government assistance which could counter the positive impact of transmigration on poverty. Nevertheless, it is not the case with the settled Outer Islands, sparsely populated, or isolated provinces, where transmigration had a positive relationship with poverty although only in sparsely populated provinces the impact is statistically significant.

Although it is not the main focus of this chapter, when the impacts of regional transmigration on P1 and P2 in the Outer Island are analysed, it is found that human capital and intergovernmental transfers of INPRES have a negative impact on P1 and P2 which are different from the result for P0. The results can be

seen in the Appendix 7.D and 7.E. The analysis shows that the impact of intergovernmental transfers, *ceteris paribus*, is only significant for the Outer Islands and the impact is limited to those who lived far below the poverty line.³⁹ There is a similar impact for human capital on P1 and P2, that human government intervention in terms of education and basic health facilities are beneficial for the poorest among the poor.

As indicated in Tables 7.7 and 7.8 (summary table), the regional impact of migration variables is limited to sparsely populated provinces, settled Outer Islands and the isolated provinces. Combining all the migration variables, only in-migration in the sparsely populated provinces is significant, while only out-migration in the isolated provinces is significant.

On the other hand, for the settled Outer Islands, both out-migration and transmigration contributed to an increase in the poverty headcount. And the impact was large for the transmigration program.⁴⁰

The impact of INPRES, while similar, it is not significant for the poverty headcount. However there are limited and significant impacts of these intergovernmental transfers variable on poverty gap and severity index.

7.8. Conclusions

This chapter investigates the determinants of regional poverty in Indonesia. The common determinants of poverty included are growth, Gini inequality, natural resources, human capital, and infrastructure. Two new poverty determinants are also added: (i) interprovincial in-migration (both assisted and non-assisted) and out-migration, and (ii) intergovernmental transfers of INPRES. The findings are as follows.

³⁹ Although the main focus of this chapter is on P0, which is not significantly influenced by fiscal transfers, there is some indication that P1 and P2 are affected by fiscal transfers and may contribute to reducing the poverty traps.

⁴⁰ The total impact cannot be quantified since the regional impact of transmigration on poverty was only relevant for the Outer Islands.

First, the growth elasticity of poverty in Indonesia (1984-2002) was -2.5 with a robust Gini elasticity of poverty at 0.9 to 1. While the growth elasticity of poverty is comparable in the cross country literature and single country studies, the Gini elasticity of poverty was much smaller, which may indicate that the Gini coefficient in Indonesia was low and stable for the past 30 years. Second, combining the direct and indirect channels, most results are ambiguous confirming only some of the proposed hypotheses (see Table 7.10 for a summary).

Table 7.10. Summary of the Impact of Each Determinant in the Growth and Poverty Estimations 1984-2002

Explanatory Variables	Indirect Effect		Direct Effect		Total
	sign	Confirm hypothesis ?	sign	Confirm hypothesis?	Confirm Hypotheses ?
Natural resources	- (s)	yes	- (ns)	no	Ambiguous
Openness	+ (ns)	no	+ (s)	no	Unexpected
Human capital	+ (s)	yes	+ (ns)	no	Ambiguous
Infrastructure	+ (ns)	no	- (s)	yes	Ambiguous
Gini inequality	+ (s)	yes	+ (s)	yes	Expected
Non assisted in-migration	+ (s)	yes	+ (s)	no	Ambiguous (with limited regional effect)
Transmigration	- (s)	yes	- (ns)	no	Ambiguous (with limited regional effect)
Out-migration	+ (s)	yes	+/- (ns)	no	Ambiguous (with limited regional effect)
Intergovernmental transfers	- (ns)	no	+ (ns)	no	Unexpected

Source : Author's summary

Note :

+ = has positive impact; - = has negative impact; (s) = significant; (ns) = not significant
yes if the findings confirm the proposed hypothesis with significant and correct sign; no if the findings do not confirm the proposed hypothesis with significant sign.

Ambiguous if the findings confirm some of the proposed hypotheses; Expected if the findings confirm all the proposed hypotheses; Unexpected if the findings do not confirm all of the proposed hypotheses (for total hypotheses).

Interestingly, Gini inequality increased both growth and poverty. Natural resources reduced growth and had no significant impact on poverty, which actually confirms that being rich in oil and gas did not necessarily help poverty

reduction. Human capital only contributed indirectly via increasing growth, whereas infrastructure only contributed directly to reducing poverty.

For migration variables, the hypotheses regarding the indirect channels through growth was confirmed for non-assisted and assisted in-migration, and out-migration. Nevertheless, the hypothesis was not confirmed with regard to the direct effects on poverty, suggesting some regional impacts may be important. For non-assisted in-migration, the positive direct impact suggests these migrants needed time to find jobs in destination provinces, given that the short term impact is to increase the absolute poverty in these provinces, (although the coefficient is not stable). In contrast, the impact of assisted in-migration and out-migration are inconclusive and not significant.

Third, unexpected results which do not support either direct or indirect channels, are obtained for both openness and intergovernmental transfers. For the former measurement errors with regard to the explanatory variable in a sub-national context may have influenced the outcome. Nevertheless, the labour intensive sectors which received a stimulus from greater openness in international trade in the 1980s and 1990s might have still excluded many unskilled among the poor. It is plausible that the latter tended to live in isolated regions and relied mostly on work in the agricultural sector.

The result was also unexpected for intergovernmental transfers of INPRES which has a direct and positive contribution on poverty and a negative impact on regional growth, although this impact is not significant.

Fourth, some regional variations are found in terms of the impact of migration variables on poverty. The impact was limited to the sparsely populated provinces (non-assisted in-migration), the settled Outer Islands (both transmigration and out-migration), and isolated provinces (out-migration).

Finally, high growth, low inequality and the availability of infrastructure were all found to have successful outcomes to alleviate poverty in Indonesia in 1984-2002. In contrast, human capital, non-assisted in-migration and out-migration through

remittances did not directly alleviate poverty but impacted indirectly through economic growth. In contrast, INPRES surprisingly was neither growth enhancing nor poverty alleviating.

Appendix 7.A. The Migration Rates by Provinces and the Hill Province Grouping 1985-2000
Table 7.A. The Migration Rates by Provinces and the Hill Province Grouping 1985-2000

Provinces	In-Migration Rates (1/1000)				Out-Migration Rates (1/1000)				Net Migration Rates (1/1000)			
	1985	1990	1995	2000	1985	1990	1995	2000	1985	1990	1995	2000
1 Aceh	13.5	17.6	7.9	4.0	7.6	15.5	13.4	41.6	5.9	2.2	-5.5	-37.6
4 Riau	39.3	84.8	41.0	119.5	19.6	32.1	35.2	20.7	19.8	52.7	5.9	98.8
20 East Kalimantan	61.2	113.9	66.2	65.3	22.2	39.9	36.3	18.0	39.0	74.0	29.9	47.3
26 Papua	41.8	49.2	29.7	30.7	14.9	21.1	14.8	14.6	26.9	28.2	15.0	16.2
<i>Resource Rich Provinces</i>	34.3	61.3	33.1	59.7	15.0	26.0	25.0	25.6	19.3	35.3	8.2	34.2
8 Lampung	24.00	35.4	18.0	22.3	16.1	22.6	26.2	22.3	7.9	12.7	-8.2	-0.04
9 Jakarta	95.7	103.6	68.5	80.4	55.8	123.5	94.8	97.4	39.9	-19.9	-26.3	-17.0
10 West Java	19.3	40.9	30.0	45.9	12.0	15.0	12.0	22.4	7.2	25.9	18.0	23.5
11 Central Java	6.6	13.9	12.1	11.6	23.2	41.8	25.2	33.4	-16.7	-28.0	-13.1	-21.8
12 Yogyakarta	39.3	55.00	56.7	65.1	35.9	41.1	38.1	42.9	3.4	13.9	18.6	22.2
13 East Java	5.5	10.3	13.2	5.4	11.2	20.4	12.4	15.4	-5.7	-10.0	0.8	-10.0
14 Bali	9.2	24.4	20.5	28.9	10.5	20.7	16.0	15.7	-1.2	3.7	4.6	13.2
<i>Densely Populated Provinces</i>	17.9	29.7	23.6	27.4	18.5	32.2	22.8	28.8	-0.6	-2.4	0.9	-1.4
15 West Nusa Tenggara	9.3	11.7	13.1	15.7	5.4	11.5	10.0	13.3	3.9	0.2	3.1	2.4
16 East Nusa Tenggara	7.00	8.6	9.6	18.9	8.5	14.5	12.6	14.9	-1.6	-5.9	-3.1	4.0
<i>Isolated Provinces</i>	8.1	10.2	11.4	17.3	7.0	13.0	11.3	14.1	1.1	-2.8	0.1	3.2

Table 7.A. The Migration Rates by Provinces and Hill Province Grouping 1985-2000, Continued

Provinces	In-Migration Rates (1/1000)				Out-Migration Rates (1/1000)				Net Migration Rates (1/1000)			
	1985	1990	1995	2000	1985	1990	1995	2000	1985	1990	1995	2000
2 North Sumatera	6.7	11.0	9.7	12.3	18.4	28.2	18.6	31.5	-11.7	-17.2	-9.0	-19.2
3 West Sumatera	21.4	33.7	33.3	25.4	37.7	45.2	34.8	54.6	-16.3	-11.5	-1.5	-29.1
6 South Sumatera	21.0	36.3	19.0	28.3	22.3	34.0	27.7	26.3	-1.3	2.3	-8.8	2.0
19 South Kalimantan	26.0	40.3	25.2	30.4	23.4	31.3	20.6	21.3	2.3	9.0	4.7	9.1
21 North Sulawesi	6.6	14.3	8.6	27.6	13.5	21.1	18.8	31.2	-6.9	-6.8	-10.2	-3.6
23 South Sulawesi	7.7	17.6	18.9	10.2	14.2	23.7	20.5	21.8	-6.5	-6.1	-1.6	-11.5
Settled Outer Island Provinces	12.8	22.5	17.5	19.1	20.6	30.1	23.0	30.3	-7.8	-7.6	-5.5	-11.2
5 Jambi	33.2	72.9	26.1	45.9	20.3	34.2	24.1	34.9	12.9	38.7	2.0	11.0
7 Bengkulu	39.3	78.6	51.0	46.3	16.6	27.1	27.7	24.1	22.7	51.4	23.4	22.2
17 West Kalimantan	7.3	14.5	13.1	12.9	7.00	14.8	9.9	12.0	0.3	-0.3	3.2	0.9
18 Central Kalimantan	31.9	62.3	24.2	71.5	17.5	29.3	28.6	14.3	14.4	33.1	-4.4	57.2
22 Central Sulawesi	19.9	43.1	38.9	36.6	8.5	17.2	15.4	14.9	11.4	25.9	23.5	21.6
24 Southeast Sulawesi	68.7	58.6	38.8	64.8	12.7	30.3	26.5	13.1	56.1	28.4	12.4	51.7
25 Maluku	15.7	39.4	11.7	21.1	16.1	22.3	23.3	76.3	-0.4	17.1	-11.6	-55.3
Sparsely Populated Provinces	25.8	46.8	26.0	38.6	13.2	23.6	20.3	24.6	12.7	23.2	5.6	14.0
National	17.9	30.6	22.8	28.5	17.9	30.2	22.3	28.0	0.01	0.4	0.5	0.5

Source : CBS, Population Census, 1990,2000 and Intercensal Population Survey 1985 and 1995

Appendix 7.B. Calculating Recent In-Migration Rates

7.B.1. Assisted In-Migration Rate (Transmigration Rate)

Firstly, it is necessary to calculate the transmigration rate (1/1000) (*TRANSMIGRANT*), with the following steps,

1. The first step is to calculate how many people were really placed under the transmigration program for the years 1980-1985 (cumulative), with the following formula,

$$TRANSPLACEMENT_{i,85} = \sum HHPLACEMENT_{i,80-85} * AHS_{i,80-85}, \quad (7.B.1)$$

Where :

- a) $TRANSPLACEMENT_{i,85}$ is the number of transmigrant placements in province *i* from the Department of Manpower and Transmigration of province *i* in year 1980-1985.
 - b) $HHPLACEMENT_{i,80-85}$ is the number of household placements in province *i* from the Department of Manpower and Transmigration of province *i* in year 1980-1985.
 - c) $AHS_{i,80-85}$ is the average household size of transmigrants in 1980-1985 which is assumed to average 4.1 persons per household from 1980-1984 and 4.0 in 1985 (World Bank, 1988).
2. The second step to calculate the staying rate of migrants who moved because of transmigration is calculated as:

$$Staying\ rate_i = \frac{TRANSMIGP_{i,85}}{TRANSPLACEMENT_{i,85}} * 100, \text{ or} \quad (7.B.2)$$

$$Staying\ rate_i = \frac{PTRANSMIGP_{i,85} * MIGSUPAS_{i,85}}{TRANSPLACEMENT_{i,85}} * 100 \quad (7.B.3)$$

Where :

- a) $Staying\ rate_i$ is staying rate (in per cent) of province *i*

- b) $TRANSMIGP_{i,85}$ is the volume of recent in-migrants in province i who moved because of transmigration based on Intercensal Population Survey 85 data
 - c) $PTRANSMIGP_{i,85}$ is the percentage of recent in-migrants in province i who moved because of transmigration based on Intercensal Population Survey 85 data
 - d) $MIGSUPAS_{i,85}$ is the number of recent in-migrants in province i based on Intercensal Population Survey 85 data.
3. Accordingly, the volume of recent in-migrants in province i who moved because of transmigration, based on the other population census of 1990 and 2000 and the 1995 Intercensal Population Survey, is calculated with the assumption of a similar staying rate. Therefore, the volume of transmigrants in 1990, 1995, and 2000 is calculated. For example for calculating the volume of transmigrants in 1990, the formula is

$$TRANSMIGP_{i,90} = \frac{(Staying\ rate_i * TRANSPLACEMENT_{i,90})}{100} \quad (7.B.4)$$

Where

- a) $TRANSMIGP_{i,90}$ is the volume of recent in-migrants in province i who moved because of transmigration based on the Population Census of 1990
 - b) $TRANSPLACEMENT_{i,90}$ is the number of transmigrants placement in province i from the Department of Manpower and Transmigration of province i in the years 1985-1990.
3. The transmigration rate $TRANSMIGRANT$ is then calculated as follows. For example to calculate $TRANSMIGRANT$ in 1990.

$$TRANSMIGRANT_{i,90} = \frac{TRANSMIGP_{i,90}}{POP_{i,90}} * 1000 \quad (7.B.5)$$

$POP_{i,90}$ is the total population in province i in 1990

7.B.2. Non-Assisted In-Migration Rate

Following the calculation of *TRANSMIGRANT*, the non-assisted in-migration rate (*INMIGRANT*) in 1990 is then calculated as follows,

$$INMIGRANT_{i,90} = \frac{[TINMIGRANT_{i,90} - TRANSMIGP_{i,90}]}{POP_{i,90}} * 1000 \quad (7.B.6)$$

Where

- a) $INMIGRANT_{i,90}$ is the rate of non-assisted recent in-migration (1/1000) in province i in 1990.
- b) $TRANSMIGRANT_{i,90}$ is the rate of transmigration (1/1000) in province i in 1990.
- c) $TINMIGRANT_{i,90}$ is the total volume of recent in-migrants in province i in 1990.

The calculation is also carried out for 1995 and 2000 which is then estimated (by interpolation method) to get both *INMIGRANT* and *TRANSMIGRANT* figures which match the three years period of the National Socioeconomic Survey consumption module.

**Appendix 7.C. Summary of Common Determinant Elasticities of Poverty
1984-2002**

**Table 7.C.1. Summary of Common Determinant Elasticities of Poverty for
the Hill Province Grouping 1984-2002**

The Hill Province Grouping	Growth		Human capital		Infras- tructure		Openness	
1.Resource rich provinces	-2.21	*)	0.16		-0.06		0.34	*)
2.Densely populated provinces	-2.61	*)	0.08		0.00		-0.03	
3.Settled Outer Island provinces	-2.71		-0.25	*)	-0.30	*)	0.12	
4.Sparsely populated provinces	-2.66		-0.07		-0.12		0.08	
5.Isolated provinces	-1.80	*)	0.43	*)	-0.10		0.05	

Source : Author's summary

Note :*) significant

**Table 7.C.2. Summary of Common Determinant Elasticities of Poverty across
Growth Episodes 1984-2002**

	Growth		Human capital		Openness	
1. The first period of liberalisation	-2.19	*)	0.04		0.11	*)
2. The second period of liberalisation	-2.45	*)	-0.15	*)	0.09	
4. The recovery period	-2.44	*)	0.09		0.08	

Source : Author's summary

Note :*) significant

Appendix 7.D.

Table 7.D. Supplement to Table 7.7 (P1)

Explanatory Variable	In-migration		Out-migration		Transmigration-OI		In-migration		Out-migration		Transmigration-OI	
	With MOG		With MOG		With MOG		Without MOG		Without MOG		Without MOG	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>lnMEAN</i>	FE Estimate -2.61 (-10.85)	FE Estimate -2.62 (-10.86)	FE Estimate -2.46 (-8.34)	FE Estimate -2.61 (-10.88)	FE Estimate -2.62 (-10.87)	FE Estimate -2.48 (-8.43)	FE Estimate -2.61 (-10.88)	FE Estimate -2.62 (-10.87)	FE Estimate -2.62 (-10.87)	FE Estimate -2.48 (-8.43)	FE Estimate -2.61 (-10.88)	FE Estimate -2.62 (-10.87)
<i>lnGINI</i>	1.91 (5.90)	1.86 (5.69)	1.73 (4.57)	1.88 (5.87)	1.84 (5.65)	1.71 (4.56)	1.88 (5.87)	1.84 (5.65)	1.84 (5.65)	1.71 (4.56)	1.88 (5.87)	1.84 (5.65)
<i>lnEDU</i>	-0.74 (-1.28)	-0.64 (-1.28)	-1.04 (-1.76)	-0.82 (-1.45)	-0.67 (-1.33)	-1.05 (-1.79)	-0.82 (-1.45)	-0.67 (-1.33)	-0.67 (-1.33)	-1.05 (-1.79)	-0.82 (-1.45)	-0.67 (-1.33)
<i>lnROAD</i>	0.14 (1.30)	0.11 (1.02)	0.17 (1.41)	0.15 (1.37)	0.12 (1.11)	0.18 (1.47)	0.15 (1.37)	0.12 (1.11)	0.12 (1.11)	0.18 (1.47)	0.15 (1.37)	0.12 (1.11)
<i>MOG</i>	-0.004 (-0.71)		-0.004 (-0.60)									
<i>lnTRADE</i>	0.01 (0.11)	0.03 (0.31)	-0.04 (-0.42)	0.02 (0.19)			0.02 (0.19)		0.04 (0.41)	-0.04 (-0.40)		
<i>INMIGRANT</i>	0.0036 (0.79)	0.0027 (1.28)	0.0029 (1.22)	0.0036 (0.79)			0.0036 (0.79)		0.0027 (1.28)	0.0029 (1.20)		
<i>RICH*INMIGRANT</i>	-0.0017 (-0.29)			-0.0015 (-0.29)			-0.0015 (-0.29)					
<i>ISO*INMIGRANT</i>	-0.0110 (-0.52)			-0.0145 (-0.71)			-0.0145 (-0.71)					
<i>SETT*INMIGRANT</i>	0.0033 (0.37)			0.0029 (0.33)			0.0029 (0.33)					
<i>SPAR*INMIGRANT</i>	-0.0008 (-0.14)			-0.0013 (-0.22)			-0.0013 (-0.22)					

Appendix 7.D.

Table 7.D. Supplement to Table 7.7 (P1), *Continued*

Explanatory Variable	In-migration		Out-migration		Transmigration-OI		In-migration		Out-migration		Transmigration-OI	
	With MOG		With MOG		With MOG		Without MOG		Without MOG		Without MOG	
	FE Estimate	(1)	FE Estimate	(2)	FE Estimate	(3)	FE Estimate	(4)	FE Estimate	(5)	FE Estimate	(6)
<i>TRANSMIGRANT</i>	0.0106		0.0145		0.0178		0.0128		0.0169		0.0224	
	(0.51)		(0.70)		(0.21)		(0.62)		(0.82)		(0.26)	
<i>RICH*TRANSMIGRANT</i>					-0.0070						-0.0564	
					(-0.04)						(-0.32)	
<i>ISO*TRANSMIGRANT</i>					0.54331						0.48947	
					(0.70)						(0.64)	
<i>SETT*TRANSMIGRANT</i>					-0.0452						-0.0530	
					(-0.36)						(-0.43)	
<i>SPAR*TRANSMIGRANT</i>					-0.0120						-0.0137	
					(-0.14)						(-0.16)	
<i>OUTMIGRANT</i>	0.0022		0.0014		0.0045		0.0017		0.0010		0.0044	
	(0.65)		(0.29)		(1.00)		(0.52)		(0.20)		(0.98)	
<i>RICH*OUTMIGRANT</i>			0.0029						0.0037			
			(0.34)						(0.43)			
<i>ISO*OUTMIGRANT</i>			-0.0034						-0.0084			
			(-0.10)						(-0.24)			
<i>SETT*OUTMIGRANT</i>			-0.0353						-0.0038			
			(-0.42)						(-0.46)			
<i>SPAR*OUTMIGRANT</i>			0.0038						0.0035			
			(0.55)						(0.51)			
<i>lnINPRESCAP</i>	-0.09		-0.12		-0.24	*	-0.09		-0.11		-0.24	*
	(-0.90)		(-1.14)		(-1.86)		(-0.87)		(-1.11)		(-1.89)	

Appendix 7.D.

Table 7.D. Supplement to Table 7.7 (P1) , Continued

Explanatory Variable	In-migration		Out-migration		Transmigration-OI		In-migration		Out-migration		Transmigration-OI	
	With MOG		With MOG		With MOG		Without MOG		Without MOG		Without MOG	
	(1)	FE Estimate	(2)	FE Estimate	(3)	FE Estimate	(4)	FE Estimate	(5)	FE Estimate	(6)	FE Estimate
d87	-0.10		-0.12		-0.14		-0.08		-0.11		-0.13	
d90	0.01		0.02		0.07		0.04		0.03		0.09	
d93	0.38	#	0.37	*	0.48	*	0.42	*	0.39	*	0.51	**
d96	-0.97	***	-0.99	***	-0.88	**	-0.92	***	-0.96	***	-0.85	***
d99	-0.19		-0.21		-0.12		-0.13		-0.18		-0.10	
d02	-0.23		-0.20		0.03		-0.18		-0.17		0.06	
cons	28.97	***	29.29	***	29.82	***	29.06	***	29.28	***	30.01	***
R-sq within	0.87		0.87		0.91		0.87		0.87		0.87	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; # Denotes significance at the 10% level; # denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios.

Appendix 7.E.

Table 7.E. Supplement to Table 7.7 (P2)

Explanatory Variable	In-migration		Out-migration		Transmigration-OI		In-migration		Out-migration		Transmigration-OI	
	With MOG		With MOG		With MOG		Without MOG		Without MOG		Without MOG	
	FE Estimate	(1)	FE Estimate	(2)	FE Estimate	(3)	FE Estimate	(4)	FE Estimate	(5)	FE Estimate	(6)
<i>lnMEAN</i>	-3.06	***	-3.11	***	-2.82	***	-3.07	***	-3.10	***	-2.83	***
	(-9.87)		(-10.01)		(-7.51)		(-9.88)		(-10.03)		(-7.59)	
<i>lnGINI</i>	2.66	***	2.55	***	2.44	***	2.62	***	2.52	***	2.42	***
	(6.37)		(6.03)		(5.08)		(6.31)		(6.01)		(5.08)	
<i>lnEDU</i>	-0.67		-0.65		-1.32	*	-0.80		-0.68		-1.33	*
	(-0.89)		(-1.01)		(-1.76)		(-1.09)		(-1.06)		(-1.79)	
<i>lnROAD</i>	0.26	*	0.25	*	0.33	**	0.27	*	0.26	*	0.34	**
	(1.84)		(1.75)		(2.13)		(1.93)		(1.85)		(2.20)	
<i>MOG</i>	-0.007		-0.005		-0.005							
	(-0.94)		(-0.68)		(-0.55)							
<i>lnTRADE</i>	0.04		0.07		-0.05							
	(0.29)		(0.55)		(-0.41)		0.05		0.08		-0.05	
<i>INMIGRANT</i>	0.0074		0.0055	**	0.0053	*	0.0074		0.0055	**	0.0052	*
	(1.27)		(2.06)		(1.73)		(1.27)		(2.07)		(1.72)	
<i>RICH*INMIGRANT</i>	-0.0037						-0.0033					
	(-0.56)						(-0.50)					
<i>ISO*INMIGRANT</i>	-0.0108						-0.0169					
	(-0.39)						(-0.63)					
<i>SETT*INMIGRANT</i>	-0.0015						-0.0022					
	(-0.14)						(-0.19)					
<i>SPAR*INMIGRANT</i>	0.0019						0.0011					
	(0.24)						(0.13)					

Appendix 7.E.

Table 7.E. Supplement to Table 7.7 (P2), *Continued*

Explanatory Variable	In-migration With <i>MOG</i>	Out-migration With <i>MOG</i>	Transmigration-OI With <i>MOG</i>	In-migration Without <i>MOG</i>	Out-migration Without <i>MOG</i>	Transmigration-OI Without <i>MOG</i>
	(1) FE Estimate	(2) FE Estimate	(3) FE Estimate	(4) FE Estimate	(5) FE Estimate	(6) FE Estimate
<i>TRANSMIGRANT</i>	0.0112 (0.42)	0.0168 (0.63)	0.0109 (0.10)	0.0150 (0.57)	0.0196 (0.75)	0.0162 (0.15)
<i>RICH*TRANSMIGRANT</i>			-0.0032 (-0.01)			-0.0610 (-0.27)
<i>ISO*TRANSMIGRANT</i>			0.52685 (0.54)			0.46393 (0.48)
<i>SETT*TRANSMIGRANT</i>			-0.0310 (-0.20)			-0.0400 (-0.26)
<i>SPAR*TRANSMIGRANT</i>			-0.0026 (-0.02)			-0.0045 (-0.04)
<i>OUTMIGRANT</i>	0.0095 (2.14)		0.0086 (1.50)	0.0086 (1.99)	0.0109 (1.77)	0.0085 (1.49)
<i>RICH*OUTMIGRANT</i>		0.0114 (1.83)			0.0029 (0.26)	
<i>ISO*OUTMIGRANT</i>		-0.0239 (-0.53)			-0.0299 (-0.67)	
<i>SETT*OUTMIGRANT</i>		-0.0145 (-1.35)			-0.0149 (-1.39)	
<i>SPAR*OUTMIGRANT</i>		-0.0032 (-0.36)			-0.0036 (-0.40)	
<i>lnINPRESCAP</i>	-0.18 (-1.38)					
		#	-0.38 (-2.37)	-0.18 (-1.34)	-0.20 (-1.49)	-0.38 (-2.40)
			*		#	*

Appendix 7.E.

Table 7.E. Supplement to Table 7.7 (P2), Continued

Explanatory Variable	In-migration		Out-migration		Transmigration-OI		In-migration		Out-migration		Transmigration-OI	
	With MOG		With MOG		With MOG		Without MOG		Without MOG		Without MOG	
	FE Estimate	(1)	FE Estimate	(2)	FE Estimate	(3)	FE Estimate	(4)	FE Estimate	(5)	FE Estimate	(6)
d87	-0.29	*	-0.30	#	-0.30		-0.26	#	-0.28	*	-0.29	
d90	-0.19		-0.16		-0.05		-0.14		-0.13		-0.04	
d93	0.16		0.19		0.40	*	0.23		0.22		0.43	**
d96	-1.41	***	-1.39	***	-1.16	**	-1.32	***	-1.35	***	-1.13	***
d99	-0.54		-0.51		-0.30		-0.44		-0.47		-0.28	
d02	-0.51		-0.41		0.02		-0.41		-0.38		0.05	
cons	31.40	***	32.36	***	32.36	***	31.55	***	32.34	***	32.57	***
R-sq within	0.86		0.86		0.85		0.85		0.86		0.85	

*** Denotes significance at the 1% level; ** Denotes significance at the 5% level; * Denotes significance at the 10% level; # Denotes significance at the 15% level. FE means Fixed Effect estimates. Figures in parentheses are t ratios.

Appendix 7.F. The Descriptive Statistics

	Obs	Mean	Std.Dev	Min	Max
<i>lnP0</i>	174	3.08	0.53	0.88	4.13
<i>lnMEAN</i>	179	12.28	0.30	11.72	13.43
<i>lnGini</i>	179	3.35	0.12	3.00	3.65
<i>MOG</i>	182	7.63	16.95	0.00	82.68
<i>lnEDU</i>	182	1.49	0.25	0.80	2.13
<i>lnROAD</i>	182	0.03	0.50	-1.15	1.04
<i>lnTRADE</i>	182	4.14	0.51	2.92	5.13
<i>INMIGRANT</i>	182	33.18	24.89	2.23	150.64
<i>lagINMIGRANT</i>	182	32.13	23.18	4.55	109.68
<i>TRANSMIGRANT</i>	182	1.22	2.02	0.00	14.54
<i>lagTRANSMIGRANT</i>	181	1.23	2.03	0.00	14.54
<i>OUTMIGRANT</i>	182	26.12	18.33	7.46	123.52
<i>lagOUTMIGRANT</i>	182	25.05	16.43	7.46	123.52
<i>lnINPRESCAP</i>	182	9.50	0.89	7.65	11.87

Appendix 7.G. Correlation Coefficient

Table 7.G.1. Correlation Coefficients for Estimation of Model 7.4 (The Role of In-migration across Regions)

	<i>lnP0</i>	<i>lnMEAN</i>	<i>lnGINI</i>	<i>lnEDU</i>	<i>lnROAD</i>	<i>MOG</i>	<i>lnTRADE</i>
<i>lnP0</i>	1.00						
<i>lnMEAN</i>	-0.74	1.00					
<i>lnGINI</i>	-0.04	0.17	1.00				
<i>lnEDU</i>	-0.73	0.54	0.08	1.00			
<i>lnROAD</i>	-0.18	0.05	-0.16	0.43	1.00		
<i>MOG</i>	-0.05	0.36	-0.08	0.04	-0.11	1.00	
<i>lnTRADE</i>	-0.24	0.39	0.25	0.18	-0.26	0.25	1.00
<i>OUTMIGRANT</i>	-0.55	-0.58	0.10	0.57	0.03	-0.05	0.18
<i>TRANSMIGRANT</i>	0.13	-0.07	-0.23	-0.18	0.10	0.02	-0.32
<i>INMIGRANT</i>	-0.39	0.60	0.06	0.45	0.05	0.40	0.17
<i>SPAR*INMIGRANT</i>	0.08	-0.14	-0.35	0.00	-0.29	-0.18	-0.27
<i>RICH*INMIGRANT</i>	-0.03	0.39	0.08	0.11	0.00	0.83	0.27
<i>SETT*INMIGRANT</i>	-0.16	0.11	-0.13	0.09	0.19	-0.10	-0.13
<i>ISO*INMIGRANT</i>	0.29	-0.35	-0.03	-0.35	0.02	-0.13	-0.25

Table 7.G.1. Correlation Coefficients for Estimation of Model 7.4 (The Role of In-migration across Regions), Continued

	OUTMIGRANT	TRANSMIGRANT	INMIGRANT	SPAR *INMIGRANT	RICH *INMIGRANT	SETT *INMIGRANT	ISO *INMIGRANT
lnP0							
lnMEAN							
lnGINI							
lnEDU							
lnROAD							
MOG							
lnTRADE							
OUTMIGRANT	1.00						
TRANSMIGRANT	-0.12	1.00					
INMIGRANT	0.48	0.25	1.00				
SPAR*INMIGRANT	-0.14	0.61	0.25	1.00			
RICH*INMIGRANT	-0.04	0.06	0.55	-0.16	1.00		
SETT*INMIGRANT	0.12	-0.05	-0.16	-0.25	0.17	1.00	
ISO*INMIGRANT	-0.21	-0.13	-0.22	-0.14	0.09	-0.14	1.00

Table 7.G.2. Correlation Coefficients for Estimation of Model 7.5 (The Role of Out-migration across Regions)

	<i>lnP0</i>	<i>lnMEAN</i>	<i>lnGINI</i>	<i>lnEDU</i>	<i>lnROAD</i>	<i>MOG</i>	<i>lnTRADE</i>
<i>lnP0</i>	1.00						
<i>lnMEAN</i>	-0.74	1.00					
<i>lnGINI</i>	-0.04	0.17	1.00				
<i>lnEDU</i>	-0.73	0.54	0.08	1.00			
<i>lnROAD</i>	-0.18	0.05	-0.16	0.43	1.00		
<i>MOG</i>	-0.05	0.36	-0.08	0.04	-0.11	1.00	
<i>lnTRADE</i>	-0.24	0.39	0.25	0.18	-0.26	0.25	1.00
<i>INMIGRANT</i>	-0.39	0.60	0.06	0.45	0.05	0.40	0.17
<i>TRANSMIGRANT</i>	0.13	-0.07	-0.23	-0.18	0.10	0.02	-0.32
<i>OUTMIGRANT</i>	-0.55	-0.58	0.10	0.57	0.03	-0.05	0.18
<i>SPAR*OUTMIGRANT</i>	0.16	-0.15	-0.36	0.02	0.33	-0.16	-0.21
<i>RICH*OUTMIGRANT</i>	-0.04	0.38	0.04	0.10	0.03	0.83	0.27
<i>SEIT*OUTMIGRANT</i>	-0.17	0.08	-0.13	0.13	0.23	-0.13	-0.21
<i>ISO*OUTMIGRANT</i>	-0.31	-0.36	-0.03	-0.37	0.01	-0.13	-0.26

Table 7.G.2. Correlation Coefficients for Estimation of Model 7.5 (The Role of Out-migration across Regions), *Continued*

	INMIGRANT	TRANSMIGRANT	OUTMIGRANT	SPAR *OUTMIGRANT	RICH *OUTMIGRANT	SETT *OUTMIGRANT	ISO *OUTMIGRANT
lnP0							
lnMEAN							
lnGINI							
lnEDU							
lnROAD							
MOG							
lnTRADE							
INMIGRANT	1.00						
TRANSMIGRANT	0.25	1.00					
OUTMIGRANT	0.48	-0.12	1.00				
SPAR*OUTMIGRANT	0.08	0.43	0.01	1.00			
RICH*OUTMIGRANT	0.34	0.05	-0.01	-0.18	1.00		
SETT*OUTMIGRANT	-0.22	-0.11	0.17	-0.26	0.20	1.00	
ISO*OUTMIGRANT	-0.23	-0.14	-0.21	-0.14	-0.11	-0.15	1.00

Table 7.G.3. Correlation Coefficients for Estimation of Model 7.6 (The Role of Transmigration across Regions)

	<i>lnP0</i>	<i>lnMEAN</i>	<i>lnGINI</i>	<i>lnEDU</i>	<i>lnROAD</i>	<i>MOG</i>	<i>lnTRADE</i>
<i>lnP0</i>	1.00						
<i>lnMEAN</i>	-0.61	1.00					
<i>lnGINI</i>	0.19	0.08	1.00				
<i>lnEDU</i>	-0.68	0.40	-0.09	1.00			
<i>lnROAD</i>	-0.39	0.04	-0.05	0.64	1.00		
<i>MOG</i>	-0.15	0.55	0.00	0.13	-0.21	1.00	
<i>lnTRADE</i>	-0.15	0.46	0.16	0.10	-0.15	0.38	1.00
<i>OUTMIGRANT</i>	-0.35	0.30	-0.22	0.47	0.31	0.09	-0.09
<i>TRANSMIGRANT</i>	0.04	-0.04	-0.13	-0.13	-0.05	-0.04	-0.26
<i>INMIGRANT</i>	-0.22	0.45	-0.07	0.27	0.06	0.55	0.16
<i>SPAR*TRANSMIGRANT</i>	0.08	-0.19	-0.19	-0.12	0.09	-0.18	-0.36
<i>RICH*TRANSMIGRANT</i>	-0.08	0.51	0.24	0.17	-0.19	0.59	0.34
<i>SETT*TRANSMIGRANT</i>	-0.21	0.13	-0.03	-0.06	-0.05	-0.10	0.01
<i>ISO*TRANSMIGRANT</i>	0.20	-0.25	0.00	-0.23	-0.13	-0.11	-0.28

Table 7.G.3. Correlation Coefficients for Estimation of Model 7.6 (The Role of Transmigration across Regions), *Continued*

	OUTMIGRANT	TRANSMIGRANT	INMIGRANT	SPAR	RICH	SETT	ISO
				*TRANSMIGRANT	*TRANSMIGRANT	*TRANSMIGRANT	*TRANSMIGRANT
lnP0							
lnMEAN							
lnGINI							
lnEDU							
lnROAD							
MOG							
lnTRADE							
OUTMIGRANT	1.00						
TRANSMIGRANT	-0.02	1.00					
INMIGRANT	0.12	0.39	1.00				
SPAR*TRANSMIGRANT	-0.08	0.91	0.26	1.00			
RICH*TRANSMIGRANT	0.10	0.15	0.47	-0.13	1.00		
SETT*TRANSMIGRANT	0.20	0.04	-0.09	-0.18	0.13	1.00	
ISO*TRANSMIGRANT	-0.25	-0.11	-0.18	-0.10	0.07	-0.09	1.00

Chapter Eight

Conclusions and Policy Implications

8.1. Introduction

This thesis studies the determinants of regional poverty in Indonesia, based on a relatively consistent and extended provincial panel data set covering 26 provinces over 18 years (1984-2002). Over the 18 years, Indonesia experienced several development episodes: the first period of liberalisation from 1984-1990 was followed by a second period of liberalisation and then some backsliding on reform during 1990-1996; the financial and economic crisis of 1997-1998; and, finally the recovery after the crisis of 1999-2002.

In general, the rapid economic growth before the crisis period has been associated with much lower poverty. According to the official estimate, there was a decline in the national headcount poverty index from more than 40% in 1976 to around 11% in 1996.

Nevertheless, there are significant regional variations in provincial poverty rates. Several provinces, particularly Eastern Indonesia provinces such as East Nusa Tenggara, Maluku and Papua have had a persistently high headcount poverty index, whereas province like Jakarta has continued to have low poverty incidence.

As discussed in Chapter One, four specific contributions have been made to the literature in analysing the impact of the determinants on poverty.

First, the role of development episodes (the first period and second periods of liberalisation and the recovery period) have been incorporated to examine their impact on poverty.

Second, the role of province-specific characteristics have been incorporated in order to investigate key determinants of regional poverty such as, economic growth, inequality, natural resources (oil and gas), human capital, infrastructure, and openness. The study also examines two additional province-specific variables not commonly examined in single country studies of regional dimensions of poverty, i.e., interprovincial migration and intergovernmental transfers.

A third contribution is the incorporation of a more meaningful regional grouping than adopted in other studies, mainly using Hill's (1989) province grouping which classified the provinces not only based on geographical location but also on natural resources endowment, location and population density indicators. Fourth, this study distinguishes between two channels through which these determinants may impact on poverty: first the direct channel on poverty, and second the indirect channel through economic growth. For the purpose of this thesis, a consistent provincial database for selected indicators has been collected from 1984-2002.

This thesis has proposed a number of hypotheses and all these have been addressed, even if not fully answered. This chapter will now summarise the findings and discuss the policy implications. It is organised as follows: section two discusses the findings on the hypotheses of the determinants of poverty headcount index, where all the determinants are already included. Section three discusses the policy implications of the thesis, and section four, indicates some limitations of the thesis, with an objective to providing directions for further research.

8.2. Findings on the Hypotheses

8.2.1. Growth Elasticity of Poverty

The analysis of the determinants of poverty began with estimation of the growth elasticity of poverty (Chapters Four and Five). Chapter Four analyses the impact of growth episodes on poverty, and the links between poverty and growth related policy, whereas Chapter Five examines the regional growth elasticity of poverty.

The two chapters found that, similar to the cross-country studies which used absolute poverty measures, the growth elasticity of poverty is negative even before controlling for inequality.

In general, the results support the hypothesis that growth was a substantial although not sufficient determinant of poverty reduction. The growth elasticity of poverty was around -2.5 over the 18 years, 1984-2002, which was comparable to findings in the earlier literature especially other single country and Indonesia studies. The results also confirm that single country studies usually find slightly lower elasticities than cross-country studies.

Growth also was found to be more pro-poor (had a higher impact on poverty) after controlling for better human capital, infrastructure, and openness.¹

8.2.1.1. Growth elasticity of poverty across growth episodes

None of the previous single country studies has examined the possibility that the growth elasticity of poverty may differ across development episodes. This thesis has addressed this issue, for the case of Indonesia, which leads to improved research in growth elasticity of poverty literature especially within single country analysis. The proposed hypotheses on the growth elasticity of poverty across different growth episodes are elaborated in detail in Chapters Four and Six. While some of the results confirmed the hypotheses, several were contrary.

Contrary to the hypothesis which stated that growth elasticity should have been higher during the first period of liberalisation, since the pace of reform was stronger at that time, the growth elasticity of poverty was in fact higher during the second period of liberalisation which indicated there was a possible lagged impact on poverty from liberalisation policies. As discussed in Chapter Six, this finding might be explained by the fact that only those whose consumption was concentrated around the poverty line could take immediate advantage of growth in

¹ As a remainder, the discussion about the definition of pro-poor growth can be found in Chapter Two. The growth process is pro-poor only if poor people benefit in absolute terms, that is when there is a reduction in the poverty measures between two periods for a one per cent growth in mean income.

the labour intensive sectors during the first period of liberalisation. The growth impact itself was stronger only during the second period of liberalisation and was also enjoyed by those farther away from the poverty line.

The hypothesis that growth elasticity should have been lower in the recovery period is also rejected. Growth elasticity of poverty was found to be high during the recovery period, suggesting that when growth recovered, people who tend to move in and out of poverty ('transient' poverty) also recovered quickly and their consumption was expected to return to normal. This might also be due to the introduction of a specific poverty alleviation program known as the Indonesian Social Safety Net program between 1998/1999-2002/2003.

8.2.1.2. Growth elasticity of poverty across regions

Applying the simple province grouping (i) by Java-Bali and Outer Islands, and (ii) by island groups, the results show in general that each group of provinces had a different growth elasticity of poverty. As discussed in Chapter Five, Java-Bali is the more developed region with an integrated market. Therefore Java-Bali had a high and significant growth elasticity of poverty, which supports the hypothesis that better infrastructure and human capital enable a greater transmission of the growth impact on poverty reduction.

The regional analysis of the growth elasticity of poverty was then expanded based on Hill's (1989) province grouping: the rich resource provinces, the densely populated provinces, the settled Outer Island provinces, the sparsely populated provinces and the isolated provinces. The growth elasticity of poverty was the lowest in the isolated provinces which, in contrast to the densely populated provinces (Java-Bali and Lampung), lagged behind in development indicators such as infrastructure and human capital. This result for the isolated provinces was contrary to the hypothesis proposed in Chapter Five. That is growth elasticity of poverty was expected to have been high in low income, relatively isolated provinces where growth was anticipated to be more labour intensive as the main sector tends to be agriculture. It was also hypothesised here that there would be a tendency towards convergence in terms of the growth elasticity of poverty for this group of provinces, but this was not the case.

The growth elasticity of poverty in the resource rich provinces supports the hypothesis for two reasons: growth based on oil and gas, had a low impact on poverty since such growth was likely to be less labour intensive. In addition, most of the revenue from growth went back to the central government rather than to the producing provinces, prior to the 2001 decentralisation period.

The findings on growth elasticity of poverty across regions support previous country studies for India, China and Indonesia (with shorter time period than in this thesis) that the growth elasticity of poverty varies across regions within a country.

8.2.2. General Findings on the Determinants

Chapter Six discussed the common determinants of regional poverty which cover natural resources, openness, human capital, inequality, and infrastructure.

For the determinants, the discussion focused first on the indirect channels to poverty via growth. Several variables were found to be significant and had the expected relationship with growth and poverty. Natural resources (oil and gas) concentration were found to support the previous literature by being associated negatively with growth, while in contrast human capital was associated positively. This confirms that natural resources and human capital work indirectly through growth. These findings provide further evidence regarding the potential 'curse' of natural resources as growth is likely to provide limited spillovers to the local economy. In contrast, confirming findings elsewhere in the literature, human capital was found to be a robust determinant of economic growth.

Similarly, as one of the key contributions of the thesis, the findings show that all migration variables have an indirect and significant impact on poverty through economic growth. Non-assisted in-migration and out-migration are shown to be positively associated with growth whereas, transmigration is negatively associated with growth.

In addition to indirect channels, direct channels from the explanatory variables to growth were investigated. The hypotheses were confirmed with expected signs for infrastructure and inequality.

This thesis found that infrastructure is the only determinant which has both a direct and negative relationship with poverty, which highlights the fact that the availability of good infrastructure links the poor with employment, trade activities, education and other activities.

It is interesting to find that inequality also contributes positively to growth. The finding on the positive impact of inequality on growth is consistent with the ambiguous relationship between inequality and growth found in the literature. Inequality can possibly have either a positive or negative relationship with growth, as discussed in Chapter Two. This might be due to the length of the periods under analysis, 18 years, that may not be long enough to establish the negative relationship. In addition, there were outliers from provinces which had high income per capita and high inequality.

Apart from the significant and expected findings, some of the findings are controversial, with variables seemingly having an adverse relationship with growth and/ or poverty. To some extent, measurement problems might contribute to the unexpected results. For example, the measure of openness includes not only foreign trade but also domestic trade, and there are likely to be some outliers, especially among the resource rich provinces where tradable goods are a high percentage of Regional Gross Domestic Product. However, although they are controversial, the results are supported in some existing empirical literature, which includes the direct positive relationship between openness and poverty and human capital and poverty (they increase poverty although for human capital, the impact is not significant), and the impact of intergovernmental transfers on poverty and growth (transfers increase poverty and reduce growth, although the impact is not significant). These findings require further study.

8.2.2.1. Human capital and the openness elasticity of poverty across growth episodes

Following the controversial results of human capital and openness, the findings indicate the possibility that the impacts are different across growth episodes.

The results show human capital had a negative and significant impact on poverty during the second period of liberalisation which might be related to the launch of the nine years of Compulsory Elementary Education Program in 1994 requiring students to stay longer in school. In contrast, the results of the decomposition of the impact of openness across different growth episodes still indicates a positive impact for all development episodes, although it is only significant during the first period of liberalisation. However, openness might not have benefited the poor directly, especially those who live in isolated regions and work in the agricultural sector.

Combining the results of growth elasticity and human capital elasticity of poverty across development episodes, it seems that both had the strongest impact in reducing poverty during the second liberalisation period. Therefore, human capital during the second period of liberalisation had two effects; (i) a direct impact on improving incomes among the poor and (ii) contributed to making growth more pro-poor.

Combining the results of growth elasticity and openness elasticity of poverty across development episodes, it seems the impact of trade liberalisation worked mainly through growth and did not work directly on poverty. Trade liberalisation in Indonesia and labour intensive manufacturing growth, appears to have benefited everyone including the poor.

8.2.2.2. Relationship between growth elasticity of poverty and other determinants of elasticity of poverty

On the role of common determinants of poverty across regions, one interesting finding was substitutions between direct and indirect channels, with the exception of the rich and isolated provinces.

The findings for the densely populated provinces indicate the superiority of the growth elasticity of poverty whereas the direct channels in which the other determinants might have impacted on poverty are not significant. For example, only in the densely populated provinces was there a negative relationship between openness and poverty although this was not significant. This result is not surprising since the densely populated provinces mostly cover Java where the centre of manufacturing industries is located.

The reverse results to those for the densely populated provinces are found in the settled Outer Islands. Although high and negative, the growth elasticity of poverty in these provinces was not significant. The determinants of poverty are found in more direct channels. It was the human capital of the settled Outer Islands which had a negative and significant impact on poverty. This result is also plausible in light of the fact that the settled Outer Island provinces include North Sulawesi and North and West Sumatra which are considered the most advanced in terms of education in the Outer Islands. The settled Outer Islands recorded not only a higher elasticity for human capital but also a high elasticity of infrastructure on poverty, as discussed in Chapter Six. Although the growth elasticity of poverty in the settled Outer Islands was high, the fact that it was not significant suggests a poverty alleviation strategy could be carried out by promoting human capital and infrastructure directly.

8.2.2.3. The impact of interprovincial migration on poverty

Chapter Seven concluded that, in general, interprovincial migration only affects regional poverty indirectly through economic growth. Non-assisted in-migration contributes positively to growth in the destination regions, justifying both the quantity and composition effects of migration or, in short, the human capital model. In contrast, assisted in-migration, in line with the proposed hypothesis, had a negative relationship with growth in the destination regions because most transmigrants were not able to replace the financial component of government assistance after the first two years of their resettlement periods. The impact of out-migration on poverty in the regions of origin confirms the indirect channel hypothesis through the role of remittances.

While in general the findings on interprovincial migration do not confirm the direct hypotheses, there are some interesting regional dimensions. The findings on interprovincial migration determinants support the possibility of the substitution between direct and indirect effects except for the isolated provinces. In other words, when the determinants did not impact directly on poverty, the mechanism was through boosting the economic growth. For example, the growth mechanism seems to work better in the densely populated provinces. Here the growth elasticity of poverty was high, but none of coefficients of the migration variables were significant through direct channels.

In the sparsely populated provinces, where the growth elasticity of poverty is not significant, in-migration had a negative and significant impact on poverty, perhaps due to the low level of unemployment rates in these provinces.

Significant direct channels are also found in the settled Outer Islands. A direct and significant positive relationship between out-migration and poverty in the regions of origin may have been due to a brain drain. Chapter Seven suggests a brain drain might raise poverty in these areas of out-migration. The Minangkabau in West Sumatra, the Batak in North Sumatra, Minahasa in North Sulawesi and the Buginese and the Makarese in South Sulawesi are ethnic groups in this settled Outer Islands grouping who are well known for undertaking migration for social and cultural reasons and they therefore recorded a negative net migration rate (the out-migration rate was higher than the in-migration rate).

A positive association between transmigration and poverty was also found in the settled Outer Islands. Similarly as predicted, transmigration also had a positive sign and significant impact on poverty in the isolated provinces.

8.2.2.4. The impact of intergovernmental transfers on poverty

As discussed in Chapter Seven, intergovernmental transfers were neither growth enhancing nor directly poverty alleviating as the results failed to find any significant relationship between intergovernmental transfers and growth, and between intergovernmental transfers and poverty. Here, however, there is a problem of data comparability prior to and after the decentralisation. The lack of a

significant relationship between intergovernmental transfers and poverty could also be because it is not possible to decompose the available INPRES data in smaller more meaningful categories, such as the INPRES for elementary school, health and road development, factors which are likely to matter, particularly for poverty reduction.

8.3. Policy Implications of the Findings

What are the implications of these findings on policies for a poverty alleviation strategy? There are at least three main policy implications that can be drawn from the Indonesian experience, which might also be useful for developing countries in general.

First, in general, the most important determinant of poverty alleviation is economic growth. Therefore, growth strategies are important since growth reduced poverty with high elasticity. Growth enhancing strategies should also take advantage of the flow of interprovincial migration, especially non-assisted in-migration and out-migration, since they have a positive relationship with growth. The policy implications, for example, of providing more jobs can enhance the participation of the migrants with their human capital in the labour market, which both expands the output in the destination regions and also enables the migrants to send their money back to their regions of origin as remittances.

Second, although growth is a necessary condition for rapid poverty reduction, it is not in itself a sufficient condition. Therefore, the policy implications of the analysis regarding direct effects are especially relevant if growth does not perform well. In Indonesia's case, the government should concentrate on providing infrastructure intervention for the poor, which is expected to provide spillovers linking the poor with employment and access to health and education facilities.

Third, across groups of provinces, this thesis also shows that poverty alleviation strategies can work differently. For groups of provinces which perform well according to the major development indicators (which are also the determinants of poverty reduction), that is in the densely populated provinces covering mostly

Java-Bali and the Outer Island province of Lampung, pro-poor growth should be a priority for poverty alleviation. For groups of provinces where only some of the development indicators (determinants of poverty reduction) are good, such as in the settled Outer Islands, a poverty alleviation strategy can be achieved directly with some government intervention such as in terms of human capital and infrastructure. And for groups of provinces where in general the development indicators have lagged behind, both pro-poor growth and direct channels should be pursued. For the resource rich provinces, special and fairer treatment which gives a higher share of the revenue generated by the natural resources back to the regions, is also necessary (as has occurred with decentralisation in Indonesia). However, there is also need for a better fiscal system which minimises the inevitable negative impact for other poor regions. The on-going decentralisation which has improved revenue sharing between the centre and regions should be assessed with respect to the impact on poverty in poorer regions.

8.4. Limitations and Future Research

The quality of the data available is examined in Chapter Three, and the quantitative analysis in this thesis inevitably relies on the quality of the available data.

As discussed in Chapter Three, it is possible that for several proxies the years of data collection do not match those for the National Socioeconomic Survey Consumption Modules, the main source of absolute poverty data (the dependent variable) which is published every three years. There is also a limitation regarding the CBS methodology of demarcating the poverty line (2002) that has been used to calculate the absolute poverty indicators in this thesis. Ideally, the methodology of poverty line should take into account the spatial cost of living differences by maintaining the same level of utility in each province (Nashihin, 2007).

In addition, Chapter Six also specifies that there are several proxies which are good for growth but not necessarily for reducing poverty, and vice versa, but because the relevant proxies are not available, the best available indicators are chosen. For example, in terms of infrastructure, the length of the paved roads may

be better able to capture regional growth but not necessarily poverty reduction. Similarly, in the case of intergovernmental transfers not all type of INPRES were directed towards alleviating poverty.

There are also limitations regarding the direct and indirect channels which also link to data availability, especially on the role of interprovincial migration on growth. For in-migration, although in the analytical framework both the quantity and the composition effects of human capital are separated, the separate effects could not be examined in the empirical exercise, due to data unavailability. Similarly for out-migration, the separate impact of quantity effects and remittances could not be examined. A method might be developed in future research to overcome this data weakness.

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