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**PROVINCIAL DISPARITIES IN THAILAND
CONVERGENCE, AGGLOMERATION
ECONOMIES AND EFFECTS ON POVERTY,
1988-2008**

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Thesis submitted for the degree of PhD in Economics

2012

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Declaration for PhD thesis

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ABSTRACT

Since the 1980s, the Thai economy has gone through rapid economic development. Despite that, income inequality remained high, if not increasing. While there are numerous studies on income inequality in Thailand, the geographical dimension of inequality received far less attention. This study examines income per capita disparities across provinces in Thailand over the past two decades. It also looks at other relevant aspects of provincial disparities—labour productivity, government expenditure, social services and poverty—and how they relate to the income disparities. By utilising the Barro and Sala-i-Martin model for income convergence, the study investigates factors contributing to provincial growth as well as the impact of growth on provincial poverty. Finally, the study took an alternative approach of agglomeration economics to explain the provincial disparities in Thailand. The findings suggest that GPP per capita disparities widened over time with no evidence of GPP per capita convergence. However, when the average income from household surveys is used, there was an evidence of convergence. This reflects the change in income composition of farm households by seasonally migrating to work in industrial sector. The analysis on growth determinants suggested that the widening GPP per capita disparities was mainly due to the concentration of industrial sector in only few provinces. The agglomeration analysis further suggested that such concentration of industrial activities generated agglomeration forces, which induces faster growth in the rich provinces. These widening GPP per capita disparities seem to cause poverty across provinces to increase. The poverty-determinant regressions suggest that while higher real income reduces poverty, inequality increases it. Hence, an increase in GPP may not reduce poverty if inequality levels also increase. Accordingly, this study suggests that policies on regional development and inequality reduction should be seriously implemented in order to narrow the disparities in Thailand.

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NOTE ON DATA SOURCES

Data in this study come mainly from two sources, the National Economic and Social Development Board (NESDB) and the National Statistical Office (NSO). The national accounting data e.g. Gross Domestic Product and Gross Provincial Product, population, and poverty rates are officially provided by the NESDB. On the other hand, survey data e.g. Labour Force Surveys (LFS) and Socio-Economic Surveys (SES) are provided by the NSO. While relevant data at provincial level are available to the public for LFS, those for SES are not. In addition, the SES contains quite comprehensive information regarding household and household member characteristics. Accordingly, the raw data of the SES are used in this study. These data can only be obtained upon request at the NSO, normally with charges.

GLOSSARY AND LIST OF ABBREVIATIONS

2SLS	Two-stage least squares
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
BAAC	Bank of Agriculture and Agricultural Cooperatives (Thailand)
BIBF	Bangkok International Banking Facility (Thailand)
BIMSTEC	Bay of Bengal Initiative for Multi-sectoral Technical and Economic Corporation
BIR	Banking, Insurance and Real-estate sector
BMA	Bangkok Metropolitan Administration
BMR	Bangkok Metropolitan Region
BOI	Board of Investment (Thailand)
BOT	Bank of Thailand
<i>Budan Pusat Statistik</i>	National Statistical Office of Indonesia
<i>changwat</i>	Province (Thailand)
CPI	Consumer Price Index
EPZ	Export Processing Zone
<i>Esarn</i>	Northeast (Thailand)
ESB	Eastern Seaboard (Thailand)
EU	European Union
FDI	Foreign Direct Investment
FY	Fiscal year
GDP	Gross Domestic Product
GEP	Green <i>Esarn</i> Programme (Thailand)
GMS	Greater Mekong Sub-region
GPP	Gross Provincial Product
GRP	Gross Regional Product
HDI	Human Development Index
IFCT	Industrial Finance Corporation of Thailand
IMF	International Monetary Fund
IMT-GT	Indonesia-Malaysia-Thailand Growth Triangle

ISIC	International Standard of Industrial Classification
LFS	Labour Force Survey (Thailand)
MDG	Millennium Development Goal
MOE	Ministry of Education (Thailand)
MOPH	Ministry of Public Health (Thailand)
MOT	Ministry of Transport (Thailand)
NEDS	National Education Development Schemes (Thailand)
NESDB	National Economic and Social Development Board (Thailand)
NIE	New Industrialised Country
NLS	Non-linear least squares
NPISH	Non-profit institutions serving households
NPL	Non-performing loans
NSCB	National Statistical Coordination Board (The Philippines)
NSO	National Statistical Office (Thailand)
OAE	Office of Agricultural Economics (Thailand)
OLS	Ordinary least squares
PAP	Poverty Alleviation Project (Thailand)
PSO	Provincial Statistical Office (Thailand)
RJCP	Rural Job Creation Programme (Thailand)
SES	Socio-economic Survey (Thailand)
SIFO	Small Industry Finance Office (Thailand)
SMSA	Standard Metropolitan Statistical Areas (USA)
SNA93	System of National Accounts 1993
SPI	Spatial Price Index
<i>tambon</i>	District (Thailand)
TDP	<i>Tambon</i> Development Programme (Thailand)
TDRI	Thailand Development Research Institute
<i>tesaban</i>	Municipality (Thailand)
TSA	Tourism Satellite Account
TSIC	Thai Standard of Industrial Classification
UN	United Nations
UNDP	United Nations Development Programme
v_w	Williamson's population-weighted coefficient of variation

CHAPTER 1

Provincial Disparities in Thailand: An Introduction

1.1 Background and Motivations

In the second half of the twentieth century, Thai economic performance has been dramatic. Its four decades of uninterrupted rapid economic growth ended with the financial crisis in 1997. At the turn of the new century, Thailand found itself trying to recover from the crisis and to re-construct its economy. Now, more than a decade has passed since the crisis. Thai economic performance has not been as impressive as it was prior to 1997.

From 1960 to 1996, economic growth in Thailand averaged 7.7 percent per annum. This growth benefited its people extensively. The country had moved from being one of the world's poorest countries to the middle-income level. As a result, income per capita at current market prices increased from 2,250 Baht to 76,847 Baht during the period. In addition, the incidence of poverty declined remarkably from 88.3 percent of total population in 1962 to 14.8 percent in 1996 (Warr, 2004, p. 4).

Despite such an impressive performance, the distribution of the growth benefits was rather uneven. That is, part of the benefits went to a small population group, leaving less for the remaining larger population. This, however, should come as no surprise. Thailand has been characterised as having a high rate of income inequality since the 1981 socio-economic survey data became available (Krongkaew, 1985). The inequality has been considered high even when compared with neighbouring East Asian countries.

The inequality, as measured by Gini coefficient was 0.513 in 1996. It is higher than that of Indonesia, Malaysia, Singapore and South Korea. The Gini index from several countries is summarized in Table 1.1. In fact, income inequality in Thailand rose during the decades of economic growth and poverty reduction. The Gini coefficient increased from 0.487 in 1981 to 0.513 in 1996 (National Economic and Social Development Board [NESDB], 2008a, Table 15).

Table 1.1 Economic Growth and Gini Coefficient of Several East Asian Countries

Country	Annual GDP Growth 1990-2005	Gini Coefficient		
		1990-1991	1995-1996	2000-2001
Hong Kong ^a	2.4	0.476	0.483	0.488
Indonesia ^b	2.1	0.320	0.360	0.330
Malaysia ^a	3.3	0.446	0.464	0.443
Philippines ^{*b}	1.6	0.468	0.488	0.481
Singapore ^a	3.6	0.436	0.443	0.481
South Korea ^a	4.5	0.295	0.284	0.320
Thailand ^a	2.7	0.515	0.513	0.522

Note: * Data is available for 1997

a Index using data on income

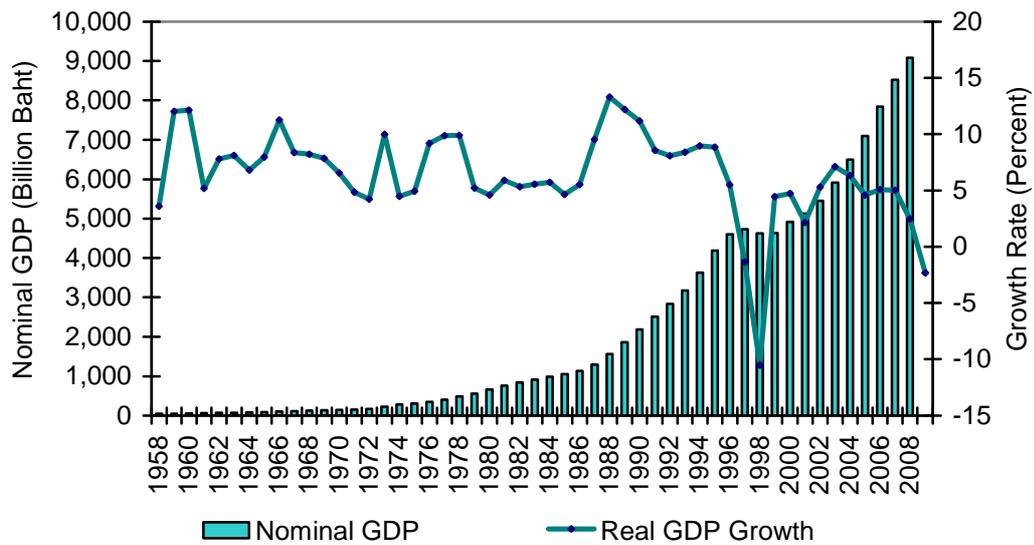
b Index using data on consumption expenditure

Source: Data for annual GDP growth are from Asian Development Bank [ADB] (2008, Table 2.14) Data for Gini coefficients are from sources as follows: Hong Kong: Census and Statistics Department (2007, Table 6.6); Indonesia: *Budan Pusat Statistik* (2006); Malaysia: Zin (2000, Table 2); Philippines: National Statistical Coordination Board [NSCB] (2000, Table 2.9; 2003, Table 2.9); Singapore: Department of Statistics (2002, Table 4); South Korea: Choi (2003, Table 2), Thailand: NESDB (2008a, Table 15)

Given a long period of sustained high growth, over-confidence of both investors and policymakers toward the Thai economic outlook had led to a bubble economy (Warr, 2005, pp. 19-20). This was particularly apparent in the real estate sector and financial markets. Coupled with a wrong policy package of financial liberalisation and fixed exchange rate, Thailand fell into a financial crisis in July 1997. Investment declined sharply and has remained stagnant since. Output contracted for the first time in decades and poverty incidence rose to 17.5 percent in 1998 (see Figure 1.1 and 1.2). Since then, the Thai economy has gradually recovered. In 2003, the gross domestic

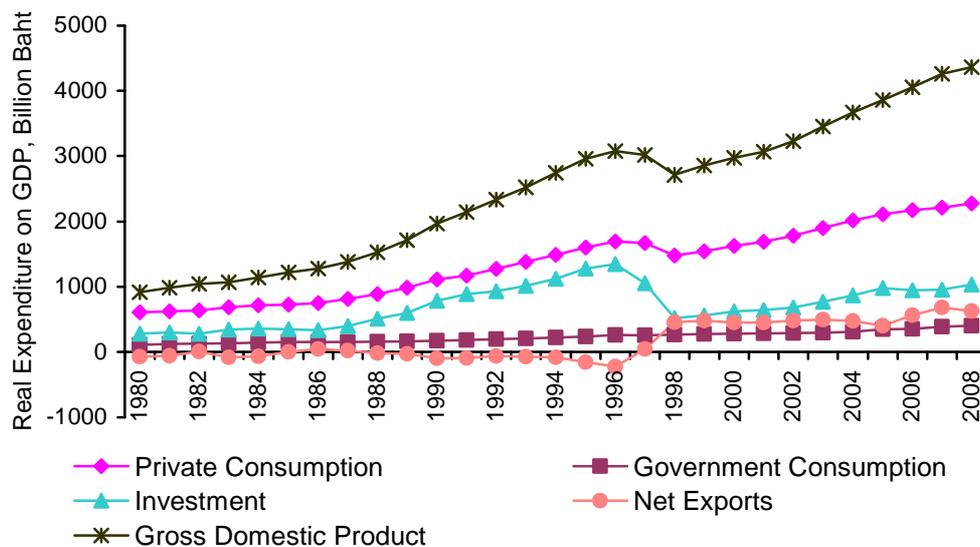
product (GDP) growth reached the pre-crisis level. Poverty incidence registered even lower than that prior to the crisis. As for income inequality, the Gini index declined during the crisis from 0.513 in 1996 to 0.507 in 1998. Throughout the recovery, the index has stayed at a lower level than in the pre-crisis period. The Gini index for Thailand is summarised in Table 1.2.

Figure 1.1 Nominal GDP of Thailand and Real GDP Growth Rate 1958-2007



Source: 1958-1979: NESDB (1999, Table 1-2), 1980-2000: NESDB (2002, Table 3-4) and 2001-2008: NESDB (2010a, Table 3-4)

Figure 1.2 Expenditure on Gross Domestic Product at 1988 Prices 1980-2007



Note: Author's own calculation based on National Income values from sources below.

Source: 1980-1999: NESDB (2002, Table 2) and 2000-2007: NESDB (2010a, Table 2)

Table 1.2 Income Gini Coefficient and Income Distribution of Thailand 1988 – 2007

Year	Gini Index	Income Distribution				
		Lowest 20%	Second 20%	Third 20%	Fourth 20%	Highest 20%
1988	0.487	4.58	8.05	12.38	20.62	54.37
1990	0.515	4.29	7.54	11.70	19.50	56.97
1992	0.536	3.96	7.06	11.11	18.90	58.98
1994	0.520	4.07	7.35	11.67	19.68	57.23
1996	0.513	4.18	7.55	11.83	19.91	56.53
1998	0.507	4.30	7.75	12.00	19.82	56.13
2000	0.522	3.95	7.27	11.50	19.83	57.45
2002	0.507	4.23	7.72	12.07	20.07	55.91
2004	0.493	4.54	8.04	12.41	20.16	54.86
2006	0.515	3.84	7.67	12.12	20.08	56.29
2007	0.499	4.30	8.01	12.42	20.22	55.06

Note: Both Gini index and income distribution are calculated from the primary data in the household socio-economic surveys (SES) conducted by the National Statistical Office (NSO). Data are not available for 2008 as household income was not included in the surveys in 2008.

Source: NESDB (2009, Table 15-16)

While it is apparent that overall poverty reduction in Thailand correlates with national economic growth, the distribution of income has been unaffected by economic circumstances (Warr, 2004, p. 11). Income inequality has remained high throughout the economic boom, the crisis and recovery. This has encouraged both Thai academics and policymakers to explore why the outcome prevails. As a result, numerous studies on income inequality in Thailand have been produced in recent decades. Despite that, almost all of them emphasised exclusively one dimension of uneven income distribution—the inequality between different income groups. The reason why it has been a focus for researchers and policymakers is that it illustrates how national income is distributed among populations at different income groups. Analysis in this aspect, however, categorises populations regardless of sectors or regions where they live. While this is unarguably the most important dimension to be considered, other aspects also

deserve attention. Perhaps the inequality persisted in Thailand partly because of the lack of attention on these other dimensions. One interesting aspect that should receive attention is the inequality across geographical areas.

The study of geographical inequality can be traced back to the 1950s when economists started to notice the persistence of regional income disparities within national borders. Earlier works suggested that increases in regional disparities during the early stages of development were to be expected. It was argued that disparities should start to fall when a country entered a more mature stage (Williamson, 1965). This conclusion was later criticised, as regional income differences in developing countries did not show signs of shrinking even at higher levels of national per capita income (Gilbert & Gugler, 1992, pp. 35-36). In addition, an argument that the agglomeration forces in urban centres would lead toward polarisation and, thus, larger regional disparities has become increasingly strong. This is particularly evident in several rapid-growing developing countries. Widening income inequality among regions within a country was found in India, China, the Philippines, and the new EU member countries. (Ghosh, 2008; Zhao, 1996; Balisacan, 2007; Szorfi, 2007)

Thailand is no exception. In fact, Thailand has long been recognised for its high concentration of development in and around Bangkok. This is because Bangkok has been more than just the capital city where the government is located. Its location has given advantages to many businesses, consequently pulling resources into it. Accordingly, Bangkok has grown dramatically compared with the rest of the country. In 2000, it had around 6.3 million inhabitants, which was 17 times the number of residents of the second largest city (Richter, 2006, p. 38). This could hardly be missed by anyone looking at the regional figures or even by anyone who has been to Bangkok and the second-largest city, Samut Prakarn. In fact, both the second- and third largest cities in

Thailand are located within the vicinity of Bangkok. Only the fourth largest city, Udon Thani is located 564 kilometers away from Bangkok (NESDB & World Bank, 2005, p. 57). This indicates high degree of Bangkok's agglomeration forces.

Despite that, regional disparities have largely been ignored by researchers as well as by policymakers in Thailand. Particularly, when analysing at the provincial level. Although some direct studies exist, only a few of them examines geographical disparities using the provincial data after the year 2000. This means that the effects of financial crisis and structural changes during the post-crisis period have not been evaluated. While there is a study on why Northeastern region lags behind, there are no in-depth studies done on regional disparities in general. That is, the factors that determine regional development patterns in Thailand throughout the past few decades of high growth, crisis and post-crisis period have not been explored. While government policies and agglomeration trends have usually been stressed as primary explanations of the regional disparities, there is no empirical evidence for this claim. It is, therefore, important that the relationship between the past government policies, agglomeration forces and regional disparities be investigated.

1.2 Objectives of the Study

This thesis sets the following objectives:

- (1) To examine provincial disparities in Thailand between 1988 and 2008. The analyses will cover the periods of economic boom, the crisis in 1997-1998 and the post-crisis period. The thesis also seeks to analyse the links between provincial income disparity and poverty in Thailand.

- (2) To identify whether there is β -convergence in income per capita among provinces in Thailand. A country is said to exhibit regional growth convergence when the poorer regions grow at a faster rate than the richer ones, thus reducing regional disparities in the long run.
- (3) To determine factors contributing to provincial per capita income growth. Empirical studies have indicated several determinants e.g. physical- and human-capital accumulation, trade openness, geography, economic structure and most importantly, regional development policies. (Resosudarmo & Vidyattama, 2006; Fujita & Hu, 2001; Garcia & Soelistianingsih, 1998; Hill & Balisacan, 2007) This research also intends to investigate agglomeration factors and their effects on the provincial disparities in Thailand.
- (4) This thesis aims to give policy implications which may come out from the findings on provincial disparities in the country.

1.3 Organization of the Thesis

Chapter Two gives an overview of regional economic theories and methodologies developed so far. Given the interdisciplinary nature of regional economics, regional disparity usually coincides with economics of agglomeration and economic geography. Hence, theories and methodologies on these issues will also be briefly reviewed in order to better utilise the techniques relevant for the analyses in this thesis. Then the empirical evidence will be reviewed. Previous studies carried out in countries that are comparable to the case of Thailand—namely the Philippines and Indonesia—will be discussed. Finally, the empirical studies on Thailand will be presented.

Chapter Three describes the historical background of Thailand's economic development. Here, the study will look at the period of economic boom, namely from 1981 to 1996, followed by the financial crisis and the post-crisis period. It is now widely known that the government policies were not the only major factor determining the performance of the Thai economy. However, several factors interplayed to produce both an outstanding performance prior to 1996 and the crisis. These factors will be analysed along with the provincial disparities. Williamson's population-weighted coefficient of variation (v_w) and Theil index will be employed as measures of disparity. Analysis will focus on per capita income differences among 76 provinces, which is the geographical division according to the current administrative system. As these provinces can be grouped into seven regions, the study will analyse differences among regions as well as the differences within each region. Figure 1.3 illustrates the administrative provinces and regions in Thailand. For the period after the crisis, the emphasis will be placed on whether the reforms taken so far have contributed to the regional disparity issues.

In relation with the income disparities, Chapter Four looks at four other aspects of provincial disparities in Thailand. These aspects include sectoral distribution, labour productivity, government budget allocation and education- and health services. The former three aspects are normally considered as factors explaining the provincial income disparities. Meanwhile, the disparities in education and health services are included to show how welfare is distributed across provinces. Patterns of disparities in these four aspects will also be compared with that of income.

Chapter Five investigates the evidence of β -convergence in income across provinces of Thailand. According to Barro and Sala-i-Martin (1991, pp. 112-113), there are two types of convergence, σ - and β -convergence. The σ -convergence exists when

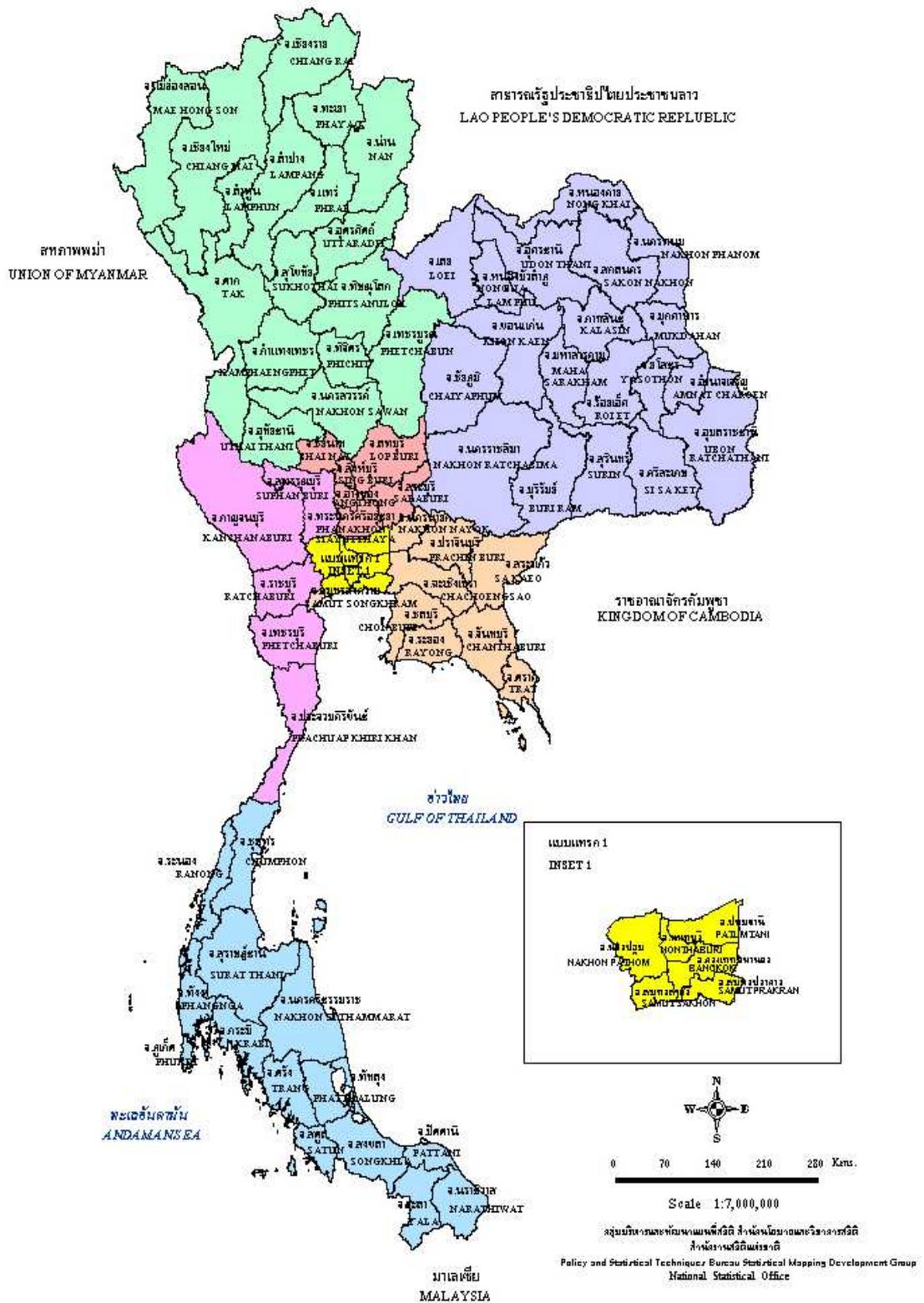
variation across provinces reduces over time. This is therefore the same as provincial disparities examined in Chapter Three and Four. On the other hand, β -convergence exists when initially poor provinces grew at faster rates than initially rich provinces. Given a close relation with β -convergence concept, Chapter Five will also examine factors contributing to provincial income growth. Comprehensive explanations of econometric methods and data sources to be used in the model will be given. It will be followed by an interpretation of the results.

Chapter Six turns attention toward poverty issue. Given a wide range of poverty definitions used nowadays, this chapter will start with the poverty definitions and measurements. Both definition of poverty and construction of poverty lines in Thailand will be discussed. Then, provincial disparities in poverty rates will be examined and compared with the disparities in provincial income. As economic growth normally leads to poverty reduction at the national level, this chapter also investigates this relationship at the provincial level. Chapter Six will end with an analysis on provincial poverty determinants.

Chapter Seven moves the discussion to the agglomeration analysis. The agglomeration forces are widely argued to play a significant role behind increasing regional disparities around the world. It is also expected to play as important role for the case of Thailand. Bangkok has been widely known to dominate the Thai economy ever since it became the capital city of Thailand. Bangkok and its vicinity, the so-called Bangkok Metropolitan Region¹ (BMR) generates almost half of the country's GDP (42.8 percent in 2006). Hence, the role of agglomeration around Bangkok is examined in this chapter. Finally, Chapter Eight summarises the findings and offers policy implications that are drawn from this thesis.

¹ The BMR comprises of Bangkok and its five bordering provinces. These are Nonthaburi, Phatum Thani, Samut Prakan, Samut Sakhon and Nakhon Pathom (Dixon, 1999, p. 192).

Figure 1.3 Map of Thailand showing Provincial (Changwat) Boundaries



Source: NSO (2005b, p. 5)

CHAPTER 2

Regional Development: Theoretical and Empirical Review

2.1 Introduction

The study of regional economics is a young discipline when compared to other fields of economics. This is partly due to lack of data during earlier periods. It is also partly because of the dominance of neoclassical views in the past. These views assumed that an issue such as regional disparities would be automatically solved by market adjustments (Weiss, 2007, p. 52). It was only when the available data indicated that regional income differences persisted and were widening that the issue started to receive attention.

Despite its rather new emergence in economics, the issue of regional disparities has drawn considerable attention from researchers. As a result, a large amount of theoretical and empirical work has been developed. This chapter takes a look at both types of evidence. Regional development theories will be reviewed first. Then, existing empirical findings will be discussed with analysis of how each of them supports the theories.

2.2 Regional Development Theories

The study of regional economics emerged in the late 1940s when economists started to consider the spatial aspect in their analyses. Much of the theoretical work in this early period originated from location theory and international trade theory (Meyer, 1963, p.

26). Location theory describes how firms choose their production locations. It assumes that firms compete in a free market and that transport costs are the only variable cost for a firm. Firms thus decide to locate where their cost of transportation is minimised. This implies choosing a location where demand for the firm's product is highest. Although the location theory focuses on the microeconomic aspect, it has a bearing on the issue of regional disparities. Because demand tends to be positively correlated with city size, most firms would want to locate in big cities. This is to capture large urban demand with lower transport costs. As firms increasingly locate in the cities, polarisation will emerge (Alonso, 1964).

International trade theory, on the other hand, considers the issue from a macroeconomic viewpoint. Unlike location theorists, economists in this camp argue that economies develop and compete in the world market. Cities are usually established in response to global demand. In North America, for example, new cities sprung from their comparative advantage in costs of production, including transfer costs. (North, 1975, p. 337) As exports determine the development of core areas, regions with locational advantages usually emerge as trading centres. Once these regions have developed, external economies take place and stimulate further growth. While this notion is consistent with location theory, the long-run result is not. Based on neoclassical assumptions, the theory assumed that capital and labour are perfectly mobile within the nation. Thus, regional income inequality is often a short-term phenomenon. Once adjustment mechanisms are fully in place, the disparities will automatically disappear.

From the late 1950s, theories with emphasis directly on the regional income differences began to develop. Williamson (1965) suggested that there was a systematic pattern of regional disparities when a country proceeded along a development path. It took the form of an inverted U-shape. That is, regional income inequality was to rise in

the earlier stage of development. As rich regions grew, they attracted both capital and skilled labour into them. In addition, lack of interregional linkages slowed down the spread of technology from rich regions to poor ones. At the same time, the government was likely to pursue economic growth over equity as a goal during this stage. However, this widening disparity would not continue indefinitely. As a country developed, the benefits of economic growth were expected to gradually trickle down to the poor regions. Once adjustments in factor markets had been in place, differences in regional income would begin to narrow. At the mature stage of development, convergence in income per capita among regions should be evident.

Several economists, however, shared different views from that of Williamson. Myrdal (1957) argued that not only do disparities persist, but that the gap could also widen. This is because there are agglomeration forces pulling resources, talent and surpluses to the core areas at the expense of the periphery. Thus, the gap between the rich and the poor regions is continuously reinforced by ‘cumulative causation’ process. Similarly, Hirschman (1975, p. 139) suggested that an economy usually started off its development process by creating regional centres. Once established, economic growth would be concentrated around these centres or what he termed “growth poles.” He further pointed out that there were two effects of the growth poles on the backward regions—trickling down and polarisation effects. In the end, the former effect was expected to dominate over the latter. The speed for this result to take place depended on government policy toward the development of the backward regions.

While the debates continued, growth theorists offered an alternative approach to the issue of regional disparities. These theorists include Koopmans (1963), Case (1965) and Barro (1991). They were originally interested in economic growth and convergences among countries. However, the theories have implications for regional

growth differences within a country as well. They suggested that there were two types of convergence, σ - and β -convergence. The former, σ -convergence, appears when dispersion of regional per capita income declines over time. This is the type that was considered by Williamson. The latter, β -convergence, appears when per capita income of poor regions catches up with the rich regions. This is the aspect that growth theorists were interested in. The two types of convergence do not always have to go in the same direction. That is, σ -convergence cannot appear if the poor regions do not grow faster than the rich. However, β -convergence does not always lead to σ -convergence (Barro & Sala-i-Martin, 1991, pp. 112-113). According to neoclassical growth theory, the per capita growth rate of a closed economy tends to be negatively related to initial level of per capita income. Thus, β -convergence is expected. In other words, economies with lower initial per capita income tend to grow faster than the rich ones. However, that can only be the case when returns to capital are declining and the poor regions have not reached a steady-state level. The theory also assumes that economies have similar preferences and technology (Barro & Sala-i-Martin, 1991).

Romer (1986) challenged the neoclassical view by introducing increasing returns-to-scale production to the growth model. He assumed that knowledge is a capital good with increasing marginal productivity. However, research technology, which produces new knowledge, exhibits decreasing returns. That is, it takes more than one unit of research input to produce one additional unit of new knowledge. In addition, new knowledge created by one firm generates positive externalities to other firms. Romer then showed that competitive equilibrium could be reached with these above-mentioned assumptions. The model thus implies that richer economies can grow faster than the poorer ones. As a result, there is a possibility that growth rates among countries would not converge.

Now that increasing returns can be modelled, Krugman (1993a) utilised increasing returns to extend the theory in the field of economic geography. His model assumes economies of scale in production and monopolistically competitive market for the manufacturing sector. Krugman, then, showed that history is an important factor determining location of production. Although there are multiple equilibria for firms to locate, they tend to cluster together at one location. That is, firms would choose the location where the manufacturing labour is initially concentrated. With increasing returns and cumulative process, this location will continue to grow and maintain its position as the core. In other words, the core-periphery pattern will persist when there are (i) strong economies of scale, (ii) low transportation costs and (iii) large share of manufacturing sector. This explains why major cities around the world have continued to grow until today. It also suggests that regional income growth convergence is less likely to occur.

Krugman's model, however, contains some limitations. His result was achieved under a simplified assumption that agricultural workers cannot move to manufacturing sector and vice versa (Krugman, 1993a, p. 102). Another limitation of the model is that it considers an economy with only two locations. This is difficult to apply to the case of several regions. Knowing these limitations, Krugman later extended his work to a linear spatial economy. This yields the same result. That is, production tends to concentrate in one location (Fujita & Thisse, 1996). Fujita and Krugman (1995) then relaxed the immobility assumption by allowing workers to move between regions and sectors. This more relaxed model suggests, however, that the agglomeration process may not continue when population becomes too large or when products are not differentiated enough. In this case, it is possible to have more than one city.

Being the first to introduce a full-specified model, Krugman's work has triggered several subsequent developments in this area. Englmann and Walz (1995) assumed that unskilled workers are immobile while skilled workers are mobile. They proposed that R&D sector would employ only skilled workers. However, the product created by the sector is non-tradable. As a result, production will be concentrated in the area where the non-traded goods are produced.

This new approach to the spatial analysis has sometimes been regarded as the "new economic geography" (Fujita & Thisse 1996). Generally, it considers the issue of agglomeration in a more quantitative style as compared to the work prior to the 1990s. Here, much attention has been paid to the two opposite types of forces influencing the spatial pattern. Centripetal forces intensify agglomeration while centrifugal forces reduce it. Because there are both types of forces interacting in each city, there are theorists who do not agree that agglomeration will continue infinitely. Mori (1997) found that firms have an incentive to locate in rural areas due to lower wages. Workers may also want to live in rural areas because lower agricultural prices imply higher real wages. Even Krugman and Venables (1995) predicted that the core-periphery pattern would continue only to a certain point. The core-periphery pattern first emerged when transportation costs began to fall below a certain critical value. However, when transportation costs continued to decline, the forward-backward linkages became less important. Once transaction costs reached sufficiently low level, the lower wage in periphery would offset the disadvantage of being away from markets and suppliers. As a result, firms would start to move out of core to the periphery. This would thus lead to growth convergence among regions (Krugman & Venables, 1995, pp. 859-861).

In summary, theoretical development in regional economics has been rapid in the past few decades. Several tools and measures were developed to support theoretical

descriptions found by earlier theorists. The scope of the field has also expanded to cover many aspects of economic analysis. The field now coincides with urban economics, economic geography and is part of interdisciplinary regional science. Consequently, economists now have a deeper understanding of how spatial factors influence economic patterns around the world. In spite of that, the issue of regional disparity continues to be subject to debate. Economists have been unable to agree whether regional disparities will automatically converge or whether policy correction is necessary. Given the interdisciplinary nature of the issue, theoretical development may become too difficult to model. Here, empirical evidences can generate more understanding of how the theories fit with the real world. They are considered in the next section.

2.3 Empirical Evidence

Given the theoretical debates that have continued until today, there is a large amount of empirical work done on regional disparities so far. An important study, which marks the beginning of empirical work in this field, is by Williamson (1965). He employed regional data from 24 countries to compute the population-weighted coefficient of variation—a measure of level of income dispersion among regions within a country. The empirical results supported his hypothesis that the regional disparities formed an inverted U-shaped pattern as a country moved along its development path. Thus, convergence of interregional income differences should be expected at the more mature stage. These Williamson's findings were, however, subjected to criticism as he only included six developing countries in his analysis (Douglas, 1990, p. 13). In addition, empirical evidence in later periods suggested other outcomes. Regional disparities within countries continued to widen even at a medium level of national income per

capita. Evidence of increasing disparities has been found in China, India, Indonesia, and the Philippines¹ (Hill, Balisacan & Piza, 2007; Ghosh, 2008).

While the debate on σ -convergence continued, Barro (1991) turned his attention to β -convergence instead. He used data from 98 countries to empirically verify his theory on β -convergence. Results showed that countries with lower initial GDP per capita would catch up with higher income countries only when they have a high level of initial human capital. In addition, determinants for high regional growth include low public consumption expenditures, low price distortions in markets, and political stability. Sachs and Warner (1995) also confirmed these results. The findings, however, only suggested conditional convergence. Growth rates among countries converge if steady-state levels and rates of technological progress were held constant. Because these two factors differ among countries, the above empirical results partially support the neoclassical growth theory.

Barro and Sala-i-Martin (1991, 1992) went further to support unconditional convergence as proposed in the theory. Instead of cross-country data, they used intra-national data for their analysis. This is because regions within the same country tend to share more similar characteristics. Thus, steady-state levels and rates of technological advancement are expected to be similar as well. Data for 48 US States and 73 regions across seven European countries were employed in this case. The empirical results exhibit convergence, which is consistent with the theory. Not only that—the rate of convergence is higher in this analysis as compared to the cross-country one. This, therefore, confirmed the theory that higher mobility of labour accelerates the rate of convergence (Barro & Sala-i-Martin 1991, p. 153).

¹ These countries are classified as lower-middle income countries according to the World Bank definition (see <http://go.worldbank.org/D7SN0B8YU0>)

The method used here has contributed greatly to the empirical researches in the field of regional science. In fact, much of recent empirical work has been based around this convergence model. Despite that, findings have received some criticisms. The model needs to be adjusted before it reveals strong convergence. This includes adjustments for sectoral composition, and shocks. Moreover, effects of capital mobility on β -convergence yield ambiguous results. If technologies differ among regions, then capital may move from poor to rich regions. In that case, there is a tendency for divergence rather than convergence.

Beginning in the 1990s, a considerable amount of attention has revolved around the emerging theory of the new economic geography. The theoretical frameworks and models have been developed rapidly. This has brought about a new set of arguments to explain and predict the pattern of regional disparities. Despite its rapid theoretical development, the empirical studies relating to these theories are rather limited. This is partly because the quantitative techniques to investigate the issue are still in an early stage of development. The theoretical models available so far are either too abstract or over simplified, which make them difficult to be tested (Martin, 1999, p. 70). Accordingly, the empirical analyses are rather indirect ones—through productivity measures and production functions.

Early empirical studies normally used city or industry size as determinants of productivity, which in turn reflects the existence of agglomeration effects. Sveikauskas (1975) and Segal (1976) investigated agglomeration across the Standard Metropolitan Statistical Areas (SMSA) of the USA. They both found that labour productivity increased with city size, which was measured as number of population in the city. Meanwhile, Henderson (1986) examined the agglomeration effects both in SMSAs of the USA and in cities of Brazil. Here, he used industry size, as measured by the number

of employees in urban areas, instead of city size. Results showed that there were positive relationships between industrial productivity and industry size in both countries.

Ciccone and Hall (1996) argued that density, rather than size, of economic activity was a more accurate determinant of agglomeration. This can be examined through the effect of employment per physical space (acres) on Gross State Product per worker. Focusing on density instead of size also allowed them to use county- and state-level data. These data normally give a more accurate measure of output than the SMSA data employed in earlier studies. The model, then, used the non-linear least square (NLS) method to estimate the coefficient representing the net effect between congestion and agglomeration forces. They found the evidence of agglomeration effects outweighing the congestion effects across counties of the USA in 1988. In addition, Ciccone and Hall (1996) also used their framework to show that density was more important in determining agglomeration than size of economic activity. Since then, the model developed by Ciccone and Hall (1996) has become the conventional method for empirical work on agglomeration.

Given these many methods available for studying regional disparities, researches on specific country have grown significantly since 1990. For this study, particular attention is given to the researches on East Asian countries. This is because countries within the same region should share more similar characteristics than those from different regions. Hence, a review of empirical studies in neighbouring countries seems to be more appropriate. The cases of China, Indonesia and the Philippines will be reviewed below. Then, previous works on Thailand will be discussed. This will reveal the gap that this thesis aims to fill.

China

There have been numerous studies done on regional disparities in China during recent decades. Tsui (1991) employed both provincial output and income statistics for the period 1952-1985 to calculate Williamson's population-weighted coefficient of variation. He found that income differences across provinces widened during the period. This was partly due to the fiscal decentralisation in 1958. In China, total provincial revenues comprise budgetary and extra-budgetary sources. Each province received the former from the central government while collecting the latter itself. As fiscal system decentralised, more revenues were classified as extra-budgetary revenues. Consequently, the rich provinces were able to collect more revenues, which led to greater regional disparities. Although central government allocated government transfers to the poor provinces, these transfers were not large enough reduce the disparities.

Fujita and Hu (2001) looked at the issue from a coast-interior perspective. They found that regional disparities in China become more severe this way. It is because, from the 1980s, coastal provinces grew at a faster rate compared with interior provinces. Although inter-provincial disparities decreased during the 1980s, it was solely due to the catching up of many coastal provinces. In addition, there is no evidence of β -convergence in China between 1983 and 1994. However, when considering only coastal provinces, convergence was exhibited. Disparity between coastal and interior regions is further supported by stronger agglomeration in coastal provinces. This agglomeration, as the authors argued, was driven mainly by globalisation and economic liberalisation. Moreover, a policy bias toward coastal provinces also contributed to the issue.

The role of globalisation and economic liberalisation in stimulating agglomeration effects was further supported by He and Zhu (2009). They found that the

Gini coefficients for industrial employment as well as output considerably increased from 1990 onwards. The economic reform and opening-up of the coast in 1978 led to the rapid growth in the coastal provinces and relative decline of industrial bases in interior provinces. This consequently resulted in strong industrial polarisation toward the coastal provinces, as reflected by the rising Gini indexes.

Meanwhile, Song (2007) reviewed several studies to determine factors that contributed to the regional disparities in China in recent decades. He summarised that these factors include geographic location, openness to trade and foreign direct investment (FDI), capital per worker, marketisation and decentralisation. In addition, interregional income growth convergence is found to be conditional on human capital accumulation and regional policy. One of the most effective policies to reduce regional disparities is to increase interregional migration.

Market reforms in China did not only lead to increasing regional income disparities. It also affected other aspects of spatial inequality. Zhang and Kanbur (2005) found that education and health care inequalities increased after the reforms. Decentralisation of fiscal responsibilities to local governments means that they became providers of health and education services. With limited help from central government, the poor local governments were left with an inadequate budget. As a result, they had to cut their spending and let their people share the expenses. Hence, increasing income inequality translated into inequalities in these services. The study, however, focused on rural-urban dimension rather than inter-provincial inequality. This is because the issue is more severe in the former dimension (Zhang & Kanbur, 2005, p. 201).

Due to the considerable number of studies in China, several techniques have been suggested to approach the problem. These studies, thus, contribute to this research in term of generating more options to choose from. However, given the differences of

geographic size, political systems and economic development between Thailand and China, the findings may not be well suited to the case of Thailand. Countries that tend to be more appropriate to compare with Thailand are Indonesia and the Philippines.

Indonesia

There are a smaller number of studies on regional disparities in Indonesia compared to China. Nonetheless, the former shares a more similar pattern of economic development with Thailand. Not only that, Table 2.1 shows that the problem of regional disparities is as severe in Indonesia as it is in Thailand. This has raised much attention from both researchers and policymakers in Indonesia.

Table 2.1 Coefficient of Variation of Several Development Countries

Country	Year	
	1996	1997
Brazil		0.563
China		0.692
India		0.387
Indonesia	0.840	
Mexico		0.473
Nepal	0.157	
Pakistan		0.186
Philippines		0.530
Poland	0.206	
Rumania	0.189	
Russia		0.625
Thailand		0.797
Uganda		0.274
Uzbekistan		0.353
Vietnam		1.067

Note: The coefficient of variation in this table may not all be weighted by population. No such information was given in the study.

Source: Indonesia: Resosudarmo and Vidyattama (2006); all other countries: Shankar and Shah (2003 cited in Resosudarmo and Vidyattama 2006)

Akita and Lukman (1995) investigated interregional inequalities in Indonesia during 1975-1992. Williamson's population-weighted coefficient of variation was used

as a measure. Findings showed that the disparities across regions had gradually narrowed. Nonetheless, the disparities in 1992 were considered to still be large. In addition, the study also analysed the contribution of production sectors to the overall disparities. Here, the coefficient of variation was decomposed into three sectors—primary, secondary and tertiary sectors². The coefficients of variation for the latter two sectors were much higher than the former. This reflects a more uneven development of these two sectors across provinces. With the tertiary sector accounting for the largest share of GDP, it contributed the most to the overall interregional inequality. Meanwhile, a growing income share of the secondary sector implies that it was expected to play an increasing role in the future.

In a study which sought to explain why provincial income disparities persisted in Indonesia, Garcia (1998) examined both types of convergence. The study covered the period from 1975 to 1993. Results suggested that dispersion of per capita GDP across provinces had steadily declined³. This is consistent with the earlier findings by Akita and Lukman (1995). It also implies that σ -convergence was evident during the period. For β -convergence, Barro-type regression models were used and the period of study was divided into three sub-periods, 1975-1993, 1980-1993 and 1983-1993. Results show that absolute convergence exists for all three sub-periods. However, the convergence rates became slower from the first sub-period to the last. In addition, the initial income only accounts for half of the explanation, and hence, conditional convergence was explored. Factors that significantly correlated with higher growth rates were better education and lower population growth. Despite having several variables included in the model, the significant ones still could not explain provincial growth entirely.

² For mathematic details on the decomposition, see Akita and Lukman (1995, p. 64)

³ There is actually a dip in 1982, which can be explained by two reasons. One is due to change of base year and methodology used to calculate the provincial accounts. Another is that it may reflect the oil shock effects. See Garcia (1998, pp. 110-111)

Resosudarmo and Vidyattama (2006) extended the analysis to include more variables. The study covers the years from 1993 to 2002. Though the underlying concept was the same as that of Garcia (1998), the methods used here were different. While Garcia employed standard deviation of log of per capita GDP as measure of σ -convergence, Resosudarmo and Vidyattama used the coefficient of variation instead. The findings exhibit increasing disparities among provinces since 1998. Nonetheless, they found conditional growth convergence among per capita GDP across provinces during the period. Again, while Garcia conducted analysis using an OLS estimating method, it is found to be inconsistent with the model used here. Thus, fixed effect estimation was applied to the analysis. Results reveal that the factors that significantly determine provincial growth include capital accumulation, trade liberalisation and the share of natural gas and oil production in the total provincial GDP.

Hill, Resosudarmo and Vidyattama (2008) revisited the regional disparities issue by covering the longest period of time possible. The study used provincial data from 1975 to 2004. Findings indicated that there has been a clear shift of economic activity toward Jakarta. The capital almost doubled its share of non-mining GDP from 11.0 percent in 1975 to 18.8 percent in 2004. Not only that, Jakarta has also been among the fastest-growing provinces throughout the period. Thus, Jakarta has exhibited strong agglomeration forces. This result was apparent regardless of the data set being used. On the contrary, when looking at the regional level, the disparities depend considerably on the choice of data. When gross regional product (GRP) was employed, the σ -convergence could be observed over the period of study. In addition, absolute β -convergence was detected for the period between 1975 and 1997. However, when non-mining GRP and consumption expenditure data were used instead of the total GRP, no significant convergence occurred. There was no evidence of σ -convergence for the two

series as the Williamson's population-weighted coefficient of variation exhibited stable trends. Likewise, the coefficients for absolute β -convergence were insignificant for both series. Nonetheless, evidence showed that the provinces with high growth during the period were those being most connected to the global economy.

The Philippines

Although it is an archipelagic state, the Philippines share some similar characteristics to Thailand. The two countries are similar in geographic size, population, income level as well as the economic structure. Having similar development patterns, both of them fell into the financial crisis in 1997. They have also been faced with persistent income inequality. In fact, the income Gini coefficients of Thailand and the Philippines are roughly at the same level.

In examining characteristics of poverty and inequality in the Philippines, Balisacan (2002) identified regional inequality as one of the attributes. He then employed provincial panel data to investigate factors affecting the welfare of the poor across provinces. Regression results suggested that poverty reduction depended on the types of growth rather than the rate of growth. In other words, growth would benefit the poor more if policies were designed to favour them. Factors that affected the welfare of the poor include schooling coupled with infrastructure, better terms of trade for agricultural products, agrarian reform, and governance. More importantly, geographic disadvantages such as landlocked areas or regions frequently hit by typhoons also led to poverty traps. Hence, improving conditions in these areas would increase the welfare of the poor.

A comprehensive study on regional disparities in the Philippines is summarised in the book edited by Balisacan and Hill (2007). Here, several factors were examined in

detail to see whether they determined income differences across regions. These factors were comprised of local governance quality, regional labour markets, decentralisation, infrastructure, development of rural non-farm sector and trade liberalisation. Using Human Development Index (HDI) scores as measures of local governance quality, no correlation between HDI scores and provincial economies were found. Theoretically, local governance and regional development can be linked in three channels—social service provision, social inclusion and initial level of development (Capuno, 2007, p. 206). The study suggested that there was a relationship between poverty and poor quality of local governance. That is, level of development in each area determined its politics, which in turn determined its future development level.

Similarly, regional labour markets in the Philippines between 1988 and 2002 showed few signs of convergence. There was also no significant sign of divergence either. Although regional per capita income was not closely related with the unemployment rate, it had a stronger positive relationship with wages growth. In addition, high-income regions continued to be major destinations for migrants from the poorer regions. Data suggested that this was one of the most effective ways to move out of poverty in rural areas. While this illustrates the agglomeration force of the rich regions, it also implies that labour in the Philippines was quite mobile (Esguerra & Manning, 2007, p. 273).

The Philippines implemented fiscal decentralisation in 1991. Theoretically, this should lead to more efficient use of budgets, as local governments are expected to know what local people want better than the central government. Nonetheless, this has not been evident in the Philippines particularly during 1997-2000. This was due to a mismatch of revenue assignment and expenditure responsibilities of local governments. Consequently, local governments in richer regions were in better positions to provide

public services. Although there were transfers from central government, they turned out to be positively correlated with the regional per capita income between 1995 and 1999. This tended to increase, rather than reduce the disparities. On the other hand, infrastructure investment was found to be a source of regional income growth. Since this type of investment had been highly uneven among regions in the Philippines, it explains why the country continued to have high regional disparities.

Another factor that is expected to reduce regional income inequality is the access to rural non-farm income. A study by Estudillo and Hossain (2003) found evidence of this relationship in the Philippines. Data also reveal that non-farm income accounted for the largest part of rural household income. This non-farm income was comprised of remittances from those who worked abroad and income from rural industries. Recent growth in rural industries came from relocation of firms outside cities in order to access cheaper labour and lower land prices. Another character of rural industrialisation in the Philippines was the growing number of subcontracting firms. This rapid rise in subcontracting was a result of trade liberalisation and substantial foreign investment inflow in the mid-1980s. Nonetheless, to minimise transportation costs, most of these relocated firms and subcontractors were still in close proximity to the manufacturing centres. Like conventional pattern, the manufacturing sector in the Philippines was concentrated only in a few areas of the country.

This point is further supported by analysis of trade liberalisation effects on regional disparities. Tecson (2007) found that trade liberalisation played an important role in reducing the primacy of the country's capital city. However, industries appeared to re-concentrate in the nearby areas. To measure the concentration of industry, Tecson

used the Industrial Location Quotient⁴ and FDI. Both data revealed a high degree of regional concentration in production sectors and foreign investment. In fact, concentration of manufacturing had been encouraged by the government through export processing zones (EPZ). Nevertheless, increasing concentration around the capital runs counter to the government's aim to disperse industry to other regions. This implies that agglomeration forces have taken effect here.

Finally, Balisacan (2007) used provincial per capita income during 1988-2003 to empirically investigate income growth convergence among provinces. He found absolute convergence of per capita income growth across provinces of the Philippines. Furthermore, a conditional convergence model was employed to examine relationships between many factors and provincial growth. Results show that per capita income growth was significantly affected by improvements in education, health and infrastructure, better agricultural term of trade and land reform. The same analysis was also conducted with poverty reduction. However, no direct effect of the above factors was found on poverty reduction. With significant and positive correlation between income growth and poverty reduction, it implies that these policies only reduce poverty via their effects on income growth.

Thailand

The number of studies that focus directly on the regional inequality in Thailand has been exceptionally small. This is partly because most attention has been paid to the income inequality across income quintiles. A perception might be that all other

⁴ Industrial Location Quotient or ILQ is a measure of a region's degree of concentration in a given industry. Concentration of industry in location i is given by

$$ILQ_i = s_i / x_i$$

where s_i is location i 's share of industry value added and x_i is location i 's share of total value added or employment

inequality dimensions will be automatically improved once inequality across quintiles is reduced. Moreover, regional policies have been embedded in the five-year national development plan since 1977 (Kmonwatananisa, 2008). As a result, it may be perceived by many that this dimension of inequality has been taken care of. Nonetheless, the increasing gap between Bangkok and the rest of the country implies that these past regional policies may not be sufficient.

In a study of regional inequality, Douglass (1990) showed that the regional disparities were on the increase in Asian countries including Thailand. This study also showed that development had been concentrated only around Bangkok for decades. Williamson's population-weighted coefficient of variation was used on per capita gross provincial product (GPP) to measure regional disparities. Results reveal that regional disparities in Thailand were increasing and that Bangkok continued to be the major source of these disparities. Factors contributing to this high polarisation in and around the capital city include the geography of Bangkok, a government policy bias toward Bangkok and slow agricultural productivity-improvement. Given that the manufacturing sector clustered around Bangkok and its surrounding provinces, Douglass predicted that polarisation would continue. This would lead to even higher income disparities between regions. Government interventions were thus recommended. The conventional policy had been to induce industries to locate in targeted areas outside the BMR. While this approach was effective in slowing down the polarisation in the old cores, it does not always directly lead to a reduction in regional disparities. As a result, a policy to accelerate rural development was also recommended to complement industrial decentralisation policy. The logic was that towns and non-agricultural sectors in provinces would grow in response to higher demand. Demand could increase only in response to higher agricultural productivity and incomes.

The implementation of regional development policy was also supported by Booth (1997, pp. 179-185). She suggested that high regional disparity was one of the reasons why Thailand—though the economy grew faster—was less successful in poverty reduction than Indonesia. This was due to different policies toward rural development. In Thailand, rural areas and the agricultural sector, where majority of the poor were located, did not receive much attention. Indonesia, in contrast, stimulated growth in regions where the poor were concentrated.

The study by Southichack (1998) provided a more comprehensive analysis to regional development in Thailand. He examined both σ -convergence and β -convergence using provincial data from 1975 to 1995. Here, standard deviation of the log of real per capita GPP was employed as a measure of regional dispersion. Results showed that per capita GPP dispersion increased between 1975 and 1995. This implies that Thailand experienced σ -divergence during the period of study. The dispersion was also found to be positively correlated with the real per capita GDP growth rate. As for β -convergence, the regressions were estimated using NLS method. Results suggested that there was an unconditional β -divergence among provinces in Thailand during the 20-year period. It was only after controlling for regional differences and structural changes within each province that the conditional β -convergence was detected.

In this study, Southichack also analysed an effect of price differences across provinces on the convergence estimates. He compared the data deflated by province-specific deflators and those deflated by overall GDP deflator. Evidence indicated that price differentials significantly affected both σ - and β -convergence results. Moreover, the study suggested that another factor contributing to Thailand's divergence was the labour productivity divergence across provinces. Meanwhile, there was no evidence that

per capita labour input differentials and migration significantly affected the convergence pattern.

Finally, the author investigated whether agglomeration forces contributed to Thailand's divergence. Evidence showed that net in-migration was positively related to the per capita GPP growth. As a result, the high-growth provinces were expected to be associated with higher population density. Theoretically, increased population density creates two countervailing effects—agglomeration and congestion effects. While the former effect tends to raise provincial productivity, the latter reduces it. If the agglomeration effect outweighs the congestion effect, the provinces with higher population density would experience productivity gains. Evidence indicated that this was the case for few provinces in central and southern regions. In addition, provincial productivity was positively related to educational attainment of workers and per capita infrastructure expenditure. With more developed infrastructure and better educated workers in the BMR region, the agglomeration of the BMR thus contributed to the divergence.

The contribution of BMR agglomeration to the divergence was also supported by Kittiprapas (1999a). Looking at the period 1978-1989, this study found that regional disparities declined after 1988. This was due to de-concentration of economic activities from Bangkok to its surrounding provinces. As these provinces were catching up with Bangkok, the difference between BMR and the rest of the country widened. Without using regression analysis, Kittiprapas proposed several factors contributing to the growing disparities. These were unbalanced public investment in infrastructure, centralise of powers in Bangkok, sectoral policy bias toward manufacturing which located around Bangkok, uneven distribution of educated labour force, and unsuccessful regional development policy due to budget limitation. At the same time, the σ -

divergence findings made by Southichack were supported by Patmasiriwat and Pachuei (1999). They examined provincial disparities using the Theil index of Gross Provincial Product (GPP). They found that provincial inequality increased from 0.179 in 1989 to 0.183 in 1995. The findings also showed that only Bangkok, its vicinity and some Eastern provinces had GPP higher than the national average.

Similarly, Nantamanasikarn (2002) re-examined both types of GPP per capita convergence among provinces in Thailand from 1983 to 1999. Williamson's coefficient of variation and Theil's Index were used as measures of σ -convergence. Both measures indicated that the provincial disparities had increased during the period. This means that no evidence of σ -convergence was found. Decomposition of Theil's Index further suggested that the main source of disparities came from income differences between regions—as opposed to differences within region. Unconditional β -convergence could not be found in this study either. This is consistent with Southichack's findings. Nonetheless, conditional convergence was detected here only when the province-specific effect was allowed. That is, each province in Thailand had its own steady-state level and was converging to such state. Moreover, this study employed the Markov transition analysis⁵ to predict the movement of provinces from one income group to another. Results revealed that provinces in the poor groups had lower probability to move upward than those in the richer groups. Hence, catching up of the poor provinces was less likely to happen in Thailand. Given that provinces were concentrated in the low-income group, provincial income gap was also unlikely to be narrowed.

While earlier studies were using GPP data, Motonishi (2003) examined σ -convergence using household socio-economic surveys (SES) instead. Consistent with

⁵ The Markov transition analysis is a mathematical method for analysing social mobility overtime. It is usually represented in a form of a matrix. A Markov transition matrix is a square matrix describing the probabilities of moving from one state to another. See Read (1972, pp. 766-786)

the GPP data, inequality in household income across regions also increased over the period 1975-1998. Motonishi, then, went further to investigate factors determining regional disparities in Thailand. Results suggested that inequality between agricultural and non-agricultural sectors played an important role in determining overall regional income inequality. In contrast, financial development was found to help reduce inequality. While this study gave an in-depth analysis on causes of disparities, it only looked at the regional level. This is possibly because the sample size at the provincial level was not large enough to represent the provincial averages until 1994.

A research project by NESDB and World Bank (2005) took a look at more recent GPP data. The study examined growth convergence across provinces covering a period from 1975 to 2003. Figure 2.1 illustrates the results. Growth convergence among provinces was evident during the earlier period of 1975-1986. In contrast, no convergence was found during the latter period of 1986-2003 as the fitted line sloped upward. The graph suggests that provinces with higher per capita income in 1986 tended to grow faster than those with a lower income. As a result, income disparities among provinces widened.

Figure 2.1 also reveals that the Northeast provinces lagged behind others both in terms of initial income level and the growth rates. Focusing on development of the Northeast region, the study examined factors contributing to these results. The major factors include weak productivity gains, Bangkok's agglomeration forces, inadequate infrastructure and relatively low amount of public spending. Weak productivity gains in the Northeast were due to low agricultural yields and lack of a driving non-agricultural sector. Strong agglomeration forces of Bangkok, meanwhile, pulled all the resources from other regions into it. Although many provinces have emerged as secondary cities and industrial zones during the past few decades, most of them are in close proximity of

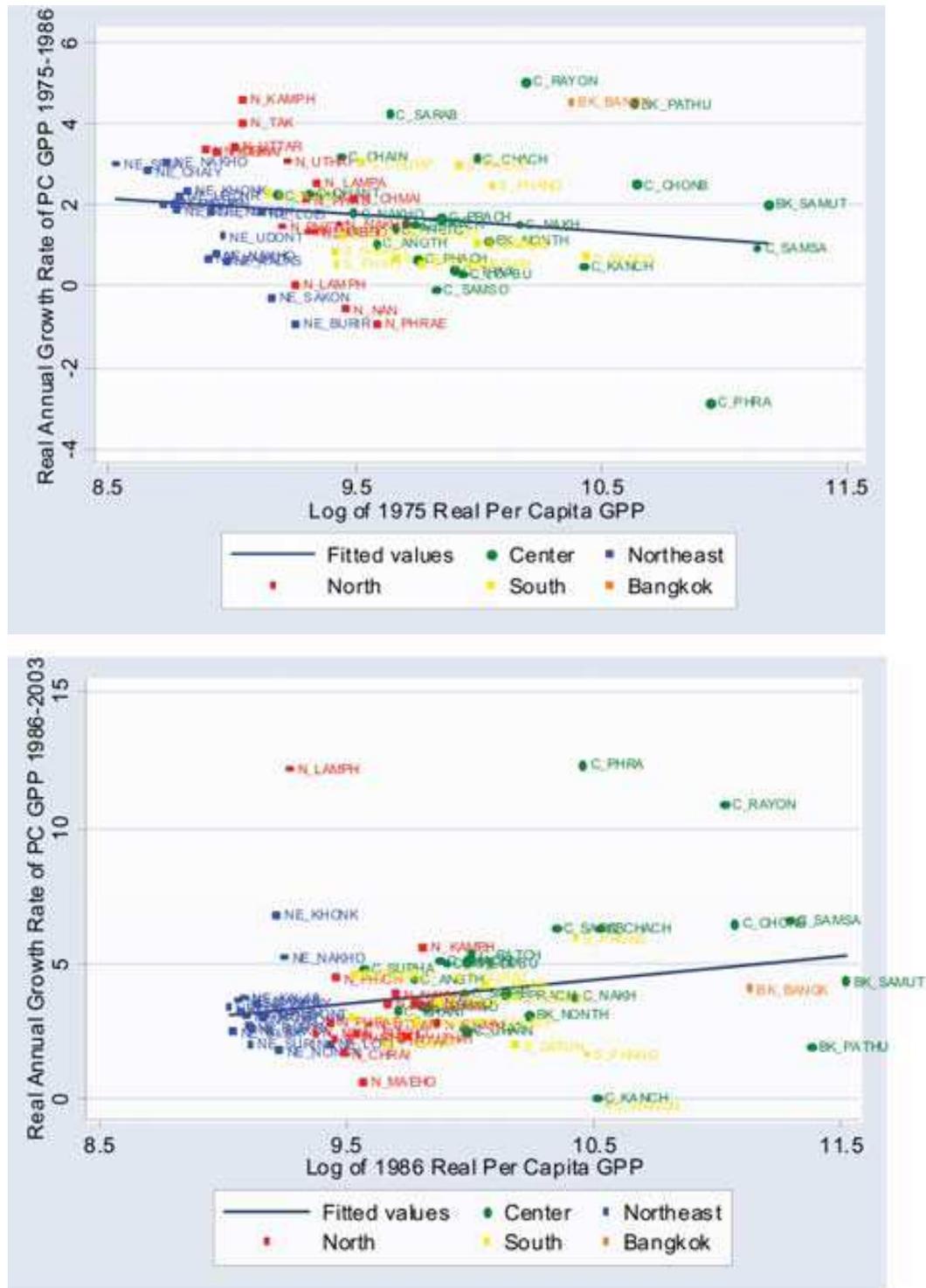
Bangkok. As for infrastructure, inadequate facilities have neglected the Northeast region so as to benefit from trade with the neighbouring countries. Finally, lower government spending relative to other regions translated into lower spending by function.

Alternatively, Nopkhun (2007) used provincial-level data to investigate sources of disparities between inland and coastal regions. In his study, he also examined provincial growth β -convergence between 1981 and 2003. The findings revealed that there was no evidence of β -convergence since the steady-growth period between 1981 and 1986. Potipiti (2009) added more empirical details on the β -convergence as well as on σ -convergence. By grouping provinces into thirty poorest- and thirty richest provinces, he found that there was β -convergence among the richest provinces during the period 1990-2000. However, the convergence was no longer evident when considering the period 2001-2005. There was also no evidence of σ -convergence, as measured by variance of log of GPP per capita, between 1981 and 2005. He, then, performed regression analyses on determinants of σ -convergence. Results suggested that the group of provinces with diverse production structures was likely to converge while migration between provinces did not play a significant role in causing convergence within the group. While this study contributed greatly to the understanding of convergence across provinces, it grouped provinces into two-, three-, five-, seven- and nine-province groups. It therefore did not show the relationship across all provinces.

In a review of spatial disparities in Thailand, Wisaweesuan (2009) confirmed the findings of the previous studies. Using regional Gini index as a measure of disparities, the study indicated that income gaps among regions in Thailand increased during the period 1981-1997. Although the index fell during the crisis, the 2005 figure remained at a level higher than that in 1980. This was partly due to uneven public spending which

was biased toward Bangkok and its vicinities. As a result, access to basic services was required for improving quality of life.

Figure 2.1 Growth Convergence among Provinces 1975-1986 and 1986-2003



Source: NESDB and World Bank (2005, Figure 17)

2.4 Conclusion

Income inequality among regions within several developing countries has been on the rise (Kanbur & Venables, 2005, p. 3). Given that it has persisted, if not increased, for a long time in these countries, researchers as well as policymakers started to wonder how such an outcome prevails. As a result, the issue of regional disparities has received a considerable amount of attention during the past few decades. The first part of this chapter reviewed development of the theories and arguments from the early periods to the recent concerns. As the issue remains highly debatable, empirical studies were then reviewed to show how these findings support each theory.

The country-specific evidence suggested that increasing regional disparity within a country is more a developing country phenomenon. As a result, a large number of country-specific researches have been available in several developing countries. Nonetheless, the study of regional economics has been rather limited in Thailand. The thorough analysis of disparity pattern among provinces and regions has not been investigated after Southichack (1998). Since then, the Thai economy has been through the financial crisis and partial recovery. These changes in economic conditions must affect the disparity pattern. Because no evidence is available to date, the matter of how much the pattern has changed and in which direction remains unknown. In addition, despite empirical evidence on growth convergence among provinces, determinants of provincial growth have never been examined.

The literature reviewed in this chapter suggests that there is room for further theoretical and empirical studies. Nonetheless, this thesis will focus only on examining regional disparity in Thailand. It aims at filling the empirical gaps in analysing Thailand's recent economic development. In addition, there are limited techniques employed in the existing researches on Thailand. The above review of studies in other

countries suggests that there are now more methods available. This research, therefore, will also explore these methods and incorporate those that are suitable for the case of Thailand into the analysis.

CHAPTER 3

Three Decades of Thailand's Development and Provincial Disparities

3.1 Introduction

During the past three decades, the Thai economy has gone through remarkable changes. Between 1987 and 1996, the economy grew very rapidly that the country was regarded as one of the Asian Economic Miracles (World Bank, 1993, p. 1). Then, the Thai economy fell into the crisis of 1997-1998. This raised a question of what went wrong in Thailand's economic development. Since then, several reforms have been implemented. These reforms aimed to help the economy recover as well as to ensure that growth would be more sustainable in the future.

Notwithstanding these changes, one characteristic of Thai economic development remained. Development has long been uneven, particularly when comparing across regions (Parnwell, 1996; Dixon, 1999). This chapter discusses the pattern of development in Thailand between 1981 and 2008, with emphasis on regional development. Then, the pattern of regional disparities will be examined. Given data limitations, the empirical analysis will only cover the period between 1981 and 2008.

3.2 Thai Economy and Regional Development

The Pre-boom (1981-1986)

Modern economic development in Thailand started in 1957 when the government shifted policies toward those suggested by the World Bank (Dixon, 1999, p. 77). This

was followed by formulation of the First National Economic Development Plan¹, henceforth called the Plan. The First Plan was implemented in 1961. Since then, the five-year National Plans have become an established feature of the Thai development (Dixon, 1999, p. 79). The first two Plans called for substantial infrastructure development and manufacturing development support. In the Third-, Fourth- and Fifth Plans (1972-1976, 1977-1981 and 1982-1986, respectively), several other aspects of development were added to the plans. All of these aimed at achieving the same goal—overall economic growth. Due to these modern development policies, the Thai economy took off since 1958. Based on official GDP data from the NESDB, Thailand grew by an average rate of 7.1 percent per year between 1958 and 1986 (see Table 3.1).

Table 3.1 Real GDP Growth Rate of Thailand 1958-2008

	Period			
	1958-1986	1987-1996	1997-1998	1999-2008
Agriculture	4.9	2.6	-1.1	3.2
Industry	9.0	12.8	-7.4	6.1
<i>Manufacturing</i>	8.9	13.3	-4.7	6.7
<i>Construction</i>	7.9	12.8	-31.9	0.7
Services	7.4	9.0	-5.6	3.7
GDP	7.1	9.5	-5.9	4.7

Source: 1958-1979 from NESDB (1999, Table 2); 1980-1992 from NESDB (2002, Table 2) and 1993-2008 from NESDB (2010a, Table 4)

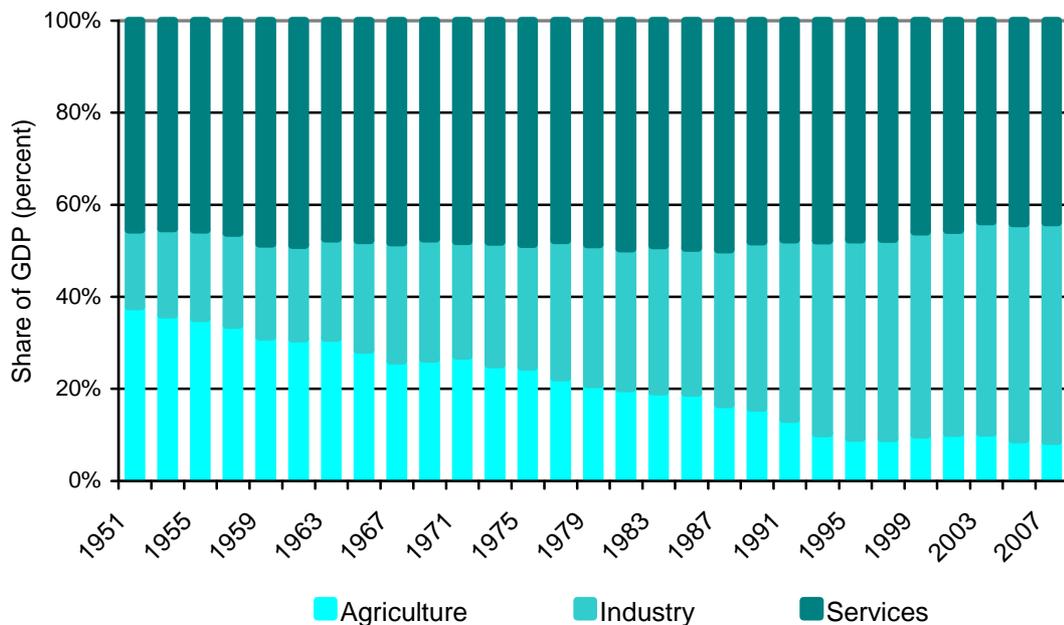
Although these Plans aimed at promoting economic growth, they did not entirely ignore the issue of regional disparities. Policies to reduce regional disparities appeared for the first time in the Third Plan (1972-1976). This was because the primacy of Bangkok increased significantly during the 1960s. The primacy index of Bangkok—ratio of population in Bangkok and that in the second largest city—went up from 25

¹ Social development aspects were added from the Third Plan onwards. Thus, the plan has changed to National Economic and Social Development Plan since. For convenience, it will be called the National Plan or the Plan hereinafter.

times in 1960 to 33 times in 1970 (Dixon, 1999, p. 194). Consequently, the Third Plan emphasised reducing income disparities. Despite such a policy being laid out, the implementation was far less apparent. The share of the government budget allocated to the regions as percentage of the total budget fell. Thus, it could be expected here that not much change had taken place during the Third Plan.

To resolve such issues, the Fourth Plan (1977-1981) proposed that regional cities should be developed. Due to political instability at the time, much of regional policy was either abandoned or scaled down. Meanwhile, the change in Thai economic structure began to accelerate. From 1951 to 1975, the share of the manufacturing sector increased from 16.7 percent of GDP to 26.7 percent. By 1979, the share rose to 30.4 percent. This increase meant a fall in the agricultural share of GDP, which declined from 37.9 percent to 21.0 percent during 1951-1979. This change in economic structure is illustrated in Figure 3.1.

Figure 3.1 Share of GDP by Sector (Real Values) 1951-2007



Source: see Table 3.1

Up to 1979, the aim of the shifts toward the industrial sector was only to sustain the domestic market. As a result, the small-scale, low-tech manufacturing continued to dominate the sector. Moreover, Thai policy was still considered to be more directed to import substitution. Although there were moves toward export orientation in the 1970s, protection for import-substitution industries remained high throughout the period. Several subsidising policies continued to be in place. This had caused the current account deficit and the budget deficit to accumulate. Combined with political instability, investors became reluctant to invest. Thailand was thought to be heading toward an economic downturn. In addition, there was also concern over uneven regional development. This is because the shift toward the industrial sector during the 1970s took place mostly in and around Bangkok. Almost seventy percent of the projects approved by the Board of Investment (BOI) located in BMR during 1974-1978 (Dixon, 1999, p. 232). In 1981, BMR generated 64.0 percent of total industrial output.

Due to these imbalances, the Fifth Plan (1982-1986) proposed structural change. Foreign exchange controls were relaxed. Import substitution policy was abandoned and replaced by export-oriented policy. The Eastern Seaboard (ESB) was initiated with an intention to diversify economic activities away from the BMR. Along with this was the development of five regional cities. These were Chiang Mai, Khon Kean, Nakhon Ratchasima, Chon Buri and Sonkhla-Hat Yai.

The Boom (1987-1996)

The policy shift toward export oriented, coupled with devaluation of the Baht in 1984 made Thailand more attractive to foreign investors. At the same time, Asian Newly Industrialised Economies (NIEs) started to lose their comparative advantage in low-cost labour intensive goods. As a result, investors from the NIEs—along with others—began to look for new locations. With structural changes and cheap labour,

Thailand became their prime destination. This led to a boom in labour-intensive manufacturing for exports and, hence rapid growth of the Thai economy. From 1987 to 1996, an annual economic growth of Thailand averaged 9.5 percent. This growth rate was the world's second fastest after China (Richter, 2006, p. 7).

The regional development in Thailand also showed a better picture. This was partly because considerable attention was given to the regional issue in the Sixth- and Seventh Plans (1987-1991 and 1992-1996, respectively). Continuing from their predecessor, these Plans intensely promoted the development of the Eastern Seaboard. The Eastern Seaboard Development Programme, which was drafted during the Fifth Plan, focuses mainly on the infrastructure development. It involved the construction of Map-Ta-Put Port and Industrial Estate for heavy chemical industries, the construction of Laem Chabang Port and Industrial Estate for export-oriented industry, and the establishment of related infrastructure such as roads, railways, communication facilities, water pipelines and electricity (Japan International Cooperation Agency [JICA], 2001, pp. 347-350).

As part of the initiative to decentralise industries, the Eastern Seaboard was implemented along with BOI- and financial incentives. The BOI incentives were given via promotional zoning and tax privileges. Although these incentives had been given since the First Plan, the granting of tax exemptions had no spatial element until the Fifth Plan (1982-1986). In 1983, the BOI announced new criteria that made location a criterion for tax incentives. Despite that, BOI zones were limited to only 21 provinces. Hence, the incentives did not find much success until zones were extended to cover all provinces in 1987. Here, projects located in Zone 1 (Bangkok and Samut Prakarn) no longer received any tax holidays unless they met exports and employment targets (Biggs, Brimble, Snodgrass & Murrey, 1990, pp. 93-96). The zoning was further

modified such that Zone 1 covered Bangkok and five surrounding provinces in 1989. These changes in 1987 and 1989 coincide well with the development of the Eastern Seaboard, thus enhancing the de-concentration process. As for the financial incentives, low interest rates were given by the Bank of Thailand (BOT), the Industrial Finance Corporation of Thailand (IFCT) and the Small Industry Finance Office (SIFO). These incentives, however, did not have any location criteria.

In addition to the continuation of the Eastern Seaboard, the Seventh Plan also promoted industrial development in the Central region (Kmonwatananisa, 2008, p. 8). As a result, the share of industrial output generated by the BMR fell considerably from 63.9 percent in 1991 to 49.1 percent in 1996. This was replaced by increases in industrial output in the East and Central regions. The share of industrial output generated by the East and the Central regions rose from 10.9 percent and 5.2 percent of the total industrial output to 21.3 percent and 10.1 percent, respectively (see Table 3.2).

While the Eastern Seaboard succeeded in diverting factories away from BMR, other policies to create regional centres did not show much success. This was partly due to poor inter-provincial transport facilities. Inevitably for overall growth, BMR continued to receive a large share of the infrastructure development budget at a cost of other provinces. In addition, regional centres in Thailand were considered small by international standards. In 1991, apart from Bangkok there were only 25 urban centres with populations higher than 50,000. Only nine of these had populations of more than 100,000 (Dixon, 1999, p. 230). Thus, provincial markets remained small while BMR and the Eastern Seaboard extended. As a result, regional disparities remained high—if not increasing.

The role of BMR was further enhanced by the rapid growth of the banking, insurance and real estate (BIR) sector². Between 1987 and 1994, except for 1989 and 1991, BIR was the fastest-growing sector in Thailand (NESDB, 1996). The share of BIR sector to GDP rose from 2.8 percent in 1987 to 7.5 percent in 1996. With BMR generating more than two-third of the total BIR output, this means most of the benefits from the BIR sector went to the BMR.

Table 3.2 Share of Industry Output by Region 1981 – 2006 (Nominal Values)

	Year					
	1981	1986	1991	1996	2001	2006
<i>Industry</i>						
Northeast	6.60	6.77	5.97	6.92	4.86	5.25
North	5.93	6.92	6.14	6.69	5.07	5.43
South	6.78	4.20	3.69	5.42	5.01	5.07
East	8.50	12.58	11.78	19.06	21.01	27.16
West	4.39	3.93	3.57	3.65	3.53	3.34
Central	3.83	3.87	4.98	9.12	10.71	11.19
BMR	63.97	61.73	63.87	49.14	49.80	42.56
Whole Kingdom	100.00	100.00	100.00	100.00	100.00	100.00
<i>Manufacturing</i>						
Northeast	4.50	3.72	3.79	4.07	3.89	4.58
North	4.17	3.04	3.09	4.14	3.60	4.27
South	3.26	2.15	2.15	4.01	4.03	4.05
East	9.54	11.93	10.90	21.32	18.51	24.30
West	3.73	3.53	3.07	3.15	2.75	2.53
Central	3.50	3.40	5.24	10.09	12.16	12.99
BMR	71.29	72.22	71.75	53.21	55.06	47.28
Whole Kingdom	100.00	100.00	100.00	100.00	100.00	100.00

Source: 1981-1997: NESDB (1998, Table 'Whole Kingdom'), 1998-2001: NESDB (2007a, Table 'Whole Kingdom') and 2002-2006: NESDB (2010b, Table 'Whole Kingdom')

In general, the financial system rapidly developed to facilitate stellar growth during the boom period. Not only did the commercial banks grow considerably, but

² Due to change in disaggregating methods, this series contain data only up to 1997. The new series re-categorise the Banking, Insurance and Real Estate sector into two sectors. Banking and Insurance are part of Financial Intermediation sector. Real estate has become part of the Real Estate, Renting and Business Activities.

several financial and security companies were also established. With support from the Thai government, the financial market was liberalised in the early 1990s. The Bank of Thailand lifted controls over foreign-exchange transactions in 1990 in order to facilitate large movements of foreign capitals. Then, the Bangkok International Banking Facility (BIBF) was established in 1993. This allowed foreign institutions to set up operations and make loans to domestic borrowers. The low interest rates offered by these foreign institutions attracted many investors to borrow in foreign currency. The capital market openness coupled with the high returns in the Thai financial markets also attracted short-term portfolio investment and foreign holdings of domestic bank accounts. Consequently, large amounts of short-term foreign capital flowed into the Thai economy.

The rapid economic growth since the late-1980s, also led to a shortage of office space as well as housing. With fixed exchange rates and sustained high growth, much of these foreign loans consequently went to real estate projects. The share of real estate lending more than doubled in both commercial banks and finance companies (Siamwalla, 2005, pp. 67-68). This real-estate boom and optimistic predictions of continued high economic growth finally led to a bubble economy.

The long period of rapid growth also led to substantial increases in real wages. This was particularly the case for the labour-intensive export manufacturing sector. The supply of unskilled labour, which was abundant at the beginning of the boom period, had been used up. At the same time, the number of the young population entering the labour market started to come down. This was due to the National Family Planning Programme, which began in 1970. The programme was adopted to control the high population growth rate Thailand had experienced during the 1960s (Prachuabmoh & Mithranon, 2003, p. 36). As a result, number of population aged 15-24 started to fall in

1990 (United Nations [UN], 2009). Eventually, the labour shortages drove up real wages. Being a price-taker in the global market, the higher wages caused Thailand's competitiveness in labour-intensive goods to fall. Consequently, exports from Thailand contracted in 1996.

As exports weakened and the bubble economy continued, foreign investors started to consider investing elsewhere. This triggered foreign capital outflows. Unfortunately, there was a large volume of foreign portfolio and short-term capital in Thailand at the time. The rapid outflows of a sizable foreign capital means the real value of the Baht depreciated. Following fixed exchange rate regime, the Bank of Thailand had to use foreign reserves to keep the Baht stable. This raised expectations that the Baht would devalue in the near future. Accordingly, the Baht was speculated against, leading to a depletion of the foreign reserves. Finally, the Bank of Thailand decided to float the Baht in July 2, 1997 (Warr, 2005, pp. 21-26).

The Crisis and the Post-crisis Period (1997-2008)

The Thai economy fell into an economic crisis in July 1997. Immediately after the floatation of the Baht, the exchange rate moved from 25 Baht per US Dollar to 30 Baht. The devaluation continued and peaked at 55 Baht per US Dollar in January 1998. This means financial institutions that borrowed short-term capital from abroad to lend domestically saw their liabilities increased drastically. In addition, a lot of their customers also borrowed from abroad and found themselves with larger debts. Borrowers, particularly those who invested in properties became unable to service their debts. Consequently, financial institutions ended up with significant share of non-performing loans (NPL).

The devaluation of the Baht also produced adverse effects on the real sector. Particularly for businesses that borrowed from abroad, many of them had to either shut down or lay off some of their employees to cope with their financial situations. At the same time, the high NPL in financial institutions led to suspension of 56 out of 91 finance companies. Consequently, unemployment more than doubled from 700,000 persons in February 1997 to 1.48 million in February 1998 (World Bank, 1999, pp. 9-10). Those who were still working at the time also became more cautious on their spending. In 1997 and 1998, private consumption fell by 1.4 percent and 11.5 percent, respectively. Likewise, private investment also fell. In fact, the largest contraction occurred in the private investment. As real estate bubble burst, investment fell by 21.9 percent in 1997 then declined further by 50.9 percent in 1998.

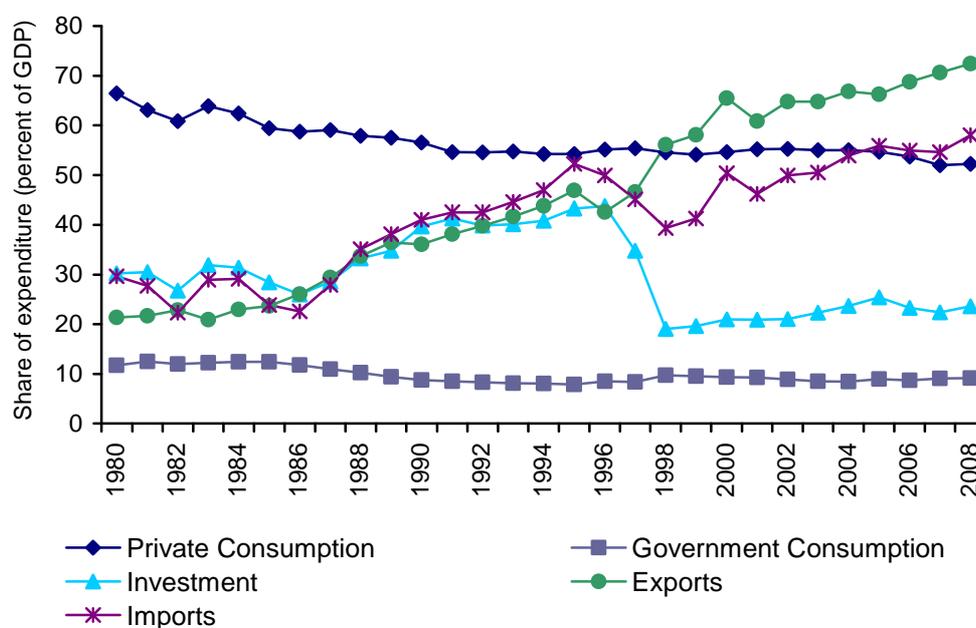
The adverse effects of the International Monetary Fund (IMF) policy package also added to the fall in domestic demand. As the Thai government accepted US\$17.2 billion rescue package from the IMF, it agreed to impose several adjustment measures to the economy. These included fiscal budget tightening, following the IMF requirement of a budget surplus equivalent to 1.0 percent of GDP. As a result, the public consumption fell by 2.8 percent in 1997 (NESDB, 2002, p. 12). In addition, the closedown of 42 finance companies³ was also believed to be the IMF pre-condition for Thailand to receive the rescue package (Siamwalla, 2005, pp. 70-71). This IMF requirement, along with other measures, was later widely criticised as causing too much contraction in the Thai economy.

As a consequence of these factors, the Thai economy contracted by 1.4 percent and 10.5 percent in 1997 and 1998, respectively (see Table 3.1). With several measures

³ On June 28, 1997 there were 16 finance companies suspended from operation. In August 5, 1997 42 finance companies were added to the suspension. Only two of them were able to restructure and carry on their operations (Siamwalla, 2005, pp. 70-72).

and reforms being implemented, the economy gradually recovered. GDP started to grow again in 1999. The average GDP growth rate for the period 1999-2008 is 4.7 percent per year (see Table 3.1). Despite that, Thailand's economic growth after the crisis has never been as fast as that during the boom. Private investment stagnated during the crisis and remained low since (see Figure 3.2). This was partly because banks became more cautious in approving loans. In addition, firms had no incentive to invest as their existing capacity was under-utilised. Likewise, the share of private consumption to GDP barely grew at all after the crisis.

Figure 3.2 Share of Expenditure as Percentage of GDP 1980-2008 (Real Values)



Source: 1980-1992: NESDB (2002, Table 2) and 1993-2008: NESDB (2010a, Table 2)

Despite several adverse effects, the devaluation of the Baht also produced positive effects for exporters. As the Baht devalued, exports from Thailand became more attractive. As a result, exports expanded considerably and became the major driver of the Thai economy after the crisis. Figure 3.2 illustrates this. The share of exports jumped from 46.5 percent of GDP in 1997 to 56.1 percent in 1998. Then, it has

continuously increased such that it accounted for 72.4 percent of GDP in 2008. This increasing role of exports, however, means that the economy has become more reliant on external factors. That is, the global economy now plays a bigger role in determining the direction of the Thai economy. With stagnating domestic investment and consumption throughout the recovery period, this recovery is only a partial one. Meanwhile, the national plans, the Eighth- and Ninth Plans (1997-2001 and 2002-2006, respectively) shifted their focus from economic growth to human development.

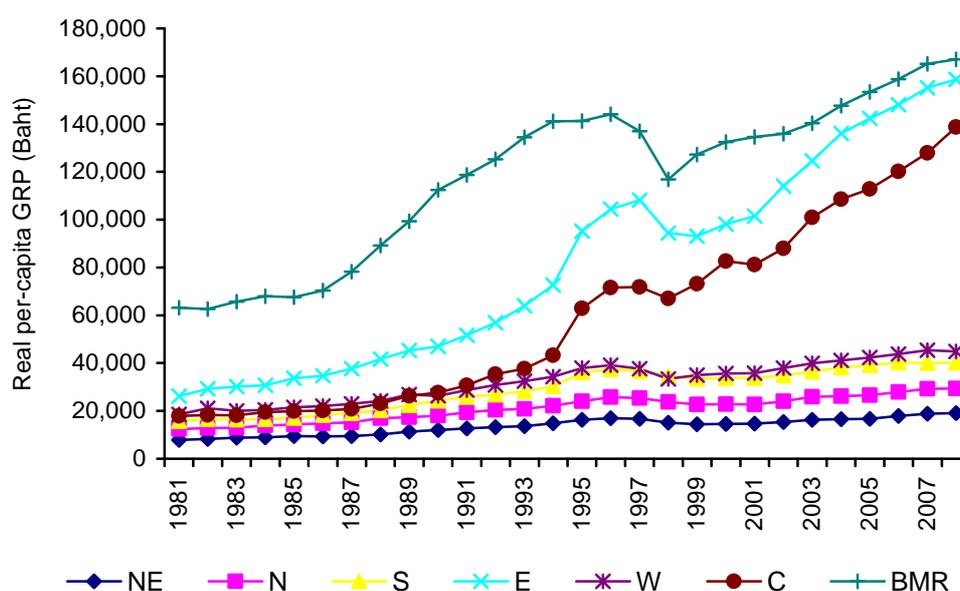
Having to comply with IMF measures, the Plans also suggested that fiscal and administrative authorities should be decentralised. Following the Plans, the Decentralisation Act was enacted on November 18, 1999. The Act aims at transferring local duties and authorities from central ministries to the local governments—mainly at provincial and sub-district (*tambon*) levels. It also mandated that local revenues should be at least 20 percent of the government's total revenue by fiscal year 2001 and 35 percent by fiscal year 2006 (Lao-Araya, 2002, p. 7). Although the transfer of authority to local government had mostly been completed by 2004, the fiscal decentralisation process had not (National Decentralisation Committee [NDC], 2004). Revenues received by local governments increased from 9.8 percent of total government revenue in fiscal year 1998 to 16.5 percent in fiscal year 2009 (Ministry of Finance [MOF], 2010). Despite that, out of all local revenues, the locally-collected revenue remained stable at below two percent of total government revenue (Amornvivat, 2004, pp. 11-12). Not only has the 2001 target not been met, but local governments also continued to be financially dependent on the central government. Hence, it can be concluded that the decentralisation process has been far from fully completed.

Looking at the regional level, the BMR was hardest hit by the crisis. This should come as no surprise. The BMR accounted for seventy percent of the financial sector

output and almost fifty percent of total manufacturing output in 1996. All of the 56 suspended finance companies were located or headquartered in the BMR. The BMR also hosted 53.0 percent of all manufacturing sector in 1996. As a result, per capita GPP in BMR fell sharply during 1997-1998. This can be depicted in Figure 3.3 and Table 3.3. While per capita GPP of other regions also declined during the crisis, they did not fall as much as that of BMR. From 1999 onwards, per capita GPP of the East and Central regions quickly caught up with the BMR. Particularly in the East, real per capita GPP rose from 93,011 Baht in 1999 to 158,604 Baht in 2008. This is probably because the East and the Central regions housed the manufacturing for exports, which is the sector with considerable growth after the crisis. Between 1999 and 2008, the industrial output in the Central region grew by an average of 9.7 percent per year—the fastest rate across regions. Likewise, the industrial output in the East grew by 7.6 percent per year during the same period. As a result, the contribution of the East and the Central regions to the total industrial output increased noticeably. In 1999, the East and the Central regions together contributed 28.2 percent of total industrial output. By 2008, they accounted for 39.4 percent (NESDB, 2010b).

While the East and the Central regions were catching up with the BMR, the other four regions grew very slowly after the crisis. Per capita GPP of the Northern region grew at the slowest rate. The Southern and the Northeastern regions also grew slowly. The slow growth in the South was possibly a result of increasing violence in the three most Southern provinces in recent years. Meanwhile, the North and the Northeast already had the lowest per capita production to start with. Having slow growth rates means that the Northern and the Northeastern regions would continue to lag behind all other regions (see Figure 3.3).

Figure 3.3 Per Capita Gross Regional Product 1981-2008 (Real Values)



Source: see Table 3.2

Table 3.3 Regional Growth Rate of Thailand 1981-2008 (Real Values)

	Period			
	1981-1986	1987-1996	1997-1998	1999-2008
Northeast	3.7	6.3	-6.7	3.2
North	3.6	5.6	-5.2	2.7
South	3.0	6.4	-4.1	2.8
East	5.8	10.7	-2.0	6.6
West	3.6	5.7	-6.8	3.5
Central	2.5	9.9	-4.2	7.9
BMR	2.2	8.0	-10.0	4.9
Whole Kingdom	3.4	9.5	-5.9	4.7

Source: see Table 3.2

In summary, Thai economic development has been dramatic in the past three decades. Along with it, the regional development pattern in Thailand changed accordingly. While evidence presented here apparently reflects uneven growth across regions, it does not show the magnitude of the inequality. It also cannot tell how this

magnitude changes over time. The next section looks particularly at the pattern of regional disparities as the regional development moves from one period to another. This will be done through disparity measures and statistics.

3.3 Regional Disparities: Methods and Data

Patterns of development in Thailand have been characterised as highly uneven since 1940 (Dixon, 1999, p. 214). This, however, has been widely discussed without much empirical evidence, particularly after the crisis. This section explains the disparity measurement methods and the data. All of these will be used to investigate regional disparities in Thailand in the next section.

Methodology

There are many ways to measure regional income disparities. Among the commonly-used methods are: Williamson's population-weighted coefficient of variation (v_w), the Theil index, regional Gini index, and standard deviation of log of regional income per capita. The first two measures are employed in this thesis. This is because Williamson's coefficient of variation has only minor flaws in measuring regional inequality in small countries (Portnov & Felsenstein, 2005). Then, the Theil index is used as its decomposability allows for deeper analysis.

The population-weighted coefficient of variation was first introduced by Jeffrey Williamson in 1965. He used the measure to support his theory on economic development and income inequality across regions. According to Williamson (1965), regional income inequality within a country was expected to rise at the early stages of development. The rising inequality was caused by barriers for goods and production factors to flow across regions within a nation. Such barriers include poor transport links,

difficulties to access capital, low ability for labour to move and government policy favouring national growth over regional equality. Regional income inequality, however, was not expected to rise indefinitely. When a country moved to a more advanced stage of development, interregional linkages improved. This would allow factors to move freely and markets to adjust. Consequently, regional disparities were expected to come down. This means that the graph of regional disparities over stages of development should form an inverted U-shaped curve. To prove his theory, Williamson calculated v_w for countries which were at different stages of development. In addition, he also uses state income to analyse v_w for the United States between 1840 and 1961. Since then, Williamson's population-weighted coefficient of variation has been widely used as a measure of interregional disparities.

The Williamson's population-weighted coefficient of variation is the ratio of the standard deviation to the corresponding mean. The standard deviation is weighted by share of population in the spatial unit to the total population. It can be calculated as follows:

$$v_w = \frac{\sqrt{\sum (y_i - \bar{y})^2 (f_i/n)}}{\bar{y}} \quad (3.1)$$

where f_i denotes population of the i^{th} province, n national population, y_i income per capita of the i^{th} province and \bar{y} national income per capita. The larger value of v_w indicates that there is a larger dispersion.

Another index that also measures regional disparities is the Theil index. While the Theil index may be less commonly used, it has an additional feature. The Theil index has an additive property across subgroups within the country. This means that it

can be decomposed into inequality within- and between regions. Hence, more understanding of regional disparities can be obtained using the Theil index. The Theil index is defined as follows:

$$I_{Total} = \sum_{i=1}^N Y_i \log\left(\frac{Y_i}{X_i}\right) \quad (3.2)$$

where X_i denotes population of i^{th} province over the national population and Y_i GPP of i^{th} province over the national GDP. The index takes a value of zero when there is absolute equality across provinces. If income is not equally distributed, the index takes a value larger than zero. The province that is richer than the national average has a positive contribution to the index while those poorer than the average have a negative contribution. The higher value of the Theil index signifies more severe inequality. As previously mentioned, the index can be decomposed into inter- and intra-regional inequality. This is formulated as follows:

$$I_{Inter} = \sum_{j=1}^7 Y_j \log\left(\frac{Y_j}{X_j}\right)$$

$$I_{Intra,j} = \sum_{ji=1}^{ji} Y_{ji} \log\left(\frac{Y_{ji}}{X_{ji}}\right)$$

where j denotes region j . In case of Thailand, there are seven regions and thus $j = 1, 2, \dots, 7$. The total index is equal to the sum of the inter- and intra-regional indexes.

That is,

$$I_{Total} = I_{Inter} + \sum_{j=1}^7 Y_j I_{Intra,j} \quad (3.3)$$

Data

There are two sets of data to be used in this analysis. The first data set is GPP per capita. The NESDB publishes data on GPP annually. The complete series goes back to the year 1981. Due to changes in the disaggregation of production sectors, there are two data series available. The first set covers the period 1981-1997, disaggregating the GPP into 11 sectors. As for the second set, there are 16 sectors and the data runs from 1995 onwards. The overlapping years 1995-1997 for the two series, however, differ significantly. This is despite the fact that the NESDB reconciled the data such that the national GDP data are the same in both series. The NESDB is also an official government agency which publishes the national GDP. Since the GPP figures are reconciled with that of the national GDP, GPP for all provinces always sum up to the national GDP.

To arrive at GPP per capita, data on population by provinces are required here. There are several sources for population data in Thailand. The most complete one is from the population and housing census. The census is conducted and published every ten years by the National Statistical Office (NSO). Alternatively, the Department of Provincial Administration in the Ministry of Interior has population registration records. These data, unlike the former, are available annually. Another source of population data is provided by the NESDB on a five-year basis. It is, however, the estimation of population deriving from several indicators. With the population and housing census employed as a base for the estimation, these population data are considered to be reliable. Since they are also consistent with the GPP data, the population data by NESDB will be used for analysis here. The NESDB publishes provincial population and nominal GPP per capita in all issues of its publication *Gross Regional and Provincial Product*.

The second data set are the average household income and expenditure data from household surveys. These data are provided by NSO. The NSO has conducted a household survey called ‘Socio-economic Survey’ every two years⁴ between 1988 and 2006. From 2007, the Socio-economic Survey has been done on an annual basis. However, the surveys in the even years i.e. 2008 and 2010 do not contain the income information. In other words, only the odd years i.e. 2007 and 2009 do the surveys cover both household income and expenditure. This means that the analysis on household income can only cover up to the year 2007.

It is also important to note that provincial-level data prior to 1994 should be used with caution. Although the surveys have been undertaken since 1988, the data at the provincial level were not available to the public until 1994. This is possibly because the sample size at the provincial level may not be sufficient to be a good representation of each province prior to 1994. However, data for 1988-1992 will be included in the analysis here for the benefit of longer time series. Provincial-level data for 1988-1992 are derived from raw data using STATA version 11. Recall from the *Note on Data Sources* that the raw SES data are available upon request at the NSO.

In poverty and inequality analyses, choosing which definitions of income and expenditure to use is important. In fact, choosing whether to use income or consumption expenditure continues to be subject to debate. While income is a rather straightforward measure of welfare, it can fluctuate considerably over time. Income data also tend to be under-reported due to their relation to income taxes. Consumption expenditure is more stable across periods of time. Moreover, it is argued that an individual usually consumes based on his/her expected permanent income. Hence, consumption expenditure is a

⁴ The Socio-Economic Survey has been conducted since 1957 under the name “Household Expenditure Survey.” The name was changed to “Socio-Economic Survey” in 1969. Between 1969 and 1987, the survey was conducted every five years using stratified three-stage sampling method. Since 1988, the NSO has conducted the survey every two years using stratified two-stage sampling method.

good welfare indicator. Since there are data on income and consumption expenditure available in Thailand, this chapter will examine both.

For provincial income data in Socio-economic Survey of Thailand, total income and current income are available to the public. Total income consists of current income and all other receipts. Current income comprises wages and salaries, business profits, property income, current transfers and non-money income. Non-money income includes remunerations, home-produced goods and services, and imputed rental values of own dwellings. All other receipts include lottery prizes, insurance proceeds and all other income that does not fall into any of the other categories. It is obvious that current income captures more of the regular income of a household than total income. Hence, current income will be used in the analysis.

On an expenditure side, total expenditure and consumption expenditure are available. Total expenditure consists of consumption and non-consumption expenditure. Consumption expenditure is the household expenses on goods and services purchased for their everyday living. It also includes imputed expenditure that a household receives as part of pay, is home-produced or received for free. Non-consumption expenditure consists of tax payments, interest expenses, insurance premium, lottery tickets and gambling and other expenses. The household expenditure does not include expenses on investment such as purchase of land or property, payments for provident or pension funds. Consumption expenditure will be employed in this chapter as it is widely accepted to be an indicator of welfare.

The data from the Socio-economic Surveys are usually measured as averages per household unit. Luckily, the surveys have also published current income and consumption expenditure in per-capita units up to 2005. From 2006, the data on average household size by province are given along with the average household income and

expenditure. This means the per-household figures can be easily converted into per-capita ones. Since the disparities estimates may change when different units are used, this chapter examines both per-capita and per-household income and expenditure. It is also noteworthy that the Williamson's coefficient of variation is usually weighted by provincial population. This can be directly applied to the data sets with per capita unit. However, when the per-household data are used, the weighing of these data by provincial population would be questionable. Hence, for data measured in household unit, the ratio of provincial households to the national number of households will be employed as the weights. These data are available in an annual publication, *Report of Socio-economic Surveys*.

3.4 Regional Disparities: the Results

The results from using GPP data will be presented first—both the population-weighted coefficient of variation and the Theil index. Then the results from using the provincial household survey data will be analysed.

Regional Disparities in Gross Provincial Product

Overall Disparities

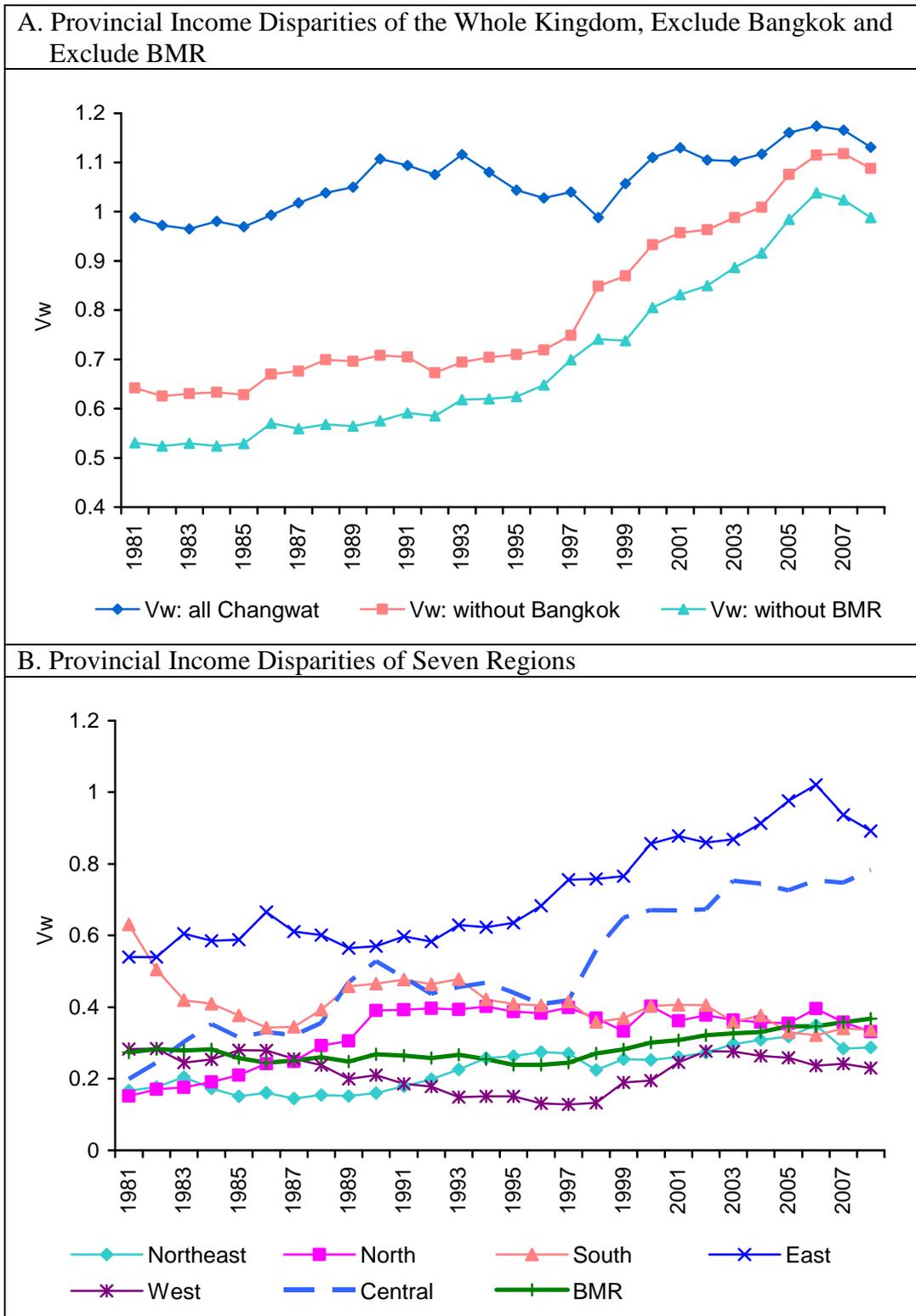
Figure 3.4 illustrates patterns of provincial disparities in GPP per capita between 1981 and 2008. Williamson's population-weighted coefficients of variation show an upward trend from 1981 to 1993. Then, the disparities gradually decline during the period 1993-1996, with a small increase in 1997. However, by 1998 the disparities fell to the level of 1986—the year prior to the boom. This probably reflects the effects of the financial crisis. As Bangkok was harder hit by the crisis than other provinces, it probably experienced larger decrease in per capita GPP than others. Consequently, the

gap between GPP per capita of Bangkok and other provinces narrowed. Nonetheless, the disparities were on the rise once again from 1999 onwards. By 2005, they surpassed the peak of period 1981-1993 (see Figure 3.4A). When considered together with economic growth, one can easily see the correlation between them. The higher economic growth is accompanied by larger regional disparities.

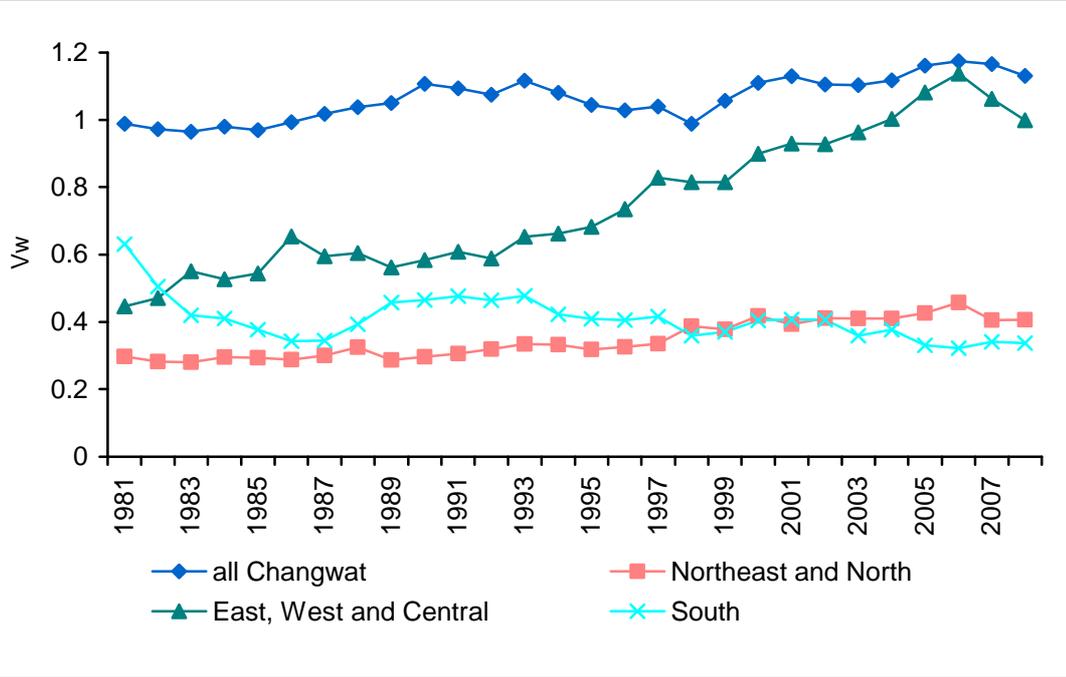
This trend, however, differs considerably from the trend in disparities in where Bangkok and BMR are excluded. When Bangkok is taken out, the disparities across provinces dropped sharply from 0.99 to 0.64 in 1981. It becomes even lower when the BMR is excluded. Without BMR, the disparities fell to 0.53 in 1981. This suggests that during the period 1981-1997, increases in overall disparities come mainly from Bangkok and its surrounding provinces.

The overall disparities peak at 1.12 in 1993, then gradually decline between 1993 and 1998. In contrast, those excluding Bangkok and BMR persistently increase. Moreover, the gap between the two has narrowed during this period. It seems here that the role of Bangkok and BMR as the main source of disparities has declined over time. In 1998, the overall disparities fell to the pre-boom level. The disparities without Bangkok, on the other hand, jumped from 0.75 in 1997 to 0.85 in 1998. Likewise, those without the BMR rose from 0.70 to 0.74. This means that the crisis caused disparities among provinces other than Bangkok and BMR to increase. From 1999 onwards, all three series of provincial disparities post upward trends. Those excluding Bangkok and BMR increase at much faster rates than the overall disparities. As a result, the gaps between the two series and the overall disparities have considerably narrowed. This suggests that Bangkok and its vicinity are no longer the major source of disparities after 1997.

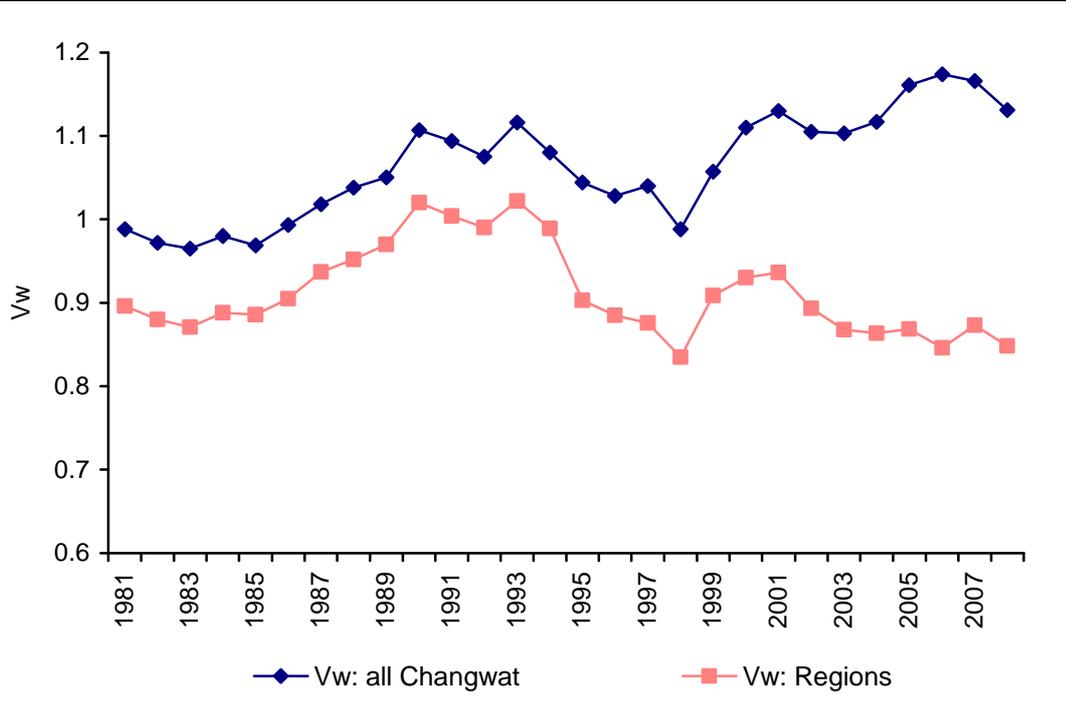
Figure 3.4 Provincial and Regional Disparities in GPP per Capita (Nominal Values) in Thailand 1981-2008



C. Provincial Income Disparities of Three Regions (North-Northeast, Central-East-West and South)



D. Regional Income Disparities



Note: All data are in nominal values.

v_w denotes the Williamson's population-weighted coefficient of variation.

Source: Data are collected from several editions of *Gross Regional and Provincial Product* as follows: 1981-1997: NESDB (1998), 1998-2001: NESDB (2007a) and 2002-2008: NESDB (2010b)

More aspects of disparities can be studied by looking at the Williamson's population-weighted coefficient of variation for each region. Figure 3.4B and 3.4C illustrate the results. It is surprising that instead of the BMR, provincial income differences have been the highest within the Eastern region. The disparities increase noticeably between 1981 and 2006. Likewise, the disparities within the Central region also widen significantly—but to a lesser degree. The Williamson's population-weighted coefficient of variation for the Central region was only 0.20 in 1981. This is lower than that of the East, South, West and BMR. By 1990, it rose to the level similar to that of the South—surpassing disparities within the West and BMR. In 1998-1999, the disparities of the Central region rose dramatically and have continuously widened since. The disparities within the Southern region of Thailand have gradually come down during the period of study. As for all other regions—namely the North, Northeast, West and BMR—disparities within regions remain lower than 0.40. In addition, disparities within BMR have also been stable up until 1997 before rising gradually in the more recent years.

By examining Figure 3.4A and Figure 3.4B together, some conclusions can be drawn on the pattern of regional disparities in Thailand. First, there is a large income difference between the BMR and the rest of the country. This can be seen from the high overall disparities while those within BMR and those excluding Bangkok and BMR are low. Secondly, the disparities excluding Bangkok and BMR increase significantly from 1997 onwards. Along with this increase are the trends of disparities within the Eastern and Central regions. Without much change in all other regions, these widening disparities within the East and the Central regions emerge as the source of overall disparities for 1997-2008. Combining this with the regional development pattern found in section 3.2 leads to a third conclusion. The reason why the East and Central regions

became the source of disparities was that they have been catching up with the BMR. With all other provinces failing to do so, disparities between them and those which had caught up have widened.

Intra-regional and Inter-regional Disparities

Figure 3.4D exhibits another dimension of disparities. It compares the overall disparities across all provinces with disparities across regions. In other words, it exhibits inter-regional disparities. Results suggest that from 1995, the income differences between regions have notably declined. During 2002-2008, the pattern of inter-regional disparities contrasts with that of overall disparities. That is, while overall disparities continue to rise, the average income across regions has become more equal. The Theil index, which decomposes the overall disparities into intra-regional and inter-regional disparities, also supports this. Table 3.4 illustrates the outcomes.

Table 3.4 Decomposition of Disparities in Real GDP 1982-2008: Theil Index

Year	Theil: GPP			Share		
	Inter (1)	Intra (2)	Total (1) + (2)	Inter (4)	Intra (5)	Total (4) + (5)
1982	0.131	0.022	0.153	85.9	14.1	100
1984	0.134	0.021	0.155	86.2	13.8	100
1986	0.131	0.019	0.150	87.1	12.9	100
1988	0.153	0.022	0.175	87.6	12.4	100
1990	0.170	0.024	0.194	87.6	12.4	100
1992	0.168	0.024	0.192	87.5	12.5	100
1994	0.170	0.027	0.197	86.5	13.5	100
1996	0.150	0.031	0.181	82.8	17.2	100
1998	0.137	0.040	0.177	77.2	22.8	100
2000	0.158	0.048	0.206	76.6	23.4	100
2002	0.155	0.052	0.207	75.0	25.0	100
2004	0.157	0.059	0.216	72.7	27.3	100
2006	0.158	0.064	0.222	71.3	28.7	100
2008	0.166	0.065	0.231	72.0	28.0	100

Source: see Figure 3.4

In Table 3.4, the inter-regional index is presented in column (1) while intra-regional index is shown in column (2). Since the intra- and inter-regional indexes add up to the total, Table 3.4 also exhibits their contributions to total disparities. That is, the values in column (1) and column (2) add up to the third column—the total Theil index. Column (4) and (5) then show the contributions of the inter- and intra-regional index to the total Theil index. Results show that the inter-regional disparities have dominated as the main source of overall disparities throughout the period. The income differences across regions account, on average, for 86.9 percent of the overall disparities during 1981-1994. From 1995 onwards, the inter-regional disparities have become stable. Here, the increase in the total Theil index has been accompanied by intra-regional disparities. Although the inter-regional disparities continued to be the major source, the intra-regional index has increased its significance in more recent years.

From the results above, the GPP data offer a good representation of regional income inequality across provinces. It has been argued, however, that average household income and expenditure by provinces are better indicators of welfare (Islam & Khan, 1986, p. 83; Akita & Lukman, 1995, p. 65). This is because all income from goods and services produced within a province does not necessarily end up in the hands of those living in that province. It would therefore be useful to look at the disparities in household income and consumption across provinces as well. The results are presented in the next section.

Regional Disparities in Current Income and Consumption Expenditure

Overall Disparities

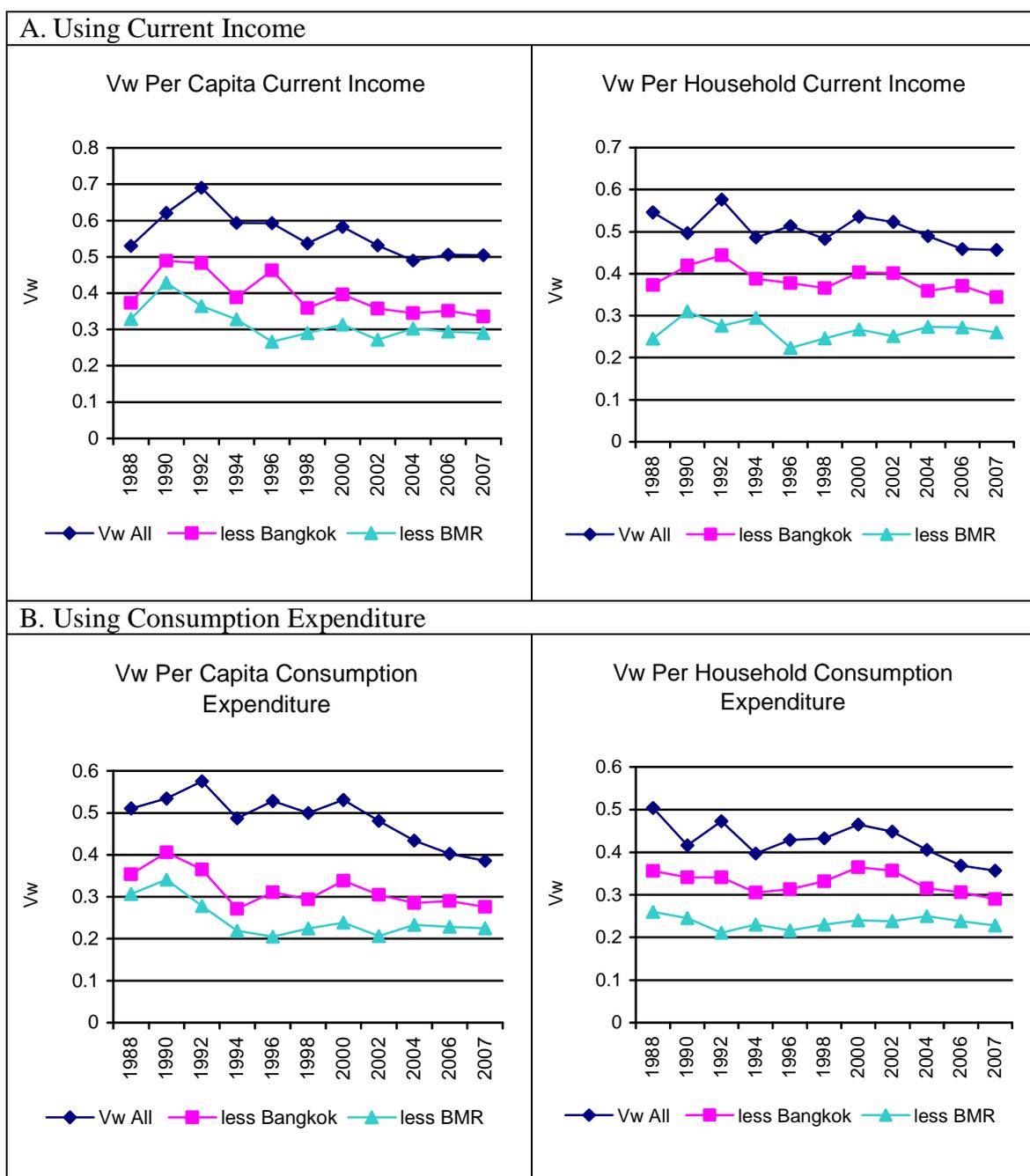
Provincial inequality using average current income and consumption expenditure during 1988 and 2007 are shown in Figure 3.5. Apparently, they exhibit

different results from those using the GPP data. Overall provincial disparities in per capita current income are smaller than the disparities in GPP per capita. From the previous section, we see that the population-weighted coefficient of variation has been ranging around 0.98-1.17 during 1988-2007 (see Figure 3.4A). Comparatively, population-weighted coefficient of variation in income per capita is between 0.49 and 0.69 during the same period (see Figure 3.5A). The disparities using per capita consumption expenditure are even lower—with values between 0.38 and 0.58 (see Figure 3.5B).

Results in Figure 3.5 show that there are similar patterns between current income disparities and consumption expenditure disparities. This is the case for both per-household unit and per-capita unit. The disparities in consumption expenditure are lower than those in current income. On the other hand, for both income and expenditure, the per-household disparities are slightly less than the per-capita counterparts. The household-weighted coefficients of variation in current income per household ranged 0.45-0.57 during the period 1988-2007. The variation in consumption expenditure per household is between 0.35 and 0.50 for the same period.

The provincial disparities obtained from the household survey data and those using GPP exhibit different long-term trends. Particularly after the crisis, the two data sets seem to give opposite results. The disparities in both per capita GPP and per capita income widened between 1988 and 1994. Then they were both declining between 1994 and 1998. From 1998 onwards, the disparities in per capita GPP have continuously widened. Contrastingly, the disparities in current income and consumption expenditure trended downward during 2000-2007.

Figure 3.5 Household-Weighted Coefficient of Variation 1988-2007



Source: Data for 1988-1992 are from raw SES data (see *Note on Data Sources*). Data on income and consumption expenditure for 1994-2007 and number of households for 2006-2007 are from NSO (2009). Data on number of households for 1994-1998 are collected from three editions of *Report of the Household Socio-Economic Survey: Whole Kingdom* as follow: 1994 (NSO, 1996, p. 35), 1996 (NSO, 1998, p. 56), 1998 (NSO, 1999, p. 13). As for 2000-2004, data are from *Report of Provincial Household Income and Income Distributions* as follow: 2000 (NSO, 2001, Table 1), 2002 (NSO, 2003a, Table 1) and 2004 (NSO, 2005a, Table 1).

The differences between disparities using GPP per capita and those using household surveys can be expected. In fact, the differences in data from household surveys and those from the national accounts have been widely discussed (see e.g. Karshenas, 2003, p. 689). This will be examined in the following subsection. In addition, the disparities in consumption expenditure can also be expected to be lower than current income. This is because households with higher incomes tend to spend a lower proportion of their income on consumption (Akita & Lukman, 1995, p. 77).

Once Bangkok and its vicinity are taken out of consideration, the disparities among provinces become lower. This is the same for both current income and consumption expenditure, as well as the results using GPP data. It is therefore obvious that Bangkok and its surrounding provinces—or the BMR—is set very much apart from the rest of the country. Despite that, the results from GPP data and the survey data exhibit different trends. The disparities in GPP per capita, excluding Bangkok and BMR, are both widening between 1992 and 2007. In fact, from 1998 onwards the disparities across provinces excluding Bangkok and BMR accelerate—thus catching up with overall disparities (see Figure 3.4A).

On the other hand, disparities of current income and consumption expenditure are rather stable throughout the period of 1988-2007. There is a jump in per-capita current income disparities, excluding Bangkok, in 1996. Meanwhile, the disparities remained stable or have slightly declined when the BMR is excluded in 1996. This reflects a large income growth in Bangkok's border provinces during 1994-1996. Then the crisis in 1997 had caused the disparities to be back around the 1994 level. While the current income disparities excluding Bangkok have slightly come down after 2002, those excluding BMR increase. This means that the income inequality across provinces outside the BMR worsened during 2002-2008. On the other hand, disparities in

consumption expenditure—both excluding Bangkok and the BMR—have been stable between 1994 and 2007. This is probably because consumption patterns of individuals and households outside Bangkok are not as sensitive to economic performances as those in Bangkok.

Intra-regional and Inter-regional Disparities

The overall disparities in current income and consumption expenditure can be decomposed into inter- and intra-regional disparities using the Theil index. The overall Theil indexes for both current income and consumption expenditure slightly increased between 1988 and 2000. Then the disparities have continuously declined from 2000 onwards (see Table 3.5). These results are consistent with the weighted coefficients of variation in the previous section. The decomposition suggests that disparities between regions have been the major contributor to the overall disparities. The inter-regional disparities account for more than 80 percent of the overall disparities in both current income and consumption expenditure. This is shown in column (4) of Table 3.5.

The Theil indexes obtained from the survey data are lower than that obtained from GPP per capita. This means that household income is more evenly distributed across provinces than is production. Not only do the trends differ between the GPP data and the survey data, the decomposed indexes also show more differences. While disparities in GPP per capita within regions have increased their significance overtime, it has not been the case for household data. The intra-regional disparities gradually declined between 1990 and 2002, then increased from 2002 onwards. Nonetheless, the average current income and consumption expenditure across provinces within each region are generally more equal than for average production. The factors behind this circumstance are discussed next.

Table 3.5 Decomposition of Regional Disparities: Theil Index 1994-2007 based on Current Income and Consumption Expenditure

Year	Theil: Current Income			Share		Theil: Consumption Expenditure			Share	
	Inter (1)	Intra (2)	Total (1) + (2)	Inter (4)	Intra (5)	Inter (1)	Intra (2)	Total (1) + (2)	Inter (4)	Intra (5)
1988	0.049	0.005	0.054	90.4	9.6	0.040	0.007	0.047	85.1	14.9
1990	0.037	0.010	0.047	79.7	20.3	0.027	0.007	0.034	79.7	20.3
1992	0.050	0.009	0.060	84.4	15.6	0.034	0.007	0.041	83.2	16.8
1994	0.052	0.012	0.063	81.9	22.1	0.036	0.009	0.045	80.8	19.2
1996	0.051	0.014	0.065	78.5	21.5	0.042	0.009	0.050	83.1	16.9
1998	0.047	0.009	0.056	83.6	16.4	0.040	0.007	0.047	84.8	15.2
2000	0.056	0.009	0.065	86.4	13.6	0.046	0.007	0.052	87.2	12.8
2002	0.048	0.008	0.056	86.3	13.7	0.037	0.006	0.043	86.4	13.6
2004	0.040	0.008	0.048	83.1	16.9	0.030	0.007	0.037	82.3	17.7
2006	0.040	0.008	0.048	83.6	16.4	0.026	0.007	0.032	79.5	20.5
2007	0.037	0.008	0.046	81.6	18.4	0.023	0.006	0.030	78.2	21.8

Source: see Figure 3.5

Per Capita GPP versus Household Survey Data

As previously mentioned, discrepancies between income data from national accounts and household survey can be expected. This is partly due to the differences in definition and coverage⁵. That is, the two data sets differ in their measurement purposes. As part of the national accounts system, the GPP is a macroeconomic indicator. It measures the gross value of the total goods and services produced within one province. Consequently, GPP per capita is simply the gross provincial value divided by the provincial population. Contrastingly, the current income and consumption expenditure data are derived from household surveys. Here, the data represent the average income or expenditure of individuals and households actually residing in that province. For this reason, data from household surveys are considered to be a better indicator of the wellbeing of people in each province.

Nonetheless, there are also weaknesses in the data from household surveys. One common drawback is that the non-response rate to the survey usually increases along with the income. This means that more observations are lost from the top of the income distribution. Consequently, the disparities across provinces using household survey data could also be underestimated. If this is the case, then the GPP data could be more accurate than the survey data.

The GPP data in Thailand provides a longer and more complete time series. The NESDB publishes the GPP annually and the time series is available back to 1981. The household surveys, on the other hand, have only been conducted every two years. Although the surveys go back as early as 1957, the provincial data have only been

⁵ Standardised national accounts system (SNA93) includes imputed rents of owner-occupiers, income of non-profit institutions serving households (NPISH), imputed financial service charges and non-exchange services. These items are usually left out by the household surveys. However, this is not the case in Thailand as the Socio-Economic Survey by NSO includes these items in the household income. For general arguments on this issue, see Karshenas (2003) and Deaton (2005).

publicly available⁶ since 1994. Because the more complete time series data usually allow for more comprehensive analysis, the GPP data should be used as a major indicator of average provincial income. Nonetheless, the household survey data will be employed further in an analysis of poverty across provinces, in Chapter 6.

3.5 Conclusion

The Thai economy has gone through significant changes during the past three decades. With it, patterns of regional development have also changed markedly. This chapter examined these changes. Using the per capita GPP data, the overall provincial disparities went up during the period prior to 1990. In this period, Bangkok and BMR were the major source of the income disparities. Between 1990 and 1998 overall disparities declined—except for the year 1993. At the same time, disparities outside Bangkok and BMR gradually increased. Here, the East and the Central regions have emerged as new sources of disparities. After the crisis in 1997-1998, the overall income disparities continuously widened with accelerating disparities excluding Bangkok and BMR.

An analysis drawn from this chapter suggests that the national plans have played a role in shaping this regional development pattern. The earlier Plans, which focused on infrastructure development and industrial promotion, led to an expansion of the manufacturing sector. Since most firms clustered around Bangkok and its vicinity, per capita income in these provinces rose drastically. As a consequence, overall income disparities increased during the 1980s and the BMR became the main source of this increase. By 1985, this issue was fully realised by the Thai policy makers and the Sixth-

⁶ As mentioned earlier, data at provincial level can be obtained from 1988 onwards from the raw SES data. These data are available upon request at the NSO.

and Seventh Plans (1987-1991 and 1992-1996) aimed at decentralising industries away from BMR. Together with a shift toward an export-oriented policy, the Eastern Seaboard was developed. As a result, manufacturing firms increasingly established in the East and later in the Central region. Thus, per capita income in these regions caught up with that of BMR. They also became new sources of disparities.

After the crisis in 1997, however, the role of the national plans was relatively less marked. What are the major factors contributing to these widening provincial disparities? Previous research in other countries has pointed to several factors. They include, among others, sectoral distribution, labour productivity and government budget allocation. Meanwhile, the disparities in household income suggested that the issue of provincial disparities may be less pronounced when it comes to wellbeing aspect. To clarify this point further, the disparities in welfare indicators such as education and health should also be examined. These four further aspects of provincial disparities will be discussed in the next chapter.

CHAPTER 4

Further Aspects of Regional Disparities in Thailand

4.1 Introduction

This chapter examines four other aspects of provincial disparities and how they relate to the income disparities. The four aspects include sectoral distribution within each province, labour productivity, government budget allocation and variation in education and health services. They are selected here for many reasons. Sectoral distribution and labour productivity have been found to be contributing to the rising output per capita disparities in many countries (Akita & Lukman, 1995; Fujita & Hu, 2001). As for Thailand, Sarntisart (2001, p. 416) pointed out that biased policy toward manufacturing, which was concentrated around Bangkok, was the major cause of regional income disparities. Intra-sectoral productivity differences were also considered as another determinant of provincial income disparities. Although the above arguments sound rational, they still lack empirical evidence. This chapter, therefore, examines patterns of provincial sectoral distribution and labour productivity in Thailand.

In other country-specific cases, the uneven distribution of government expenditure has also been blamed as a contributing factor to provincial income disparities (Blazek & Maceskova, 2009). To see if this is also the case for Thailand, disparities in provincial government expenditure will also be examined here. With availability of per capita government expenditure broken down by sectors, we can examine which sector contributes most to provincial disparities. Finally, provincial variation in education and health services are investigated here as they are good welfare

indicators. It is interesting that provincial disparities in these social factors are also considered along with the income disparities.

This chapter begins with sectoral distribution analysis, as it is closely linked to the previous chapter. Then labour productivity, government expenditure and provision of education and health services are examined. One subsection will be dedicated to each aspect being considered in this chapter. It should be noted that there will be different methods employed for different indicators. As a result, each subsection will contain a discussion of methods, data and results.

4.2 Sectoral Distribution

As with national data, production activities within a province can be categorised into three major sectors—agriculture, industry and services. The contribution of these three sectors, however, varies across provinces. Because of that, variations in value-added across provinces also differ from one sector to the other. This section examines the extent to which each production sector contributes to overall disparities. It is expected that the provincial GDP per capita disparities come mainly from the industrial sector. In fact, the regional concentration of manufacturing activities has been widely viewed as the major cause of regional disparities in Thailand. This is because growth in the manufacturing sector was the main driver of the economic boom prior to the 1997 crisis. Concentration of the manufacturing activities in only few provinces should therefore translate into widening income disparities among provinces. That pattern seems to change after the crisis. Hence, this section looks at provincial disparities in each of the three major production sectors for period 1981-2008.

Method and Data

To conduct the analysis, the decomposed Williamson's population-weighted coefficient of variation is employed. Here, the production sectors are grouped into three major sectors—agriculture, industrial and services. Since GPP is the sum of sectoral GPP, the squared weighted coefficient of variation can be decomposed as follows:

$$v_w^2 = \sum_{j=1}^3 z_j^2 v_{wj}^2 + \sum_{j \neq k} z_j z_k COVw(j, k) \quad (4.1)$$

where:

$$\begin{aligned} z_j &= \text{Share of sector } j \text{ in national GDP} \\ v_{wj} &= \text{population-weighted coefficient of variation of sector } j \\ COVw(j, k) &= \text{weighted coefficient of covariation between sector } j \\ &\quad \text{and sector } k \\ &= \frac{1}{y_j} \frac{1}{y_k} \sum_{i=1}^n (y_{ji} - \bar{y}_j)(y_{ki} - \bar{y}_k) \frac{f_i}{n} \\ \bar{y}_j, \bar{y}_k &= \text{national income per capita of sector } j \text{ and sector } k, \\ &\quad \text{respectively} \\ y_{ji}, y_{ki} &= \text{income per capita of sector } j \text{ and } k \text{ in } i^{\text{th}} \text{ province,} \\ &\quad \text{respectively} \end{aligned}$$

In this case, there are three sectors. Hence, equation (1) becomes:

$$v_w^2 = z_a^2 v_{wa}^2 + z_i^2 v_{wi}^2 + z_s^2 v_{ws}^2 + 2z_a z_i COVw(a, i) + 2z_i z_s COVw(i, s) + 2z_s z_a COVw(s, a) \quad (4.2)$$

where a denotes agricultural sector, i industrial sector and s services sector. This decomposition allows researchers to examine how disparities in each sector contribute to the overall disparities. Not only that, the covariance between two sectors also reveals

the relationship between them. As part of the overall population-weighted coefficient of variation, the covariance can also indicate the magnitude and direction of covariations between sectors in the overall disparities (Akita & Lukman, 1995, p. 64).

The data used in this subsection come from the same sources as those being used to calculate the Williamson's population-weighted coefficient of variation in Chapter 3. When NESDB publishes GPP data, it also includes GPP by production sector. They are available annually from 1981 onwards. Although these data are available for a long time series, there was a change in disaggregating methods in 1997. Prior to that, the production activities were categorised into 11 sectors. As the country developed, its economic structure had changed and new activities emerged. Consequently, the disaggregation of production activities was changed to 16 sectors in 1997. Because each annual data set usually includes the revised data of the two previous years, GPP with 16 production sectors are available for year 1995 onwards.

Since the analysis only looks at the three major sectors—agriculture, industrial and services, different disaggregating methods should not pose any problems. Nonetheless, due to changes in definition and estimation method for each sector, the two time series cannot be comparable. This means they cannot be combined into one long-period time series. As a result, the analysis will be divided into two time periods, 1981-1997 and 1995-2008. For the data on provincial population, the same set of data from Chapter 3 can be directly employed here. The data on provincial population are also published by NESDB as part of the annual editions of *Gross Regional and Provincial Product*.

Results

Table 4.1 and 4.2 shows the population-weighted coefficients of variation of the three sectors. It appears that sectoral output disparities across provinces in Thailand are lowest in agricultural sector. It has increased during the boom period 1989-1993 and has been stable around 0.8 since. Meanwhile, disparities within the industrial sector have been the highest among the three sectors. It began at a very high level and gradually declined during the boom period. Then, the disparities reversed to an upward trend from 1997. As for services sector, the disparities have been rather stable overtime. Nonetheless, they were stable at a rather high level.

Table 4.1 Weighted Coefficient of Variation and Covariation in per Capita Sectoral Value-added at Current Prices 1981-1997

Year	v_a	v_i	v_s	COV_{ai}	COV_{is}	COV_{as}	v_w
1981	0.656	1.713	1.186	-0.099	1.455	-0.251	0.988
1982	0.629	1.674	1.115	-0.116	1.334	-0.229	0.972
1983	0.610	1.693	1.124	-0.167	1.365	-0.259	0.965
1984	0.639	1.627	1.133	-0.155	1.286	-0.263	0.980
1985	0.618	1.560	1.122	-0.101	1.176	-0.263	0.969
1986	0.676	1.605	1.104	-0.037	1.224	-0.240	0.993
1987	0.697	1.634	1.127	-0.050	1.302	-0.241	1.018
1988	0.692	1.663	1.157	-0.109	1.359	-0.261	1.038
1989	0.609	1.626	1.178	-0.104	1.327	-0.273	1.050
1990	0.658	1.614	1.239	-0.132	1.385	-0.294	1.107
1991	0.665	1.550	1.228	-0.106	1.375	-0.285	1.094
1992	0.763	1.471	1.231	-0.120	1.343	-0.300	1.075
1993	0.926	1.466	1.240	-0.035	1.367	-0.267	1.116
1994	0.875	1.429	1.243	-0.007	1.227	-0.277	1.080
1995	0.887	1.422	1.214	-0.055	1.124	-0.284	1.044
1996	0.799	1.422	1.203	-0.056	1.060	-0.287	1.028
1997	0.803	1.510	1.159	-0.038	1.087	-0.275	1.040

Note: The GPP per capita by sector used here are in nominal values.

v_a = population-weighted coefficient of variation in agricultural sector

v_i = population-weighted coefficient of variation in industrial sector

v_s = population-weighted coefficient of variation in services sector

COV_{ai} = weighted coefficient of covariation between agricultural and industrial sectors

COV_{is} = weighted coefficient of covariation between industrial and services sectors

COV_{as} = weighted coefficient of covariation between agricultural and services sectors

v_w = population-weighted coefficient of variation in overall GPP per capita

Source: Author's own calculation. Data are from NESDB (1998).

The coefficient of covariation (cov_w) adds more understanding to the analysis. The positive values of cov_{is} indicate that provinces with high value-added in industrial sector tend to have high value-added in services sector as well. Despite that, the values of cov_{is} had been declining over time. On the contrary, the coefficients of covariation for agricultural sector to both industrial and services sectors exhibit negative values. This reflects structural shifts from the agricultural sector to industrial- and services sectors. In other words, provinces with high value-added in industrial and services sectors tended to have low value-added in agricultural sector. Nonetheless, there were positive relationships between agricultural and industrial sectors in 1999-2003. After 2003, the cov_{ai} only showed small negative values. This possibly reflects the complementary between agricultural and agro-industrial sectors.

Table 4.2 Weighted Coefficient of Variation and Covariation in per Capita Sectoral Value-added at Current Prices 1995-2008

Year	v_a	v_i	v_s	cov_{ai}	cov_{is}	cov_{as}	v_w
1995	0.893	1.586	1.136	-0.066	0.741	-0.292	1.006
1996	0.810	1.562	1.135	-0.073	0.712	-0.300	0.992
1997	0.805	1.648	1.097	-0.045	0.721	-0.288	1.005
1998	0.782	1.723	1.018	-0.018	0.703	-0.246	0.988
1999	0.762	1.729	1.201	0.030	0.693	-0.315	1.057
2000	0.808	1.831	1.246	0.044	0.702	-0.337	1.110
2001	0.741	1.866	1.261	0.076	0.728	-0.339	1.129
2002	0.748	1.858	1.242	0.070	0.627	-0.334	1.102
2003	0.756	1.868	1.243	0.084	0.580	-0.347	1.097
2004	0.808	1.880	1.254	-0.001	0.572	-0.352	1.098
2005	0.829	1.983	1.222	-0.037	0.594	-0.341	1.133
2006	0.863	2.030	1.183	-0.045	0.583	-0.340	1.138
2007	0.814	2.074	1.136	-0.044	0.685	-0.331	1.166
2008	0.814	2.046	1.112	-0.047	0.640	-0.322	1.131

Note: see Table 4.1

Source: Author's own calculation. Data are collected from several editions of *Gross Regional and Provincial Product* as follows: 1995-2001: NESDB (2007a) and 2002-2008: NESDB (2010b).

Table 4.3 Contributions of Squared Weighted Coefficient of Variation 1981-2008

Year	sv_a	sv_i	sv_s	$scov_{ai}$	$scov_{is}$	$scov_{as}$	Total
1981	2.0	27.2	33.9	-1.3	43.5	-5.3	100.0
1982	1.4	25.8	35.5	-1.3	43.3	-4.7	100.0
1983	1.6	28.8	33.1	-2.2	44.2	-5.5	100.0
1984	1.3	28.2	34.0	-1.8	43.2	-4.9	100.0
1985	1.0	26.3	36.7	-1.1	41.7	-4.6	100.0
1986	1.1	28.6	32.5	-0.4	42.1	-3.9	100.0
1987	1.2	28.6	31.8	-0.5	42.6	-3.7	100.0
1988	1.2	30.7	30.1	-1.1	43.0	-3.9	100.0
1989	0.8	31.6	29.9	-1.0	42.5	-3.6	100.0
1990	0.6	29.5	31.7	-1.0	42.3	-3.0	100.0
1991	0.6	30.0	29.9	-0.9	43.3	-2.9	100.0
1992	0.8	27.1	32.3	-1.0	43.9	-3.2	100.0
1993	0.7	26.2	31.9	-0.2	43.5	-2.2	100.0
1994	0.7	26.8	33.6	-0.1	41.5	-2.5	100.0
1995	0.9	28.6	33.5	-0.4	40.3	-2.8	100.0
1996	0.7	29.7	33.8	-0.5	39.2	-3.0	100.0
1997	0.7	31.7	31.5	-0.3	39.2	-2.8	100.0
1995	0.7	41.3	31.5	-0.5	29.7	-2.7	100.0
1996	0.6	41.3	32.3	-0.6	29.3	-2.9	100.0
1997	0.6	43.3	30.3	-0.3	28.9	-2.7	100.0
1998	0.7	47.7	26.1	-0.2	28.3	-2.7	100.0
1999	0.5	44.9	31.9	0.2	25.2	-2.6	100.0
2000	0.4	48.0	30.3	0.3	23.4	-2.4	100.0
2001	0.4	48.5	29.6	0.5	23.5	-2.4	100.0
2002	0.4	51.2	29.4	0.5	21.1	-2.5	100.0
2003	0.5	55.2	27.1	0.6	19.3	-2.8	100.0
2004	0.6	55.2	28.0	0.0	19.1	-2.8	100.0
2005	0.6	59.2	24.4	-0.3	18.6	-2.5	100.0
2006	0.7	62.5	21.8	-0.3	17.9	-2.6	100.0
2007	0.6	63.1	18.9	-0.3	20.1	-2.3	100.0
2008	0.7	63.8	18.9	-0.4	19.5	-2.6	100.0

Note: The GPP per capita by sector used here are in nominal values.

sv_j = Share of weighted coefficient of variation for j sector

$scov_{jk}$ = Share covariation between i and k sectors.

Source: see Table 4.1

In addition to exhibiting the disparities by production sector, this decomposition method can also show the contribution of each sector to overall provincial disparities. In order to examine the contributions, the share of each sector in national GDP must be incorporated. Then, the share of each component is obtained using equation (2). For instance, sv_a in Table 4.3 is the share of $z_a^2 v_{wa}^2$ to v_w^2 . The results in Table 4.3 suggest that covariation between industrial and services sectors dominated the overall variation during the early period of 1981-1995. Its contribution, however, had declined over time due to falling value of covariation itself. This trend continued further during the later period of 1995-2008.

As for contributions by sectors, the disparities in the services sector accounted for the biggest part among the three sectors during 1981 and 1997. Despite that, the share of disparities in the industrial sector had gradually increased, owing to both increased share of GDP and the widening disparities. In the later period 1995-2008, variation in the industrial sector provided the largest and increasing contribution. This, again, was due to both widening disparities and increased share of GDP. The role of the economic structure in determining overall variation becomes more apparent when looking at the services and agricultural sectors. While disparities in both sectors slightly widened during the period, their contribution to overall disparities declined. This is because their shares of GDP had both fallen. Hence, it is reasonable to say that the sectoral share of GDP plays a significant role in determining the overall disparity.

From the results above, some conclusions can be drawn. As expected, the industrial sector exhibited the highest provincial disparities when compared to the other two sectors. Sectoral shares of GDP play a significant role in determining overall provincial disparities. It is therefore important that sectoral shares are incorporated into

the decomposition. Having a large share of GDP, the industrial sector was the major contributor to the overall GPP per capita disparities.

4.3 Provincial Labour Markets

In a less developed economy, labour markets can be major determinants of economic change at the sub-national level (Esguerra & Manning, 2007, p. 245). The Thai labour markets are no exception. From the 1980s to the end of the 1990s, employment structure in Thailand had changed along with the change in economic structure. The share of labour force in agricultural sector fell from 72.3 percent of total labour force in 1980 to 45.7 percent in 1998. At the same time, the share of labour force in the industrial- and services sectors to total labour force increased from 5.6 percent to 14.8 percent and 22.1 percent to 39.5 percent, respectively (Sarntisart, 2001, Table 4). This shift in economic structure, however, did not take place evenly across provinces in Thailand. Also, despite the fact that the agricultural sector had generated the smallest share of GDP, it continues to be the dominant employer. These imbalances tend to result in a high variation in labour productivity across provinces.

Intra-sectoral productivity differences across provinces are regarded as one of the determinants of regional income inequality in Thailand (Sarntisart, 2001, p. 416). The variation in labour productivity across regions has been considered a factor affecting the regional disparities since the study by Williamson (1965, pp. 79-83). In his work, Williamson examined labour productivity in agricultural and industrial sectors. He concluded that regional productivity differences in the agricultural sector are usually larger than those in industrial sector. Hence, agricultural labour productivity contributed to the income disparities. This was because regional resource endowments played a

bigger role in agricultural productivity. Given that geographical differences across regions are quite significant—though not extreme; disparities in agricultural labour productivity in Thailand are expected to be large. However, the previous section showed that disparities in industrial sector were highest among the three sectors. Since the per capita GPP and labour productivity are closely linked, the disparities in industrial labour productivity are also expected to be high. Whether the disparities in agricultural or industrial labour productivity would be larger seems ambiguous in the case of Thailand. It is therefore investigated here.

Method and Data

To empirically examine disparities in labour productivity, both overall provincial productivity and sectoral provincial productivity will be considered. Williamson's population-weighted coefficient of variation is employed, again, as a measure. Here, the index measures variation in GPP *per worker* instead of the GPP per capita. Accordingly, the weights being used in this section are the share of provincial labour to the national labour force. Data on labour force are provided by the NSO. The NSO has been conducting the Labour Force Survey at regular intervals since 1963. However, the provincial-level data have only been publically available from 1994 onward. They are published in several editions of the *Statistic Tables of Provincial Labour Force Surveys*, available only in Thai.

Labour force is defined as population aged 15 years or above who are employed or unemployed in a province. Among population aged 15 years or over, labour force excludes those that are either not available for work or not willing to work. Examples are students, disabled, works without compensation and those not willing to work. It is important to note that there was a change in the labour force definition in the year 2001. Up until the end of 2000, labour force is defined as the population aged 13 years or over

who contribute to the production of goods and services in the country. From 2001 onwards, the labour force covers population aged 15 years or above.

Note also that, although the surveys have been conducted on a regular basis, only data for the third quarter (July-September) can be obtained for all years considered. This is possibly due to the fact that third-quarter labour-force data have been widely used in the case of Thailand. As this period is the harvest season, using labour force data for July-September best reflects labour's main occupation. Accordingly, the third-quarter labour force data will be used in this study. In addition, the classification of the GPP by production sectors was also changed in 1997 from 11 sectors to 16 sectors. The NESDB which is the official source of GPP only publishes the data with the new 16-sector classification from 1995. Since the data in the new classification are not comparable with the old one, the analysis in this section will cover the period 1995-2008.

Results

Table 4.4 shows the variation in GPP per worker across provinces, reflecting provincial labour productivity. Results suggest that the overall inequality increased between 1998 and 2008. As Bangkok and the BMR are excluded, the upward trend of inequality took off from 1995. While disparities without Bangkok and BMR are lower than the overall inequalities throughout the period, the gaps between them narrowed over time. This suggests that the role of Bangkok in contributing to disparities has gradually declined. When compared to the inequality based on GPP per capita, also shown in Table 4.4, it is apparent that they are similar in both values and trends. In fact, the disparities in labour productivity are almost as high as those in GPP per capita.

According to Williamson (1965, p. 79), labour markets can influence regional disparities through two mechanisms—labour participation difference and labour productivity difference. To see whether labour participation plays a role in determining income disparities, we use the ratio of overall GPP per capita disparities to labour productivity disparities. It is presented in the last column of Table 4.4. The ratio suggests that the disparities in labour productivity were slightly lower than that in GPP per capita throughout the period. This implies that the labour participation rate among provinces played some role in determining the GPP per capita disparities in Thailand.

Table 4.4 Weighted Coefficient of Variation in Labour Productivity and Real GPP per Capita 1995-2008

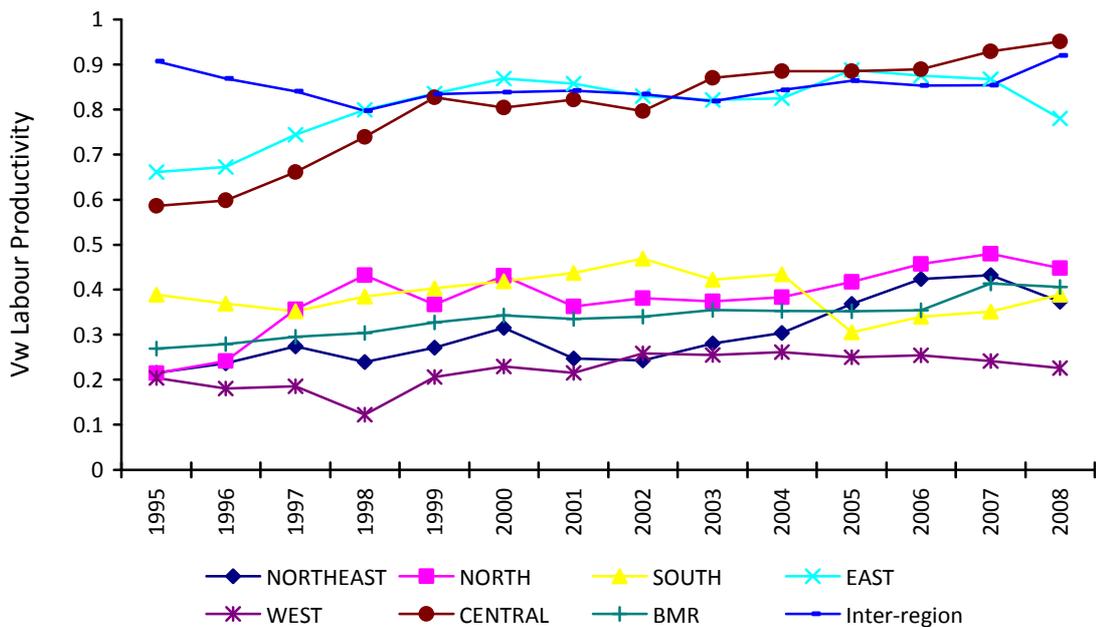
Year	(1) v_w in Labour Productivity			(2) v_w in GPP per capita			(2) / (1)
	All	No BKK	No BMR	All	No BKK	No BMR	All
1995	1.034	0.894	0.727	1.041	0.877	0.711	1.007
1996	1.010	0.893	0.748	1.035	0.886	0.745	1.025
1997	1.018	0.948	0.820	1.052	0.928	0.802	1.033
1998	1.001	0.947	0.830	1.037	0.934	0.818	1.036
1999	1.053	0.986	0.850	1.099	0.975	0.838	1.044
2000	1.075	1.024	0.888	1.127	1.005	0.874	1.048
2001	1.077	1.029	0.898	1.143	1.020	0.887	1.061
2002	1.079	1.045	0.933	1.144	1.045	0.927	1.060
2003	1.087	1.076	0.970	1.153	1.075	0.966	1.061
2004	1.117	1.102	0.999	1.158	1.077	0.978	1.037
2005	1.146	1.084	1.006	1.172	1.099	0.988	1.023
2006	1.136	1.086	0.999	1.167	1.110	0.986	1.027
2007	1.166	1.143	1.020	1.206	1.176	1.003	1.034
2008	1.214	1.187	1.036	1.228	1.204	1.036	1.012

Source: Data on GPP, see Figure 4.1. Labour force data are from several editions of *Statistic Tables of Provincial Labour Force Surveys: Third Quarter (July-September)*.

When Bangkok and the BMR are excluded, the disparities in GPP per capita and those in labour productivity continued to show similar trends. The inequality of labour

productivity excluding Bangkok is closer to the overall inequality than those using GPP per capita. While Bangkok continues to contribute to inequality in GPP per capita, it has become less significant as a cause of inequality in labour productivity. Figure 4.1 and Figure 4.2 support this finding. Figure 4.1 shows the variation in labour productivity across provinces within each of the seven regions during 1995 and 2008. Inter-regional variation is also included in the figure. It appears that the disparities across regions were higher than any intra-regional disparities prior to the crisis and remained high throughout the period. As for intra-regional disparities, those within the Eastern region have been the highest between 1995 and 2002. Then the variation within the Central region surpassed the East from 2002 onwards. The fact that variation in labour productivity within the BMR was relatively low may be surprising at the first glance. However, it is more likely that these provinces had a similar level of productivity. This also does not mean that the BMR does not contribute to the overall inequality in labour productivity.

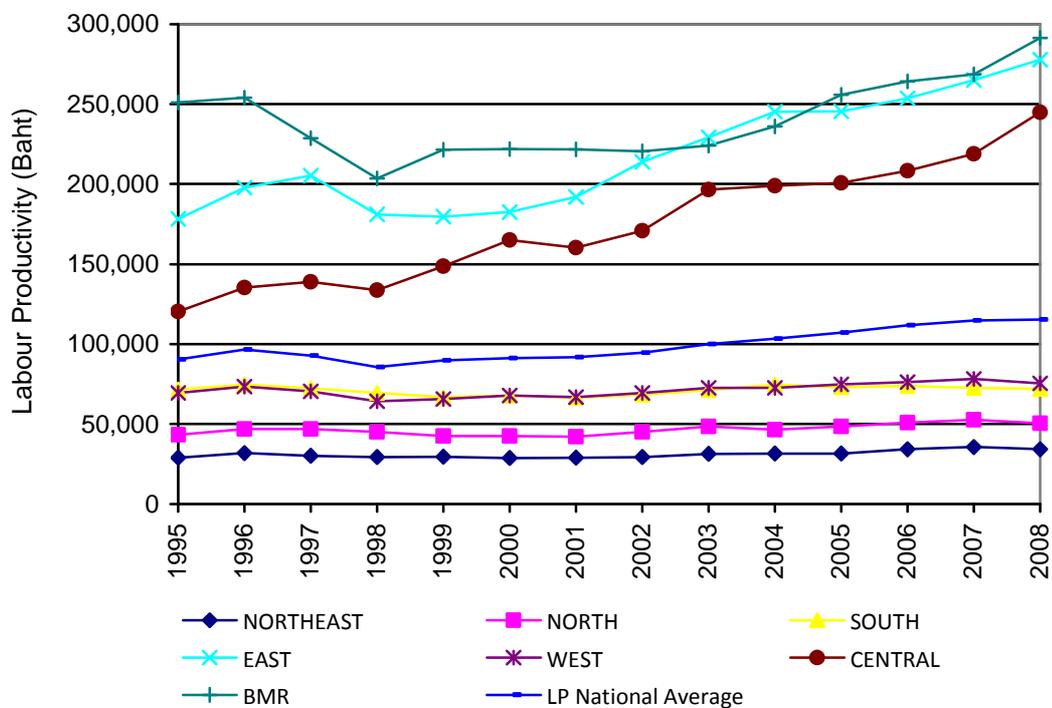
Figure 4.1 Weighted Coefficient of Variation in Labour Productivity by Region 1995-2008



Source: see Table 4.3

Figure 4.2 clarifies this point by showing the value of the average labour productivity by region in 1995-2008. While the variation in labour productivity within the BMR has been low, the average labour productivity for the region was the highest—except for 2003-2004. Throughout the period, the labour productivity in BMR was more than double the national average. The average labour productivity of the East and Central regions has also been catching up quickly with the BMR. However, the high intra-regional disparities for these regions, as shown in Figure 4.1, mean that only some provinces in these regions actually caught up with the BMR. In addition, the labour productivity in the BMR, the East and Central regions deviated largely from the rest of the country. Thus, the high values of labour productivity of the BMR and some provinces in the East and Central regions contributed to the overall labour productivity disparities.

Figure 4.2 Gross Provincial Product per Worker (Real Values) by Region 1995-2008



Source: see Table 4.3

Many studies that examine regional disparities in labour productivity also analyse the labour productivity by production sectors (Williamson, 1965, pp. 76-79; Hashim, 1998, pp. 142-148). This analysis can be done in the case of Thailand as well. The provincial-level data, both the GPP and the labour force, come with the breakdowns into production sectors. For consistency with the previous analyses, three major sectors—agriculture, industry and service—will be examined. It should be noted that the classifications for the GPP data and the labour force had not been the same throughout the 1995-2008 period¹. The GPP data have followed the International Standard of Industrial Classification, Revision 3 (ISIC Rev.3) since 1995. On the other hand, data from the Labour Force Survey only began to use ISIC Rev.3 from 2001. These classification differences, however, should not affect the analysis. This is because only the lowest level of breakdown—the three major sectors—will be considered here.

Table 4.5 illustrates the variation in labour productivity across provinces in agricultural, industrial and services sector during 1995-2008. The variation is highest in industrial sector, followed by agricultural and services sectors, respectively. This is different from the results found by Williamson (1965, p.77). In his empirical investigation, the variation in agricultural productivity was found to be the largest. Here, however, the higher disparities in industrial sector occurred as a result of uneven industrial distribution across provinces. When the Thai economy moved from labour-intensive to capital-intensive industries, the shift only took place in a few provinces. Consequently, the productivity of provinces dominated by labour-intensive industries is much lower than the few provinces with capital-intensive industries.

¹ Prior to the change to current classification, NESDB and NSO used their own classifications for GPP data and labor force survey, respectively. The NESDB used the Thai Standard of Industrial Classification (TSIC) while NSO separately developed the classifications based on ISIC 1958.

Table 4.5 Weighted Coefficient of Variation in Labour Productivity by Sector 1995-2008

Year	Agriculture			Industry			Services		
	<i>All</i>	<i>No BKK</i>	<i>No BMR</i>	<i>All</i>	<i>No BKK</i>	<i>No BMR</i>	<i>All</i>	<i>No BKK</i>	<i>No BMR</i>
1995	1.043	1.037	0.978	0.945	1.081	0.976	0.542	0.339	0.341
1996	0.978	0.979	0.929	0.959	1.065	0.931	0.471	0.317	0.320
1997	1.001	1.001	0.923	1.038	1.162	1.097	0.413	0.312	0.317
1998	1.042	1.044	0.898	0.978	1.116	1.111	0.391	0.284	0.285
1999	0.936	0.938	0.862	1.080	1.207	1.196	0.524	0.366	0.369
2000	1.049	1.050	0.845	1.059	1.187	1.170	0.509	0.372	0.368
2001	1.010	1.009	0.823	1.156	1.297	1.281	0.544	0.376	0.383
2002	0.970	0.971	0.848	1.222	1.373	1.366	0.568	0.394	0.400
2003	0.986	0.987	0.814	1.245	1.395	1.401	0.561	0.387	0.395
2004	1.015	1.015	0.874	1.253	1.387	1.374	0.608	0.411	0.423
2005	1.007	1.007	0.914	1.154	1.258	1.316	0.701	0.419	0.421
2006	0.984	0.985	0.881	1.119	1.210	1.267	0.659	0.420	0.419
2007	0.962	0.963	0.866	1.153	1.243	1.306	0.651	0.516	0.427
2008	0.935	0.936	0.866	1.136	1.228	1.245	0.702	0.531	0.447

Source: Author's own calculation

Results within each sector also reveal many interesting points. For agriculture, Bangkok and BMR have not played much role in determining the disparities in labour productivity. This also applies to the industrial sector. In fact, the overall disparities in industrial sector became even higher when Bangkok and the BMR are excluded. This is because the highly capital-intensive industries have been concentrated outside Bangkok and the BMR. The development of the Eastern Seaboard has driven the high-tech manufacturing sector to locate in the East. Throughout the period, industrial labour productivity had been the highest in Ranong, followed by Chonburi and Chacheongsao. As for the services labour productivity, the disparity pattern differs noticeably from those of agricultural and industrial sectors. In the services sector, Bangkok has continued to be a major contributor to the labour productivity disparities. This is

probably because the retail and wholesale trade, finance, transportation and communication have remained highly clustered in the capital city (Kittiprapas, 1999b, pp. 19-20).

Earlier in this section, results showed that the overall disparities in labour productivity and in GPP per capita display similar trends. This similarity has not occurred when comparing disparities at the sector level. In other words, the disparities in labour productivity for each sector do not have the same trend as their GPP per capita counterpart. This reflects the variation in labour market structure across provinces. In addition, the analysis on sectoral labour productivity here and the sectoral decomposition in section 4.2 serve different purposes. The sectoral distribution of GPP per capita disparities was brought into the analysis to show how value-added of each sector contributes to overall disparities. It inevitably ignores the fact that provinces differ in their labour market structures. The disparities in sectoral labour productivity, on the other hand, incorporate sectoral labour force into the analysis. However, it cannot show how each sector contributes to overall labour productivity disparities.

In summary, the provincial disparities in overall labour productivity in Thailand have been high and increasing. The results exhibit similar levels and trends as the provincial disparities in GPP per capita. When considering disparities by sector, it appears that provincial disparities in value-added per worker have been high for all three sectors. This means that, aside from income disparities, labour productivity also varied greatly across provinces. The simple correlation between GPP per capita and that in labour productivity is 0.952. This suggests that the variation in labour productivity is one of the major determinants of provincial income disparities.

4.4 Public Expenditure

Uneven spatial distribution of public expenditure is another factor being cited as one of the causes to the regional income disparities (Kataoka, 2005, pp. 115-117; Blazek & Maceskova, 2009, p. 694). In case of Thailand, the allocation of budget has always been biased toward Bangkok (Wisaweisuan, 2009, p. 190). Based on NESDB data, the budget for Bangkok accounted for 36.7 percent of the total government budget while the city contained only 10.4 percent of the national population in FY2001. As of FY2007, the government budget allocated to Bangkok rose to 58.3 percent of the total budget while its share of population remained stable at 10.4 percent of the national population. This section explores disparities in budget allocation in different government functions as well as the overall picture.

Government Administrative Structure in Thailand

The Kingdom of Thailand is a unitary state. Prior to 1997, the Thai government administrative system had been highly centralised. Despite the existence of regional and local governments, they only acted as branch offices of the central government. Ministries normally dispatched their officers into provinces to carry out their local duties. However, most policies and budget allocations either were formulated or had to be approved by the central government in Bangkok (JICA, 2007, pp. 9-11). In accordance with this highly centralised administrative system, the local governments had only been allocated around 10.0 percent of the total government budget.

At the same time, there also exists another type of local system in Thailand. That is, the local autonomy system, which is made up of 7,800 units throughout the country²

² These Thai local autonomy units can be classified into five types. They are namely (1) Provincial Administrative Organizations; (2) *Thesaban* or Municipalities; (3) Tambon Administrative Organization at the sub-district level; (4) Bangkok Metropolitan Administration (BMA) and (5) the City of Pattaya. In contrast, the Thai local administrative governments consist of provincial governors and district officers.

(Nagai, Funatsu & Kagoya, 2008, p. 5). These local autonomy units coexist along with the local administrative governments for all provinces except Bangkok. Unlike the local governments, officers in these units are locally hired. Their authority, however, is under the supervision of provincial governors and district officers, who were appointed by the Ministry of Interior.

In October 1997, the promulgation of the 1997 Constitution stressed decentralisation as one of the “national basic policies.” As a result, the Decentralisation Act was enacted at the end of 1999. The Act aimed at transferring authority, finance and human resources from local administration system to the local autonomy system. The share of local government expenditure to the total budget was targeted to be at least 20.0 percent in FY2001 and 35.0 percent in FY2006 (JICA, 2007, pp. 7-14). Despite such an ambitious goal, the decentralisation process, particularly the fiscal part, has been slow. As of August 2003, there were 5,029 government employees transferred to the local government. Most of them were generalists while the target was to transfer 8,000 technical employees (Amornvivat, 2004, p. 14). Similarly, the local government share of total government budget only reached 25.3 percent in FY2009 (Bureau of Budget [BB], 2010). This means that the 2006 target has not even been met.

In addition, increased budget comes mainly from shared taxes and general grants allocated from the central government. The general grants are normally assigned based on a set of indicators that change from one year to another. Consequently, although the local governments can now make their own spending decisions, the uncertainty on the amount has made it difficult for them to plan ahead (JICA, 2007, p. 24). Not only that, there are also conditional grants distributed among local authorities. These grants consist of three types: block grants, project grants and matching grants. Block grants are

Governors and district officers have authority to direct and supervise officials at the provincial and district levels, respectively. See JICA (2007) for detailed explanation.

given to local governments to use in order to meet certain broad objectives—regardless of how to achieve them. Project grants, on the other hand, are allocated to local governments to spend on activities predetermined by central government. Matching grants are used to provide public services (Lao-Araya, 2002, p. 16). The recent attempts to increase these grants by the central government simply lowered the authority of the local governments (Thammasat University Research and Consultancy Institute [TU-RAC], 2009).

Despite the decentralisation attempts in Thailand, the government administrative system seems to still be very much centralised. This is particularly true when it comes to the fiscal system. Given this type of system, the government budget is expected to be highly concentrated in the capital city. As Bangkok houses all the Thai ministries, it is likely that Bangkok would be the major contributor to the provincial government budget disparities. In addition, with the little progress in transferring human resources and the fiscal budget, the decentralisation effects on provincial expenditure disparities are expected to be small.

Method and Data

For consistency, the Williamson's population-weighted coefficient of variation is employed again in this section. Data on government budget is available mainly in *fiscal years*. These government budget data are provided by the Comptroller-General's Department of the Ministry of Finance and the Bureau of Budget. Although the data at the national level have long been available to the public, the provincial-level data are not. From 2000 to 2007, the NESDB had compiled the government budget classified by province and function. These data are no longer available to the public. They can only be obtained on request. Its primary source of data came from the Comptroller-General's

Department. Since the data source is an official one, the government budget data compiled by NESDB are considered reliable.

These data are also quite comprehensive. In addition to budget by province and purpose, the budget was also broken down into current and capital expenditure. The current and capital expenditure was, again, classified by province and function. This allows deeper analyses to be possible. For instance, disparities in expenditure on some specific functions or on either current or capital expenditure can be examined. Data on expenditure per head are also available at all classification levels.

Because the Thai government budgeting system is highly centralised, it is possible that the data by NESDB may include all budget allocate to central government as part of Bangkok's budget. This is due to the fact that all the central ministries are located in Bangkok. To make sure that the analysis is not misleading, the Bangkok Metropolitan Administration's (BMA) Budget will also be used. The BMA Budget Department publishes the *Budget Plan* every fiscal year. The data are available on request from 2000 onwards. These data, however, cannot be broken down into sub-categories as do the NESDB data. This means that only the aggregate provincial budget will be analysed when the BMA Budget is incorporated.

Results

The provincial disparities in government budget allocation for FY2000-2007 are displayed in Table 4.6. The disparities in capital expenditure and current expenditure, which comprise overall government expenditure, are also shown in the table. According to the Bureau of the Budget, the capital expenditure is expenditure on acquiring tangible assets such as land, buildings, machinery and equipment. It also includes expenditure on repairing tangible assets and spending on intangible assets such as copyrights,

trademarks and land concessions. Current expenditure, on the other hand, is expenditure on goods and services that are necessary for administration. It covers all the remaining items not included in capital expenditure. Wages and salary is also included as part of this category.

Table 4.6 Provincial Disparities in Per-Capita Government Expenditure FY2000-2007, Nominal Values

FY	2000	2001	2002	2003	2004	2005	2006	2007
Gov. Exp.								
<i>All</i>	0.884	0.859	0.941	1.408	1.414	1.735	1.790	1.913
<i>Excl. BKK</i>	0.290	0.271	0.327	0.317	0.287	0.293	0.256	0.257
- Education								
<i>All</i>	0.406	0.352	0.250	0.321	0.183	0.919	1.037	1.076
<i>Excl. BKK</i>	0.188	0.192	0.186	0.174	0.174	0.184	0.192	0.194
- Health								
<i>All</i>	0.376	0.575	0.508	0.608	1.093	0.950	0.984	2.002
<i>Excl. BKK</i>	0.318	0.292	0.578	0.242	0.268	0.246	0.218	0.341
Current Exp.								
<i>All</i>	0.811	0.858	1.077	1.474	1.483	1.939	1.982	2.139
<i>Excl. BKK</i>	0.255	0.250	0.328	0.312	0.292	0.330	0.320	0.330
Capital Exp.								
<i>All</i>	1.118	0.866	0.647	1.119	1.131	0.892	1.043	0.869
<i>Excl. BKK</i>	0.573	0.483	0.431	0.462	0.367	0.299	0.193	0.226
- Transport & Comm.								
<i>All</i>	1.353	1.112	0.984	1.660	1.262	1.204	1.421	1.801
<i>Excl. BKK</i>	0.930	0.764	0.566	0.641	0.550	0.521	0.543	0.599

Source: Data are obtained on request at the NESDB

The provincial disparities in overall per-capita government expenditure continuously increased during FY2000-FY2007. It more than doubled over this seven-

year period. By comparing disparities across all provinces to those excluding Bangkok, it is apparent that Bangkok was the major cause of the disparities. Using this set of data, Bangkok alone accounted for more than one-third of the overall government budget. This large gap between expenditure that stayed in Bangkok and the rest of the country did not occur only at the aggregate level of government expenditure. It can also be found in both current and capital expenditure.

It is likely that such results were due to the centralised nature of the Thai government system. In Thailand, all ministries are located in Bangkok. This means that the majority of government officials—particularly the high ranked officials—work in the capital city. Since wages and salary accounts for one-third of the total budget, a considerable share of the budget certainly remains in the central ministries. There are also some expenditure items which are normally kept at the central ministries but are spent elsewhere. An example is the budget allocated for contingency situations such as floods. This type of expenditure is normally drawn out of the central government budget to be spent on the flooded areas. Since there is no certainty on where the spending will be, it has to be kept at the central government. In addition, the government service centres in Thailand tend to be located in big cities or more developed areas. This is because it is more costly for the government to set up operations in the remote areas. Consequently, a large part of the current expenditure occurs as a part of spending of the big cities—particularly Bangkok (Rachatanun, 2002, pp. 44-45).

In addition to the disaggregation into current and capital expenditure, the government expenditure data by NESDB were also broken down by function. For Thailand, government functions can be classified into 14 functions. These functions are (1) general public services, (2) defence, (3) public safety, (4) education, (5) health, (6) social security, (7) housing and community, (8) religious, culture and recreation, (9)

energy, (10) agriculture, (11) mining and mineral resources, (12) transportation and communication, (13) other economic affairs and (14) miscellaneous items. The large disparities in government expenditure at the aggregate level do not necessarily mean that expenditure disparities of all functions must also be uneven. Hence, disparities of expenditure at a disaggregated level are examined next.

Among the fourteen functions, the per-capita government expenditure on education and health services are investigated. This is because they are normally regarded as important monetary tools which have a direct impact on the poor. Results suggest that the disparities in health services spending across all provinces continuously widened. This is partly due to the fact that the Ministry of Public Health (MOPH) is situated in Bangkok. It is also because the budget allocation is based on to the capacity of service-provider. In Thailand, large public hospitals are concentrated in Bangkok and its vicinity. Since large hospitals have more advanced technology and more specialised doctors, they normally require much more budget support than the smaller hospitals (Rachatanun, 2002). This consequently causes the disparities to be high. The disparities increased during the period as the continuously increasing amount of the MOPH budget was kept at the ministry's headquarters.

Meanwhile, the disparities in education spending were relatively low and decreasing between 2000 and 2004. Then, the disparities jumped from 0.18 to 0.92 in 2005 and have remained high since. This was because educational institutions at all levels are concentrated in the capital city. With priority given to the primary and lower-secondary education, disparities declined during 2000 and 2004. The disparities rose in 2005 as the budget allocation shifted in favour of tertiary institutions. Because Bangkok houses one-fourth of all tertiary institutions, its share of the budget increased more than those of other provinces. In addition, there was also a major salary-base adjustment in

2005. It is possible that the additional remuneration for teachers throughout the country was drawn out of Ministry of Education's (MOE) budget. When Bangkok is excluded, the disparities of both functions were low and rather stable.

Another factor that is usually related to regional development is infrastructure. Efficient infrastructure and communication systems lead to a more integrated national economy and stimulate economic growth (Williamson, 1965, pp. 7-10; Hill, 2007, p. 82; Llanto, 2007, p. 316). Government expenditure on capital investment is usually employed as a measure of infrastructure investment. However, the capital expenditure covers many investment items including machinery, office furniture and equipment. These items do not contribute much to the regional development compared to roads, irrigation and communication systems. Fortunately, disaggregated data of the government expenditure on capital investment into functions are available for Thailand. Hence, the capital expenditure on transportation and communication is used here as a measure of infrastructure expenditure. The results show that disparities across all provinces had been high, and slightly increasing over the period 2000-2007. Despite that, disparities across provinces excluding Bangkok narrowed considerably during the same period. This, again, means that the infrastructure investment was also skewed toward Bangkok—causing large overall disparities.

The main reason for this, again, was that the budget was kept mostly at the Ministry of Transport (MOT). In the MOT Budget, the Department of Highways and the Department of Rural Roads together received around 60 percent of the budget (Ministry of Transport [MOT], 2010). Given their main duties as building roads across towns or provinces, allocating the budget to provinces can be problematic. As a result, the budget for them normally remains at the Departments in Bangkok. Hence, the disparities across provinces were high compared to those excluding Bangkok.

In summary, the data showed that per-capita government expenditure for Bangkok was noticeably higher than the national average. It occurs at all levels and dimensions of disaggregation. The major contributor to such results is the centralised system in the Thai government budget. Although the decentralisation has been on process, only responsibilities and authorities have been devolved to the local governments. The budgeting system remains under the central government's control. In other words, the majority of budget has continued to be kept at the central ministries located in Bangkok. To see how much the budget was actually allocated to Bangkok itself, the Bangkok Metropolitan Administration's (BMA) budgets for FY2000-2007 are considered.

The total budget for BMA in FY2000 was only 18,947 million Baht. This is very small compared to the NESDB data set which has 312,333 million Baht stated under Bangkok in FY2000. It is probable that the NESDB data must have included the budget for central ministries as part of Bangkok's budget. This largely distorts the real situation of the government finances in Thailand. Obviously the budget allocated specifically to Bangkok is much smaller than the amount stated in the NESDB data set. This significantly supports the assumption that the large government expenditure disparities were due to the inclusion of the central ministries' budgets into Bangkok's budget.

By replacing Bangkok's budget allocation stated in the NESDB data with the BMA's Budget, the disparities across all provinces dropped considerably. Results are displayed in Table 4.7. Here, the disparities across provinces become very close to those excluding Bangkok. This means that the government expenditure was actually quite evenly distributed across provinces. When the expenditure allocated to the central ministries is excluded from the Bangkok's budget, the per-capita expenditure for Bangkok was only 2,919.2 Baht in FY2000 and 4,854.0 Baht in FY2007. In fact,

Bangkok had had the lowest per-capita expenditure among all provinces throughout the period. This further confirms that the large disparities in government expenditure were due to the inclusion of central government spending into Bangkok's budget.

Table 4.7 Provincial Disparities in Per-Capita Government Expenditure FY2000-2007 using BMA's Budgets for Bangkok

Fiscal Year	All Provinces		Exclude Bangkok
	<i>NESDB Data</i>	<i>BMA Data</i>	
2000	0.884	0.352	0.290
2001	0.859	0.360	0.271
2002	0.941	0.413	0.327
2003	1.408	0.386	0.317
2004	1.414	0.353	0.287
2005	1.735	0.357	0.293
2006	1.790	0.335	0.256
2007	1.913	0.323	0.257

Source: For Bangkok, data are obtained from several editions of *Bangkok Metropolitan Administration Budget*. For other provinces, see Table 4.6.

From the results above, it can be assumed that the difference between the BMA and the NESDB dataset is the budget allocated to central ministries. This implies that a large part of the national budget had still been under the central government's control. To analyse the government expenditure across provinces, the BMA Budget should be used. Given the rather equal distribution of budget across provinces, this implies that the relationship between provincial budgets and the provincial income disparities is rather moderate. The average simple correlation between provincial GDP per capita across all provinces and per-capita government expenditure across all provinces was 0.209 for period 2000-2007. Therefore, the provincial distribution of government expenditure does not appear to have played a significant role in determining provincial income disparities.

4.5 Education and Health

Along with analysing income disparities across provinces, it is also important to consider disparities in social aspects. This is because a high level of income inequality does not necessarily mean that inequality in other dimensions has to show similar trends (ADB, 2007, p. 6). Moreover, high social inequality can have adverse effects on economic development. Thus, it is important that these social dimensions are investigated. Health and education will be examined in this section as they are usually regarded as important well-being indicators.

Education and Health in Thailand

Education policy has been important in Thailand since it shifted from absolute to constitutional monarchy in 1932. The National Education Development Schemes (NEDS) have been implemented since 1960. The first two NEDS (1960-1968 and 1969-1976) emphasised an expansion of primary education. As a result, the primary school dropout rate fell from 60 percent of total enrolment in the 1960s to 42 percent in 1977 (Sattar, 1984, p. 11). The NEDS of 1977-1991 changed the education structure from 4:3:3:2 to 6:3:3 where the 6-year primary education was compulsory.

In the 1980s, the government further intensified its efforts to achieve universal primary education. At the same time, tertiary education had also been promoted considerably. This included allowing for the establishment of private universities and setting up colleges in provinces around the country. During this period, however, secondary education had been neglected. Then, in 1990, the cabinet approved in principle the extension of compulsory education from six to nine years. Accordingly, since 1991 there were increasing numbers of primary schools opening lower secondary classes on a free-of-charge basis (Jones, 2003, p. 11). As a result, the net enrolment

rates in lower secondary education went up from 36.5 percent of total school-aged children at appropriate levels in 1992 to 55.1 percent in 1997 (Jones, 2003, p. 14).

Despite that, compulsory education remained at 6 years. The official raise of compulsory education from 6 to 9 years came about under the enactment of the National Education Act 1999. The Act enforced parents to keep their children in schools until they graduated from lower secondary level. In addition, the government was also obligated to provide twelve years of education free of charge (Kirtikara, 2001, p. 6). In 2003, the former teacher colleges, the Rajabhat Institutes and Rajamonkol Institute of Technology were converted to university status. Given that most of these institutes were established outside Bangkok, this transformation would help close the access gap in tertiary education. Inequality at provincial educational level is therefore expected to come down over the years.

As Thailand has had a long period of educational expansion policy, the literacy rates are expected to be equally high across provinces. In contrast, due to unequal access to education in the past, provincial differences in years of schooling may be expected. Likewise, given the increasing disparities in the per-capita government budget for education, disparities in the teacher-student ratios are also expected to be high.

Thailand's public health development dates back to 1918 when the Public Health Department was established. Since then, the expansion of health infrastructure has been rapid. While there were only two hospitals in 1914, all provinces had their own provincial hospitals by 1950 (Ministry of Public Health [MOPH], 2006, p. 2). In 1942, the Public Health Department was converted into the Ministry of Public Health or MOPH. From 1961 onwards, the National Health Development Plans have been formulated in accordance with the National Economic and Social Development Plans. The first three Plans (1961-1966, 1967-1971 and 1972-1976) focused on further

extension of infrastructure as well as on basic health programmes. These programmes include family planning, child health and disease control. Then, the Fourth Plan (1977-1981) introduced decentralisation of health management. This was followed by a change in the national health system to be more primary health care-based in the Fifth Plan (1982-1986).

During the Sixth- to Eighth Plans (1987-1991, 1992-1996 and 1997-2001), the policy focus was shifted toward training in health economics and financing. Human resource training in these areas was much emphasised. As the economy was booming, the number of private hospitals in big cities expanded rapidly (MOPH, 2001, pp. 413-414). At the same time, the allocation of the budget to the MOPH constantly increased during 1989-1997. The MOPH then spent the majority of its budget on health personnel. This was particularly to counter the brain-drain problem toward private hospitals in the big cities. From 1993 onwards, the MOPH also allocated resources to expanding community hospitals. Its aim was to have hospitals for every district in Thailand (MOPH, 2008, pp. 274-275). As a result, disparities in health personnel during this period are expected to be either stable or increasing. At the same time, the inequality in number of beds should also fall. Nonetheless, the 1997/98 crisis led many private hospitals to shut down. This could, in turn, reduce the unequal distribution of health personnel. The crisis also forced the health sector to reform along with other public sector reforms.

The Ninth Plan (2001-2006) put emphasis on health security and a universal health care system. In April 2001, the “30-Baht Universal Coverage of Health Care Policy” was implemented. By April 2002, Thailand claimed “Universal Coverage” (MOPH, 2006, pp. 27-30). Continuing from the Ninth Plan, the Tenth Plan (2007-2011) set strategies to enhance the development of e-health, high quality health care and health

research centres. With the MOPH's awareness to create more equal health services across regions, the regional disparities in health personnel should decline during this period.

Methods and Data

To measure the disparities in education and health, the same methods as measuring income disparities can usually be employed. For education, the widely used measures were the standard deviation of schooling and Gini coefficients. The standard deviation measures dispersion in absolute terms while Gini coefficient measures relative inequality. Since it is more meaningful for this study to analyse inequality in relative terms, only the Gini coefficient will be examined here. The Gini index has also commonly been used as a measure of health disparities across provinces (Nishiura et al., 2004; Zhang & Kanbur, 2005). For comparability with provincial income inequality, the Gini index for GPP per capita will also be examined. Calculation of the Gini coefficient can be found in Appendix A.

The health and education Gini can be estimated following Zhang and Kanbur (2005). Student-teacher ratios and literacy data will be used to calculate an education Gini index. However, literacy rates in Thailand are expected to be rather equal across provinces for the past two decades. For this reason, inequality in average years of schooling for population aged 25 years or over by province will also be examined. As for health, population per physician, health personnel and patient beds will be analysed. In addition to the Gini index, the Williamson's population-weighted coefficient of variation can also be used as a measure of health and education inequality. It is, however, less popular. Following Hill (1992), this section will also employ the Williamson's population-weighted coefficient of variation. The health and education indicators used to calculate the Gini coefficients will be used here.

For education data, the NSO has conducted a Population and Housing Census every ten years since 1960³. The provincial data on literacy rates have been included as part of the census since the first publication by the NSO. However, except for the Census 2000, these data are only available in hardcopies. This means it is time-consuming to obtain data for all provinces even in one year. Given the limited time for this research, this analysis covers the years 1980, 1990 and 2000.

It is important to note that there was a change in the literacy rate definition in 1990. Up until the 1980 Census, the literacy rate was measured as the share of population aged 10 years or above who can read and write. From 1990, literacy is measured from population aged 6 years or above. Notwithstanding the fact that this may cause some inconsistency in the data, the analysis will still cover the year 1980. This way, the analysis will give more understanding of the changes in education disparities over time.

The data on average years of schooling by province can be obtained from the raw data of Socio-economic Surveys. As mentioned in Chapter 3, the NSO has conducted the surveys every two years since 1986. The surveys, however, cannot be classified by province until the year 1988. The analysis therefore covers the period 1988-2008. Each survey asks household members of all ages for their highest level of education they are attending or have finished. Following Barro and Lee (1996), only population aged 25 years or over will be considered for estimating years of schooling.

The data on student-teacher ratios come from several provincial issues of the *Statistical Report of Province*. This report series are published by Provincial Statistical

³The Population and Housing Census were originally conducted by the Ministry of Interior under the name "Housing Census". The first round of census was done in 1909. Then the census took place every ten years on the years that end with zero e.g. 1920. The Ministry of Interior was in charge of the census only for the first five issues before transferring the authority to the NSO in 1960.

Offices (PSO) around the country. For each province, the overall ratio is usually reported along with the ratios for primary and secondary levels. For this reason, this analysis will examine disparities in student-teacher ratios at both levels. There are, however, some issues regarding this set of data. Firstly, the data for all provinces in each year are hardly complete. Because the PSOs were only encouraged—not obligated—to publish the reports, not all PSOs produced a report every year. For the years prior to 1990, data were available for half of all provinces, if not less. As for the more recent years, more than 60 out of 76 provinces published the data each year. Even so, it is still time-consuming to collect data for all data-available provinces. For this reason, only three periods with the most complete data are selected—1990, 2000 and 2007. Nonetheless, there are still many provinces missing each year. Since it is likely that the student-teacher ratios do not vary much from one year to the next, data from a year-before the selected years are used for the missing data. In addition, Bangkok does not have its own PSO. This means that the student-teacher ratio is not publicly available for Bangkok. Although the numbers of teachers and students are available, their disaggregation into education levels is not. With all the efforts, there are 66 out of 74 provincial data to be used for 1990 and 75 out of 76 provincial data for 2000 and 2007.

As for health services data, health personnel and patient beds will be used to calculate the health inequality. The MOPH has annually published the report *Public Health Resources* since 1994. All issues of the report contain provincial data on the number of hospitals, patient beds, physicians, dentists, pharmacists and nurses. This study, therefore, covers health inequality across provinces for period 1994-2008. Since population per patient bed is probably more meaningful as a well-being indicator than the population-per-hospital ratio, only the former will be examined here. Population per physician and population per trained health personnel will also be analysed. Numbers of

trained health personnel are obtained by summing the number of physicians, dentists, pharmacists and nurses.

Results

Table 4.8 and Figure 4.3 show that the Gini index for GPP per capita increased between 1981 and 2007. This trend is consistent with the GPP per capita inequality using Williamson's population-weighted coefficient of variation as a measure. However, the role of Bangkok as a cause of disparities differs between the two measures. According to the Williamson's measure, Bangkok had contributed significantly to the overall inequality prior to the crisis. They are also shown in Table 4.8 and Figure 4.3. Nonetheless, the Gini coefficient in GPP per capita barely changed when Bangkok is excluded from consideration. This is because the provincial shares of population were not entered as weights in the calculation of Gini index.

Education

In addition to the Gini index and Williamson's coefficient for GPP per capita, Table 4.8 also show both inequality indexes for literacy rates for 1980, 1990 and 2000. As expected, the inequalities for literacy rates have been very small compared to those of per capita GPP. In both cases, Bangkok does not seem to play a significant role in causing the literacy inequality. This is consistent with the Thai educational development previously mentioned. As primary education had been made compulsory since the 1960s, the literacy rates from 1980 onwards are expected to be equally high throughout the country.

Looking at trends, the Gini and Williamson's coefficient for literacy rates exhibit similar trends. Like disparities in GPP per capita, the values of Williamson's coefficients are larger than the Gini index. Inequalities in literacy rate declined between

1980 and 1990. Nonetheless, it slightly increased in 2000. This was possibly due to the migration of illiterate unskilled labour back to their hometowns as a consequence of the crisis. According to Nanthamongkolchai (2001), 65.2 percent of all workers returning to their hometowns had primary education or less.

Table 4.8 Gini Coefficient and Williamson's Coefficient for GPP per Capita, Literacy Rate and Student-Teacher Ratio Year 1980, 1990, 2000 and 2007

Year	1980	1990	2000	2007
Gini for GPP per capita				
<i>All</i>	0.3579 ^a	0.3903	0.4643	0.4830
<i>Excl. BKK</i>	0.3415 ^a	0.3692	0.4553	0.4791
Gini for Literacy Rate				
<i>All</i>	0.0415	0.0267	0.0303	n/a
<i>Excl. BKK</i>	0.0418	0.0266	0.0306	n/a
Gini for Student-Teacher Ratio				
<i>Primary Level</i>	n/a	0.0705 ^b	0.0878	0.1202
<i>Secondary Level</i>	n/a	0.0659 ^b	0.0698	0.1602
V_w for GPP per capita				
<i>All</i>	0.9885 ^a	1.1068	1.1081	1.1604
<i>Excl. BKK</i>	0.6418 ^a	0.7081	0.8987	1.0974
V_w for Literacy Rate				
<i>All</i>	0.0685	0.0475	0.0571	n/a
<i>Excl. BKK</i>	0.0709	0.0473	0.0575	n/a
V_w for Student-Teacher Ratio				
<i>Primary Level</i>	n/a	0.1133 ^b	0.1472	0.2085
<i>Secondary Level</i>	n/a	0.1542 ^b	0.1111	0.3487

Note: (a) Data from year 1981 is used instead of 1980 in case of GPP per capita. This is because the GPP data are only available from 1981 onwards.

(b) For year 1990, only 66 out of 74 provinces were used to calculate inequality of student-teacher ratio. This is due to the lack of data for some provinces.

Source: Data on GPP per capita, see Figure 3.4. Data on literacy rates and student-teacher ratios are from several editions of *Population and Housing Census* and *Statistical Reports of Province*, respectively.

While the overall trends of literacy inequalities are in a downward direction, inequalities in student-teacher ratios show an opposite trend. The provincial inequality

in provision of education had increased over the period 1990-2007, for both primary and secondary levels. Note that there was a slight decline in Williamson's coefficient for secondary education between 1990 and 2000. This probably reflects that provinces which deviated largely from the national average were those with small population share. Nonetheless, the long-term trends of the Gini index and Williamson's coefficients are the same. The disparities in student-teacher ratio jumped considerably between 2000 and 2007. This was due to increasing numbers of students attending schools over the period. As the government raised the compulsory education from 6 to 9 years in 1999, parents were enforced to enroll their children in school until they finish the lower-secondary level. When the numbers of teachers in some provinces did not increase along with the students, the disparities widened.

From results above, it is apparent that Thailand's development in education has progressed to the point where illiteracy rates are now low throughout the country. For this reason, using literacy rates as indicators of educational differences across provinces may be inappropriate. The years of schooling for the population aged 25 years or over can better reflect the educational inequality in Thailand. Table 4.9 illustrates the Gini and Williamson's coefficients in years of schooling for the period 1988-2008.

The results in Table 4.9 show that the national average years of schooling for population aged 25 years or over constantly increased during the period 1988-2008. The differences in years of schooling across provinces also came down during the period. This implies that the population throughout the country has become increasingly educated. This is, again, consistent with the fact that primary education was promoted since the 1960s and the compulsory education was raised from 6 to 9 years in 1999. According to the joint NESDB-World Bank report (2005, p. 93), the share of workers with primary education or less dropped throughout the country between 1991 and 2004.

Table 4.9 Average Years of Schooling and Inter-provincial Inequality Indexes for Years of Schooling for Population Aged 25 Years or Over 1988-2008

Year	Average Years of Schooling		Inter-provincial Gini in Years of Schooling		Inter-provincial v_w in Years of Schooling	
	<i>All</i>	<i>Excl. BKK</i>	<i>All</i>	<i>Excl. BKK</i>	<i>All</i>	<i>Excl. BKK</i>
1988	5.328	4.907	0.077	0.072	0.192	0.127
1990	5.640	5.089	0.088	0.083	0.220	0.159
1992	5.943	5.401	0.086	0.081	0.210	0.154
1994	5.925	5.754	0.075	0.071	0.179	0.123
1996	6.157	5.997	0.072	0.068	0.177	0.125
1998	6.520	6.318	0.075	0.071	0.190	0.130
2000	6.958	6.775	0.067	0.063	0.166	0.120
2002	6.680	6.530	0.065	0.062	0.160	0.113
2004	6.982	6.819	0.062	0.058	0.155	0.107
2006	7.649	7.508	0.059	0.056	0.136	0.116
2008	7.847	7.683	0.057	0.054	0.134	0.105

Source: Several editions of NSO's *Socio-Economic Survey*, which is conducted every two years.

Notwithstanding such improvement, the average educational level in the overall Thai labour force has remained low. This is because most of the labour force had been born before the expansion policy was implemented. In 2008, there was 56.3 percent of the labour force with complete primary education or less. Even in Bangkok, the share was 38.5 percent (NSO, 2008, Table 2). This partly explains the rather low inequality in provincial years of schooling across Thailand. As majority of worker in all provinces had an educational level of primary school or lower, the mean years of schooling cannot vary much between provinces.

The fact that a large part of population has primary education or lower also explains the low average years of schooling. With the rise in compulsory education being implemented only ten years ago, its effect cannot yet be evident when considering all age groups. It can possibly be seen more clearly if only the younger group of

population is considered. By looking at the population aged 25-30 years, the average years of schooling went up from 7.1 years in 1988 to 9.3 years in 1998 and 11.2 years in 2008. Only 22.4 percent of this cohort has less than 9 years of schooling in 2008.

The average years of schooling and its inequalities across provinces became slightly lower when Bangkok is excluded. The gap between the national years of schooling and that excluding Bangkok also continuously narrowed over time. By looking at the Gini index, Bangkok seems to play a small and decreasing role in determining inequality in educational levels. Contrastingly, Bangkok has played significant role in determining education disparities when using Williamson's coefficient as a measure. This reflects the fact that the inter-provincial Gini index does not take into account the population weights. As a result, Bangkok is entered into the calculation with equal weights as every other province.

The results of Williamson's coefficient in years of schooling are consistent with the perception of educational disparities in Thailand. Ever since the beginning of educational development, Bangkok has been the educational hub of the country—particularly at the tertiary level. As of 2008, Bangkok still housed almost half of all tertiary institutions in Thailand (Ministry of Education [MOE], 2009, Table 1). In addition, highly-educated workers tend to stay or come into the big cities such as Bangkok to find jobs. According to the 2008 Labour Force Survey, 25.1 percent of all the labour force with university degrees resided in Bangkok. Nonetheless, the regions around Bangkok and the East have been catching up with Bangkok in the recent decades. These provinces increasingly attract highly-educated workers away from Bangkok, hence reducing the role of Bangkok as a cause of inequality. This situation is, again, illustrated clearly by the Williamson's coefficient. The gap between disparities

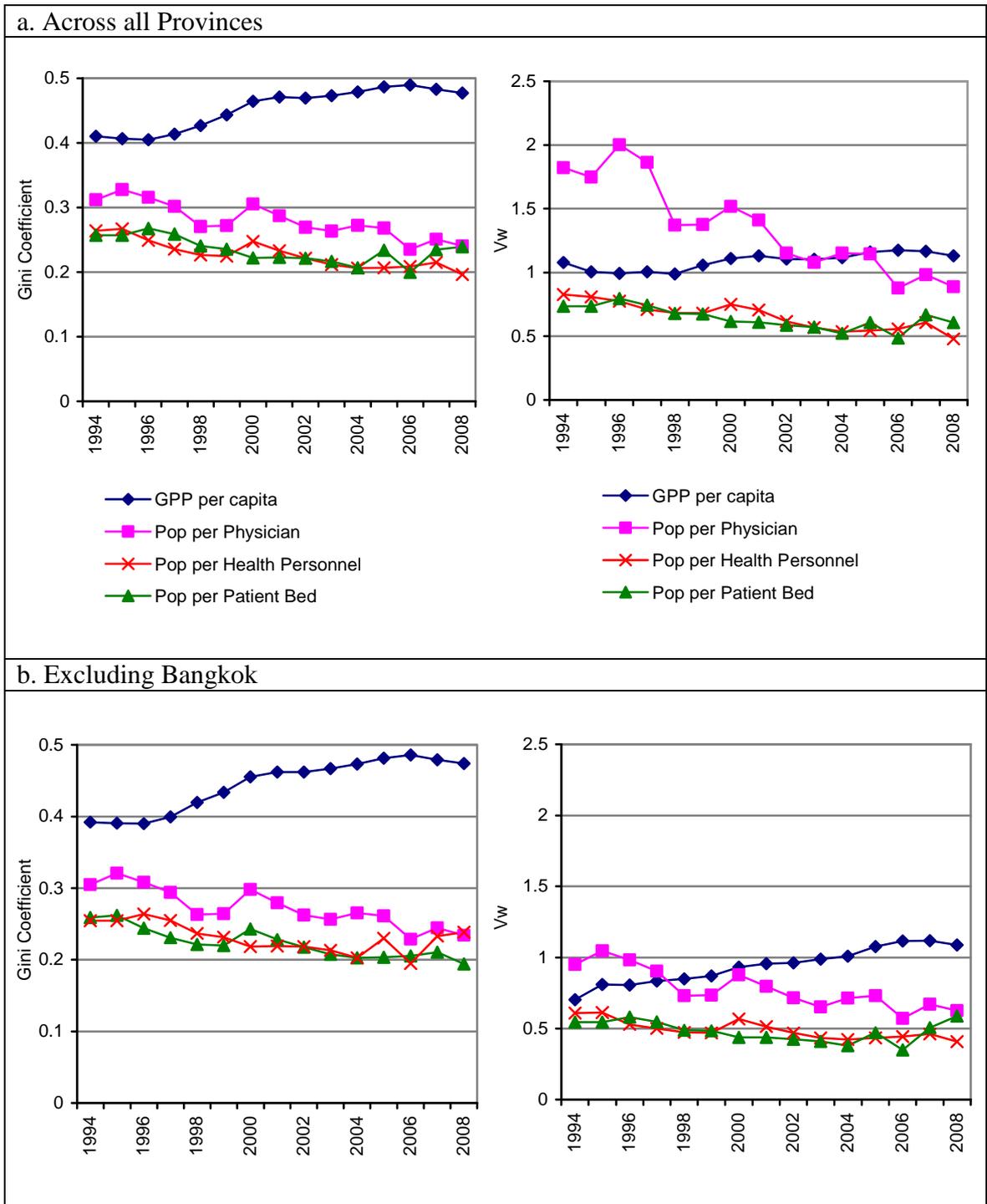
across all provinces and those excluding Bangkok has continuously narrowed over the period of study.

Health Services

Inequalities in health services across provinces are shown in Figure 4.3. The graphs include the Gini index and Williamson's coefficients for population per physician, health personnel, patient beds as well as GPP per capita. There are some differences between the Gini index and the Williamson's coefficients. Firstly, similar to the results in education inequalities, the values of Williamson's coefficients are higher than the Gini. It is probably because provinces that deviate largely from the national averages are those with large population share to the total population. The share of provincial population to the national population seems to play a significant role in determining inequality results here.

Another difference between the Gini index and Williamson's coefficients occurs when comparing the inequality in health services to that in per capita GPP. For Gini index, the inequality in all health services had been lower than the income inequality throughout the period 1994-2008. Contrastingly, the Williamson's coefficient in population per physician had been much larger than the income disparities up until 2003. Despite that, the Gini index and Williamson's coefficients show similar trends in both health service inequalities and per capita income disparities. For both measures, the inequality in all three health indicators exhibit long-term downward trends. The inequalities in population per physician and per health personnel showed a slight increase at the beginning before falling during 1996-1999.

Figure 4.3 Gini Coefficients for GPP per Capita, Population per Physician, Population per Health Personnel and Population per Patient Bed 1994-2008



Source: Data from several editions of the MOPH's annual statistical report, *Public Health Resource*

These results are consistent with the Thai situation. During the boom, rapid expansion of private hospitals in urban centres must have worsened the distribution of doctors and health personnel. Toward the end of the boom period, the MOPH policy to counter the brain-drain problem might have helped improve the distribution. As Thailand fell into crisis in 1997, many private hospitals were shut down. This further improved the distribution of health personnel across provinces—reflected by the further decline in inequalities in 1997-1998.

There was a jump in the inequalities in population per physician as well as population per health personnel in 2000. This is a bit surprising at the first glance. Nonetheless, it can be explained by looking at the number of physicians and health personnel. In 2000, there were large shifts in physicians and health personnel from all other provinces toward the Eastern and Central regions. This coincides with the catching-up of these provinces with Bangkok in term of economic growth. Then, the inequalities were on downward trends from 2001. The Williamson's coefficient in population per physician even fell below the GPP per capita disparities in 2003 onwards. This was due to increases in both MOPH budget and health personnel, coupled with the implementation of universal health care in 2001. As for the inequalities in population per patient bed, they have continuously come down between 1994 and 2004. This reflects the government policy to build community hospitals in every district during these years. The inequalities, however, fluctuates from 2004 onwards. As the number of hospitals in many provinces also fluctuated during this time, the fluctuation in both the Gini and Williamson's coefficient were possibly due to this.

The third difference between the Gini index and Williamson's coefficients is the contribution of Bangkok to the overall disparities. For the Gini index, the inequality in health services barely changes when Bangkok is excluded. The same is true for the Gini

index of GPP per capita. This differs considerably with the results using Williamson's population-weighted coefficient of variation. Particularly for population per physician, Bangkok was apparently the main cause of inequalities. This is consistent with Thailand's situation. In 1994, there were 1,019 persons per physician in Bangkok, which were 3.7 times lower than the national average. In 2008, Bangkok was still the province with the lowest population per physician ratio. However, the ratio in Bangkok fell to 2.7 times lower than the national average. Here, we can conclude that the Williamson's coefficient of variation seems to better reflect the health situation in Thailand. This, again, was due to the fact that Gini index does not take into account the provincial share of population.

In summary, the inequalities in health services and educational attainment have declined markedly from the 1990s. It reflects the government's attempts to improve the well-being of people throughout the country. These trends, however, contradict with the inequality trend in GPP per capita. This leads to the conclusion that while inequality in economic development worsened over time, the government did try to provide social services more equally across provinces. Despite saying that, the education and health data here do not reflect any quality of the services. It therefore cannot tell whether the quality of education and health services have also become more equal along with their quantity over time. Further studies regarding quality of these services should be benefiting. However, it will not be covered here.

4.6 Conclusion

This chapter adds more understanding to provincial disparities in Thailand by investigating four aspects of disparities. The findings showed that the industrial sector

was the main contributor to the overall provincial income disparities. Likewise, labour productivity—particularly in the industrial sector, also affected the disparities in GPP per capita. Not only that, the variation in labour participation rates across provinces played some role as well. The contribution from disparities in government expenditure, on the other hand, was less marked. For government expenditure in FY2000-2007 using NESDB data set, the allocation had been highly biased in favour of Bangkok. This, however, was due to the inclusion of budgets allocated to central ministries as part of expenditure for Bangkok. When adjustment is made for this, the budget was rather equally distributed across the country.

Looking at social inequality across provinces, results show that literacy rates, years of schooling and health services became more equal over time. Although this is an opposite trend from the GPP per capita disparities, it coincides with the disparities in household income. Recall from Chapter 3, while the disparities in GPP per capita were widening, those in household income and consumption narrowed from the year 2000 onwards. This shows that income redistribution and social development policies have become more equal across provinces. The geographical dimension seems to have been given some attention when it comes to social policy.

So far, this study looked at provincial disparity patterns through many data sets. The disparity measures indicate the size of inequality and the trend of that inequality over time. According to Barro and Sala-i-Martin (1991), these disparities show the evidence of σ -convergence in Thailand. The σ -convergence exists when disparities across provinces decline over time. There are also another dimension of convergence—the β -convergence. The β -convergence occurs when the poor provinces grow faster than the rich. To understand provincial development thoroughly, it is thus important that β -convergence is also examined. This will be carried out in Chapter 5.

CHAPTER 5

Investigating Convergence and Provincial Growth Determinants

5.1 Introduction

In studies of inequality across regions, the concept of convergence is normally employed to show whether inequality has been narrowing down. There are two types of income convergence, the σ - and the β -convergence. The σ -convergence occurs when the deviation of average income across geographical areas declines. The β -convergence occurs when income of the poor areas grows faster than the rich. The former type of convergence was already examined in the previous chapter. It was done using the Williamson's coefficient of variation as the measure. This chapter investigates the latter type of convergence.

According to the neoclassical growth theory, the average incomes of the poor regions tend to grow faster than those of the rich. Nonetheless, empirical results have been rather mixed, particularly when looking at developing countries. Fujita and Hu (2001) found no evidence of β -convergence among provinces in China during 1984-1994 and 1990-1994. Meanwhile, Balisacan (2007) found conditional convergence of provincial incomes in the Philippines during 1988-2003. Resosudarmo and Vidyattama (2006) also found conditional convergence for Indonesia during 1993-2002. Recall that the details of their findings were previously discussed in Chapter 2.

As for the case of Thailand, the results often contradict neoclassical growth theory. Southichack (1998) found unconditional divergence in GPP per capita in Thailand for the period 1975-1995. Nonetheless, when divided into four sub-periods,

unconditional convergence occurred only in the years 1980-1985. A study by NESDB and the World Bank (2005) also gave similar results. Unconditional convergence was found for the period 1975-1986 while unconditional divergence was apparent for period 1986-2003. Meanwhile, Potipiti (2009) showed that there was no evidence of unconditional convergence for any of the four periods, 1981-2005, 1981-1990, 1991-2000 and 2001-2005. Despite several studies on convergence in Thailand, none of them has taken into account the financial crisis. This study, therefore, examines β -convergence in Thailand for the period 1981-2008.

In relation to the β -convergence, this chapter also examines the factors contributing to provincial growth. As the method for β -convergence is based on a growth model, the extension of this model can be used to find provincial growth determinants. Given a large number of worldwide empirical studies on growth convergence and determinants, several factors have been found to be significant including population growth, within-province income inequality, physical- and human-capital accumulation, resource endowment, government consumption, infrastructure, FDI and international trade. These factors will be examined in this chapter—except for the physical capital, international trade and government consumption. The physical capital and trade data are not available at the provincial level while the government consumption data are problematic. In addition, there are also other factors which might be relevant to the Thai provincial growth. These include initial share of agricultural sector, labour productivity and share of industrial sector. They will also be examined in this chapter.

This chapter is organised as follows: section 5.2 discusses methods and data to be employed in the chapter. Section 5.3 presents the results on β -convergence. Here, evidence of convergence on both GPP per capita and per capita income from

household's surveys will be investigated. Then, section 5.4 analyses provincial growth determinants. Finally, section 5.5 concludes.

5.2 Methods and Data

Methods

The concept of β -convergence was developed by Barro and Sala-i-Martin (1991) based on the Solow growth model (see Appendix B). Since then, the concept has been adopted by many scholars for testing convergence as well as finding growth determinants. This analysis follows the model specification of Balisacan (2007). The average growth rate of per capita income during the period T is given by

$$\frac{1}{T} \log \left[\frac{y_{iT}}{y_{i0}} \right] = \alpha - \beta \log(y_{i0}) + \delta \log(y_i^*) + v \quad (5.1)$$

where:

- y_{i0} = initial per capita income
- y_{iT} = per capita income of the final year
- y_i^* = the steady-state level of per-capita income
- v = error term

The coefficient β represents the speed of convergence. Per capita income convergence exists when the value of $\beta > 0$. It is important to note that equation (5.1) also includes the term $\delta \log(y_i^*)$. This implies that the per capita income growth rate also depends on the steady-state level of income. The positive value of β , therefore, means that the poorer economies grow faster than the rich after controlling for the steady state.

The long-run steady state of an economy is normally determined by the technological level, preferences and the institutional setting. These factors tend to be very much the same across provinces within a country. Consequently, the steady-state levels among provinces are expected to be similar. For this reason, the within-country analysis usually assumes y^* to be the same across provinces. This means that the steady-state term can be dropped and the equation (5.1) becomes

$$\frac{1}{T} \log \left[\frac{y_{iT}}{y_{i0}} \right] = c - \beta \log(y_{i0}) + w_i \quad (5.2)$$

where $c = \alpha + \delta \log(y_i^*)$ and w_i is an error term. Here, “absolute convergence” exists if the value of $\beta > 0$. As this research focuses on provincial indicators within Thailand, equation (5.2) will be employed for the β -convergence analysis.

In addition to the analysis on β -convergence, the above model can also be adopted to examine growth determinants. Regardless of the steady-state levels, there are other factors influencing per-capita income growth of provinces. Based on Garcia and Soelistianingsih (1998), the model can be reformulated as follows:

$$\frac{1}{T} \log \left[\frac{y_{iT}}{y_{i0}} \right] = a - \beta \log(y_{i0}) + \sum_i \gamma_i Z_i + w_i \quad (5.3)$$

where Z_i represents other selected variables that determine provincial growth rate. Through numerous empirical works on growth determinants, there are several factors found to influence provincial growth rates. Following neoclassical growth theory, factors commonly considered as determinants are population growth rate, and capital stock accumulation including human capital (Mankiw, Romer & Weil, 1992; Barro, 1996; Resosudarmo & Vidyattama, 2006). Population growth and human capital stock accumulation will be examined in this chapter as it would be interesting to see whether

such theory holds in the case of Thailand. Unfortunately due to the lack of provincial-level data, physical capital stock accumulation will not be included in the analysis.

There are also other factors used in many growth regression analyses. Examples of these variables include government consumption, rule of law variable, terms of trade (Barro, 1996), inequality (Balisacan & Fuwa, 2000), FDI, openness to trade (Resosudarmo & Vidyattama, 2006), political setting, geography (coastal area as opposed to landlocked area) and infrastructure (Balisacan, 2007). Not all of these factors are relevant to the case of Thailand. Rule of law and political setting are not relevant for intra-country analysis as they are the same across provinces. As for government consumption, terms of trade and openness to trade, though seem important, data are either erratic or not available at provincial level. Recall from Chapter 4 that due to centralised budgeting system, data for government consumption do not reflect where the spending actually ends up. Data on trade are not available at provincial level. For geography, Nopkhun (2007) examined per capita GPP convergence during 1981-2003 by sub-dividing provinces into inland and coastal provinces. He found that coastal dummy did not significantly affect provincial growth in Thailand. Given his evidence, the variable will not be examined here. This leaves three variables—inequality, FDI and infrastructure as possible determinants for estimation.

Do these three factors seem to be valid for the Thai provincial growth determinants? Kittiprapas (1999a) identified unbalanced infrastructure development as one of the major causes of unbalanced growth. However, no empirical analysis was taken to support the claim. Adding infrastructure as a determinant will give empirical evidence on the infrastructure-growth relation. For FDI, Chowdhury and Movrotas (2006) found positive relationship between FDI and growth in Thailand during the years 1969-2000. They also found that the causation occurred in both directions. Despite that,

the analysis only looked at the relationship at the national level. Hence, investigation in this chapter will show whether the same relationship applies at the provincial level. For inequality, Deolailikar (2002) found that lagged inequality had strong negative effect on provincial income growth for 1992-1999. However, he used per capita income from household surveys rather than the GPP per capita. This analysis differs from Deolailikar in the time period of study as well as the measure used for provincial income growth. Initial inequality as measured by Gini coefficient will therefore be examined as one of the growth determinants.

There are also some additional factors that may be important growth determinants in Thailand. Southichack (1998) found that the initial agricultural share to GPP was a significant determinant of provincial growth in Thailand during the years 1975-1995. It is, however, expected to play a more moderate role in the period 1994-2008. This is because the Thai economy had gone through structural change toward the industrial sector since the late 1980s. Consequently, agricultural sector's contribution to growth has constantly declined (Siamwalla, 1996, p. 3). Initial agricultural share will be considered here to see whether the above statement is empirically supported. Comparing to the period 1975-1995, the variable is expected to become less significant, if any, in determining the growth during 1994-2008.

On the other hand, the role of the industrial sector in determining growth is expected to increase. For this, the initial share of industrial sector to GPP will be considered in the regression. It is expected that provinces with initially higher share of industrial sector to GPP would grow faster than those with a lower share. In addition, Southichack (1998), using a sector variable, found that provinces that went through

rapid structural change grew faster during the period 1975-1995¹. Likewise, Sarntisart (2001) identified expansion of the manufacturing sector in Bangkok and surrounding provinces as a key factor for growth. This means that provinces experiencing a large increase in industrial sector share of GPP would grow fast. To examine this point empirically, the change in industrial share of GPP over the years 1994-2008 will be also included as a determinant.

Another variable that will be considered in this chapter is provincial agricultural productivity. The joint-study by NESDB and World Bank (2005) indicated that low agricultural productivity was one of the causes for Northeast economy to lag behind other regions. Although agricultural sector as a share of GDP has become smaller over time, it continues to employ the largest share of labour. As of 2008, 42.5 percent of total labour force was still in agricultural sector (NSO, 2008, Table 4). To see whether agricultural labour productivity empirically plays a role in determining provincial growth, it is included in the regression. Details of all variables to be used in this chapter will be discussed in the next subsection. First, there are few points that need attention here.

For human capital stock, there were several indicators that can be employed as proxies. These indicators include school enrolment, the ratio of investment in secondary education to the gross provincial product, the share of labour force with post primary education, average years of education and literacy rates. Nonetheless, not all of them are

¹ Sector variable is an index capturing the composition of production sectors within each province. Following Barro and Sala-i-Martin (1992), it is defined as follows:

$$s_{iT} = \sum_{j=1}^3 w_{ijt} \cdot \log \left(\frac{y_{jT}}{y_{j0}} \right)$$

where w_{ijt} is the share of sector j in province i 's GPP at time T and y_{jT} is the national average per capita value-added of sector j at time T . The index represents the per capita GPP growth rate of province i between time 0 and T if each sector in the province were to grow at the national average rate. In other words, the variable reflects shocks and structural changes within each province over the study period. Provinces with large shares of fast-growing sectors are expected to grow fast.

appropriate to the level of development in Thailand. The school enrolment and ratio of investment in secondary education to the GPP are not available at the provincial level. The literacy rates seem irrelevant for the case of Thailand. Recall from Chapter 4 that the Thai government had focused on expansion of primary education since 1960. Consequently, the literacy rates were high throughout the country from 1980 onwards. In addition, the 6-year primary education was made compulsory since 1977. As a result, the labour force with primary education made up the largest share of the total labour force. It was therefore labour force with post-primary education that seems to differ across provinces. The same is true for average years of schooling. Accordingly, these two variables should be good proxies for provincial human capital stock in the case of Thailand. Given availability of the data, both the share of labour force with post-primary education and average years of schooling will be used as measures of initial human capital stock.

Similarly, there are many indicators that can be proxies for infrastructure development. Among the most commonly used are the ratio of capital formation to GPP, road density and public spending on infrastructure. Unfortunately, the first two data are not available while the last one is erratic. Balisacan (2002) introduced the share of households with electricity as one of the infrastructure variables in his growth-determinant analysis. He found the variable to be significant for provincial growth in the Philippines during the years 1988-2003. As the level of development of Thailand is similar to that of the Philippines, the variable should serve as a good proxy for infrastructure for Thailand as well. Consequently, the ratio of households with electricity to the total provincial households will be employed as one of the determinants.

For all regression analyses in this chapter, the estimations will be done using STATA programme version 11. Based on Barro and Sala-i-Martin (1991), the method to be employed here is a cross-sectional “level” analysis. Although there were growing attempts to estimate β -convergence using panel-data estimation, it will not be used here. The panel estimation has an advantage as it allows for province-specific factors to be analysed. However, there is also a drawback in the panel data estimations. To use the method requires many time-series observations. This can be done by considering short-term growth rates, i.e. annual growth instead of the long-term growth, i.e. 14-year growth between 1994 and 2008. The variable on the left hand side will no longer be $(1/T) \cdot \log [y_{iT} / y_{i0}]$. It will become $\log (y_{t-14} / y_{t-1})$. In other words, the period of study will change from a 14-year period for each province to a 1-year period for each province for 14 periods. This short time span often involves short-term fluctuations, which is not of interest to long-term analysis (Barro & Sala-i-Martin, 2004, pp. 495-496). Since a long-term period is the interest of this study, only cross-section “level” estimation will be analysed.

Data

The data for the absolute β -convergence analysis covers the period 1981-2008. As for the growth determinants, the analyses start from 1994. This is because provincial data for some of the variables are either unavailable or incomplete prior to 1994. In addition, there were many provinces created between 1975 and 1993. This means the number of provinces was not stable during the period². From 1993 up until the present day, Thailand consists of 76 provinces. As the absolute β -convergence analysis covers the period prior to 1993, it will use 72 provinces in place in 1981. The GPP and

² In 1982, Mukdahan was separated from the province of Nakhon Phanom. Then in 1993, three additional provinces were established. They are Am Nat Charoen (splitting from Ubon Ratchathani), Nong Bua Lam Phu (splitting from Udon Thani) and Sa Keaw (splitting from Prachin Buri).

population of the four newly-created provinces will be consolidated to their original provinces. Hence, the 72 provinces comprise the whole country. For all other analyses in this chapter, the 76 provinces are used.

For analyses in which the period of study is 1994-2008, two sub-periods will be considered. One is the entire period between 1994 and 2008. Another is from 2000 to 2008. The second sub-period is added to consideration because the Thai economy went into crisis during 1997-1998. Then, many reforms took place causing the structure of Thai economy to change after 1998. It is therefore interesting to investigate the growth determinants after the crisis.

As stated earlier, there are 10 factors to be examined for provincial growth determinants in Thailand. The detailed definitions and the data sources for these variables are given below. Note that many of the data used in this chapter have already been introduced in earlier chapters. For these data, only short descriptions will be given here with references to the chapter where the data were introduced. The descriptive statistics for all regressions are separately displayed in Appendix C.

Provincial income per capita (GPP and Income): as previously mentioned in Chapter 3, there are two measures of per capita income. One is per capita GPP compiled annually by the NESDB. Data are available from 1981 onwards, both in nominal- and 1988-price real terms. Another is the nominal per capita current income from the SES. The current income³ is defined as all kinds of income received on a regular basis. It

³ As the per capita current income data are derived from household surveys, the definition is based on household income definition. According to NSO, household total income includes the following items:

- (1) Wages and salary, tips and bonuses
- (2) Net profit from farming and businesses
- (3) Income from properties e.g. rent, copy rights, interest and dividends
- (4) Income from pensions, annuities, scholarships and assistances
- (5) Income in-kind e.g. estimated free-occupied housing, unpaid goods and services
- (6) Other income e.g. from inheritance, proceeds from insurance, lottery prizes.

Household current income includes all items except (6).

includes wages and salaries, net profit from business, pensions, assistance and transfers, income from properties, interest and dividends as well as income in-kind (NSO, 1998, p.33). Recall also from Chapter 3 that the surveys are conducted every two years by the NSO, with provincial-level data⁴ available from 1988. In 2007, the NSO has changed the frequency of the survey to an annual basis. The NSO no longer surveys on income for even years, e.g. 2008. Only in the odd years does the SES cover both household expenditure and income. As a result, the analysis using per capita income can only cover the period 1988-2007. Given that the values are in nominal terms, the per capita income has to be converted to the real values. This will be done using the provincial GPP deflators.

Rate of population growth (PopGr): is the growth rate of provincial population. Data are obtained from the NESDB's *Gross Regional and Provincial Product* report series. As mentioned in Chapter 3, these data are compiled using both registration data from the Ministry of Interior and the SES as bases. The SES normally records household data according to their current location, implying that migration has already been accounted for. In result, the NESDB's population data should already include migration between provinces.

Initial income inequality by province (Gini): the data on provincial Gini index will be used as a measure of this variable. The Gini index can be computed from the raw data of the Socio-economic Surveys (see Chapter 3 for details). Since the provincial-level data are available from 1988 onwards, the provincial Gini can be computed for the same time period. It is important to note that the Gini indexes can be computed from both per capita income and per capita consumption expenditure. For consistency with the previous chapter, the income Gini index will be used here.

⁴ Note again here that sample size of the SES 1988-1992 may not be sufficient for representing the true situation at the provincial level. However, they are included for the benefit of seeing the long-term trend.

Initial share of labour force with post-primary education (PostPrimaryLF): is defined as the ratio of labour force that graduated lower secondary school or higher to the total labour force. Data can be obtained from the Labour Force Surveys (LFS) conducted by the NSO. The details on these data can be found in section 4.3 of Chapter 4. In addition to disaggregation by production sectors, the LFS also provides data by the highest educational award achieved. As this research is interested in the labour force with post-primary education, the lowest award after primary school is the lower secondary. This means that each labour had to graduate the lower secondary school to be counted here. As a measure of initial human capital stock, this variable is expected have positive effect on provincial growth.

Initial educational attainment (EduAttain): is measured as the average years of education in population aged 25 years or over. As these data have already been introduced in Chapter 4, the details of data sources can be found there. As a measure of human capital accumulation, this variable is expected to positively determine provincial growth.

Share of households with electricity (Electricity): is defined as the ratio of households with electricity to the total number of households in the province. The change is measured between 1994 and 2008. These data are included as a part of the Socio-economic Surveys and, hence, are available every two years from 1988 onwards. It is entered here as a proxy for provincial infrastructure development. As argued earlier, infrastructure development is expected to enhance provincial growth in the case of Thailand.

Initial share of agricultural sector in GPP (AgrShare): is defined as the ratio of provincial agricultural value-added to GPP at the beginning of the study period. Data on agricultural value-added are available as part of the GPP data set. Hence, they were

already introduced in Chapter 4. Like GPP, agricultural value-added can be obtained from NESDB for the period starting from 1981. The provinces with initially higher share of agriculture to GPP are expected to grow at slower rate than those with lower share.

Initial share of industrial sector in GPP (IndShare): is defined as the ratio of provincial industrial value-added to GPP at the beginning of study period. In the same manner as the previous variable, data on industrial value-added are published as part of GPP data and are available since 1981. Details can be found in Chapter 4. Provinces which started off with higher share of industrial sector are expected to grow faster than those with lower share.

Change in industrial share of GPP (Δ IndShare): is measured as the difference between the industrial share of GPP at the first year and the last year of study period. Provinces with a large increase in industrial sector during the period are expected to grow faster than those with smaller increase.

Agricultural labour productivity (Agperlabor): it is defined as provincial agricultural value-added per agricultural worker. Data sources are the same as those in Chapter 4. Because agricultural labour accounts for the largest share of total labour force, agricultural labour productivity should be important for income growth. Based on a study by NESDB and World Bank (2005), provinces with lower agricultural productivity are expected to have lower provincial growth.

Foreign Direct Investment (FDI): is defined as the ratio of FDI to GPP. The value of FDI in each province is represented by the value of FDI projects that obtain newly-issued certificates. Although it is better to use the value of implemented FDI projects, such data are not available in Thailand. Thailand Board of Investment (BOI)

only publishes data on project applications, the approved projects, and the projects issued with certificates. According to the BOI, after receiving the project approval, the applicant must set up the company within six months. Then the company must apply and receive the Investment Promotion Certificate before the factory can legally start its operation (Board of Investment [BOI], 2009, pp. 53-55). These data are available from 1993 onwards. It is expected that FDI induces growth through knowledge spillovers, technological transfers and capital formation (Tanna & Topaiboul, 2005, p. 1). Consequently, FDI is expected to have positive effect on provincial growth.

5.3 Results: Absolute β -Convergence

Following equation (5.2), the regression results are shown in Table 5.1 and Table 5.2. Table 5.1 exhibits the estimates using the real GPP per capita data while Table 5.2 shows those using SES per capita income data. The first two rows of Table 5.1 show the estimates for the entire period of study from 1981 to 2008. The results suggest an evidence of *absolute divergence* in per-capita GPP growth among provinces. However, the estimate is statistically insignificant at the ten percent level. This means that the growth rate of GPP per capita is independent from initial level of GPP per capita. The results are consistent with those found in Southichack (1998), both in trends and explanatory powers i.e. the value of R-squares. Regardless of the statistical insignificance, the trend of β -divergence here is consistent with the σ -divergence results found in Chapter 3. Recall that the σ -divergence was illustrated by the widening trend of Williamson's population-weighted coefficient of variation in GPP per capita during 1981-2008. This suggests that the gap between the rich and the poor provinces was widening over time.

Table 5.1 Absolute β -Convergence on Real GPP per Capita for Thailand's 72 Provinces 1981-2008

Dependent Variable Log of Annual Growth Rate of Real GPP per Capita	Explanatory Variable (Log of Initial Real per Capita GPP)		
	Constant	β	Adjusted R ²
1981-2008	-0.0168 (0.0603)	0.0048 (0.0063)	0.01
1981-1985	0.1988 (0.0674)***	-0.0172 (0.0070)**	0.07
1986-1996	-0.0860 (0.0570)	0.0156 (0.0058)***	0.08
1997-1998	0.1997 (0.1048)**	-0.0280 (0.0101)***	0.10
1999-2008	-0.0737 (0.0298)**	0.0101 (0.0029)***	0.15
1988-2007	-0.0478 (0.0431)	0.0084 (0.0044)*	0.04

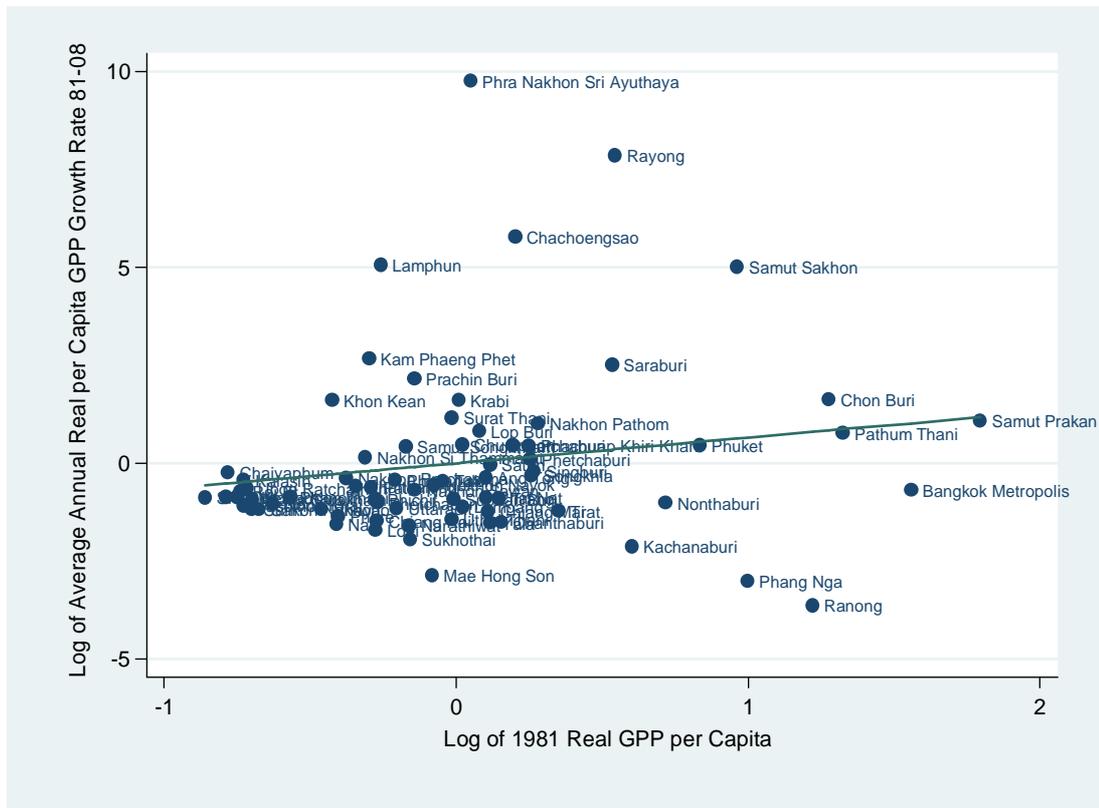
Note: Standard error terms are in parentheses.

*** denotes statistical significance at the 1 percent level, ** 5 percent level and * 10 percent level. For all regressions, number of observations is 72 for the 72 provinces of Thailand.

Source: Author's own calculation. Data are collected from several editions of *Gross Regional and Provincial Product* as follows: 1981-1997: NESDB (1998), 1998-2001: NESDB (2007a) and 2002-2008: NESDB (2010b)

Figure 5.1 further illustrates the estimation results for the full period of 1981-2008. The figure shows weak evidence that provinces with initially low income tended to grow slower than the initially richer provinces. It is apparent that the high-growth provinces are those in the Eastern and Central regions. Notice that Bangkok seems to grow quite slowly over the period. This is also consistent with the provincial disparity trend discussed in Chapter 3. Recall that during 1981-2008, the provincial disparities excluding Bangkok had been catching up with the overall disparities. This must be due to the high growth rates of Eastern and Central provinces, coupled with the slower growth of Bangkok.

Figure 5.1 Initial Real GPP per Capita and Average Annual Growth Rate 1981-2008



Source: see Table 5.1

The insignificance of β -convergence results may be due to the fact that the Thai economy has gone through several phases during the period. It can be divided into four phases: steady growth (1981-1985), the boom years (1986-1996), the crisis (1997-1998) and the post-crisis years (1999 onwards). The results suggest that convergence trends vary considerably between the four sub-periods. During the years of steady growth, there was an absolute convergence of real GPP per capita across provinces. The convergence occurred at a rate of 1.7 percent per year. During the boom, however, the real GPP per capita diverged at the rate of 1.6 percent per year. Convergence then occurred again during the two years of the crisis. After that, the real GPP per capita diverged at the rate of 1.0 percent. The estimates are statistically significant for all sub-periods. For 1981-1985, the estimate is significant at a five percent level. The estimates of the rest of the sub-periods are significant at the one percent level. Since both periods

of divergence are longer time periods than those of convergence, the provincial dispersion of per capita GPP widened. This is, therefore, consistent with the results in Chapter 3.

Another set of provincial income measures is derived from the household survey data on per capita current income. As already stressed in Chapter 3, this indicator has a somewhat different meaning compared to the GPP per capita. The GPP per capita represents the values of produced goods and services within the province. The current income, on the other hand, represents the incomes actually received by those living in the province. The time periods for data using household surveys differ slightly from that of GPP per capita. Here, the full time period of study is from 1988 to 2007. This is due to the availability of the data. Results of absolute β -convergence with this second data set are shown in Table 5.2 and Figure 5.2. Note that in order to make the results from two data sets comparable, the β -convergence of GPP per capita during the period 1988-2007 is also considered. The results are shown in the last two rows of Table 5.1.

Table 5.2 Absolute β -convergence on Real Income per Capita for Thailand's 72 Provinces 1988-2007

Dependent Variable Log of Annual Growth Rate of Real Income per Capita	Explanatory Variable (Log of Initial Real per Capita Income)		
	Constant	β	Adjusted R ²
1988-2007	0.1843 (0.0432)***	-0.0203 (0.0063)***	0.11
1988-1994	0.5248 (0.1436)***	-0.0681 (0.0209)***	0.12
1996-1998	0.4544 (0.1994)**	-0.0615 (0.0269)**	0.06
2000-2007	0.1663 (0.0656)**	-0.0172 (0.0088)*	0.04

Note: Standard error terms are in parentheses.

*** denotes statistical significance at the 1 percent level, ** 5 percent level and * 10 percent level.

For all regressions, number of observations is 72 for the 72 provinces of Thailand.

Source: Author's own calculation. Data are from NSO (2009).

The difference between the results of the two data sets can be explained as follows. Recall that per capita current income includes incomes other than wages and salary e.g. profits as well as all types of transfers. The results simply show that provinces where income is generated differ from those where it is received. This can most likely be explained by the change in income composition of rural households. In the 1980s, there had been rapid structural changes in the Thai economy. The agricultural expansion slowed down due to the exhaustion of the land frontier and declining agricultural terms of trade (Krongkaew, 1985, p. 334; Siamwalla, 1996, pp. 3-10). At the same time, the industrial sector grew rapidly—particularly from the mid-1980s onwards. This created job opportunities in the non-farm sectors, even in the rural areas. Rural farmers started to diversify their income by becoming actively involved in the non-farm sectors (Cherdchuchai & Otsuka, 2006, pp. 409-410). This change in income composition can be observed by looking at the household survey data.

Table 5.3 presents the structure of household incomes derived from the household surveys of 1988, 1996 and 2004. Data show that farm income as a share of total money income has fallen in all types of households. Even within rural farm households, farm income declined from 68.4 percent of their total money income in 1988 to 50.8 percent in 2004. At the same time, the share of wage and salary incomes to total money income substantially increased from 17.5 percent to 28.5 percent. Current transfers also increased during the period. Since current transfers include government transfers as well as remittances, these two items therefore help equalising household income across provinces.

Evidence here suggests that farm households diversify their incomes mainly through engaging in wage-labour activities. Previous studies on Thailand also supported this. Krongkaew, Tinakorn and Suphachalasai (1992, p. 216) found that farmers

normally migrated to find work during the slack seasons. Long-term migration was also apparent across the country. Since the mid-1980s, the economic boom caused the demand for manufacturing labour to increase dramatically. As these manufacturing jobs offered higher and more-stable income than did agriculture, rural workers migrated to urban centres. Not surprisingly, Bangkok and its periphery—where the industries concentrated—have been major destinations. In 1994, there were 1.9 million employed internal migrants out of 31.0-million labour force in Thailand. By 2002, the number of internal migrants around the country rose to 6.3 million out of 47.9-million labour force in the whole kingdom⁵ (NSO, 2003b, Table 15).

Migration has been perceived as means to escape poverty and achieve better living standards in Thailand (Krongkeaw et al., 1992, pp. 215-216; Sussangkarn & Chalamwong, 1994, p. 24; Tsay, 2002, p. 379; Osaki, 2003, pp. 214-217; Guest, 2003, pp. 11-17). The seasonal migrants bring back income to home regions while many of the long-term migrants send remittances home. In fact, there is evidence that remittances contributed significantly to reduce poverty and equalise income among households in Thailand (Guest, 2003; Osaki, 2003; NESDB & World Bank, 2005, p. 107). For households outside Bangkok and vicinity, more than one-third of all households received remittances in 1996. The share was highest in the Northeast region, with around 45 percent of the households receiving remittances (NESDB & World Bank, 2005, p. 108). Studies also show that the amount remitted has been significant to the receiving households. Even in 1992, the remittances accounted for almost a quarter of the household income in receiving households⁶ (Guest, 2003, p. 13; Osaki, 2003, p.

⁵ There was a change in labor force definitions in 2000. Prior to 2000, labor force is defined as population aged 13 years or above. From 2000 onwards, it is defined as population aged 15 years or above.

⁶ Data derived from the 1992- and the longitudinal follow-up 1994 National Migration Surveys. The Surveys were conducted by the Institute for Population and Social Research, Mahidol University.

215). Osaki (2003) also found that, the poorer the origin households, the more likely the migrants were to send remittances. This therefore helps explain the contradictory trends between the divergence in GPP per capita and convergence in current income per capita.

Table 5.3 Structure of Household Income 1988, 1996 and 2004

	1988		1996		2004	
	Rural	Urban	Rural	Urban	Rural	Urban
Average household annual income (Baht)	28,424	80,445	73,451	192,157	118,938	247,980
Farm households	25,899	39,453	61,861	91,901	100,930	137,884
As % of money income	100.0	100.0	100.0	100.0	100.0	100.0
1.wage and salary	17.5	24.1	22.6	28.3	28.5	37.4
2.farm income	68.4	62.9	58.7	57.8	50.8	42.3
3.nonfarm income	3.1	3.4	3.0	3.3	3.1	3.8
4.current transfer	8.4	6.6	11.4	6.8	14.3	12.9
5.other income	2.6	3.0	4.3	3.8	3.3	3.6
Nonfarm households	34,620	84,460	94,964	208,182	138,717	256,445
As % of money income	100.0	100.0	100.0	100.0	100.0	100.0
1.wage and salary	49.6	61.3	48.4	53.7	52.1	61.8
2.farm income	4.2	0.2	3.4	0.3	2.4	0.2
3.nonfarm income	30.6	26.9	34.5	36.0	29.2	26.0
4.current transfer	10.5	8.4	8.6	5.0	12.9	9.5
5.other income	5.1	3.2	5.1	5.0	3.4	2.5

Note: A farm household is a household with an agricultural enterprise (Krongkaew, 1985).

Source: All primary data are from Socio-Economic Surveys, conducted by NSO. For year 1975/76, data are obtained from Krongkaew (1985, Table V). For other years, data are from author's own calculation.

In addition to the migration within the country, international migration also plays an important role in income-equalisation in Thailand. Owing to the oil boom since the 1970s, Middle Eastern countries started to demand foreign workers. Accordingly, the number of Thai overseas workers increased during the 1980s and the 1990s (see Table 5.4). As the number of overseas workers increased, the amount of remittances

inflow has also risen. The remittances reached 1 billion US Dollars in 1992 and continued to exceed that amount since (see Table 5.4)⁷. Like internal migrants, the majority of Thai overseas workers also came from low-income households (Wong, 2000, pp. 60-61; Tsay, 2002, pp. 378-379; Jones & Kittisuksathit, 2003 cited in Huguet & Punpuing, 2005, p. 30). This means that remittances seem to benefit those at the low income distribution. Nonetheless, these households were not likely to be those at the bottom. Tsay (2002) surveyed Thai workers in Taiwan in 1999 and found that majority (58 percent) of the Thai construction workers in Taiwan came from households with income less than 10,000 Baht per month. He estimated incomes of these households to be around 5,000 Baht per month. Most of them had a rural agricultural background. Given that the overall poverty line for rural Thai household was 3,633 Baht per month⁸, these Thai overseas migrant workers certainly came from low-income households that were not poor.

It is common among developing countries that migrating abroad normally involves paying commission fees to the sending agencies. Overseas migration from Thailand is no exception. Studies suggested that most migrants borrowed money from private lenders to pay for these fees (Sussangkarn & Chalamwong, 1994, p. 29; Tsay, 2002, p. 18). As a result, an average of 45.2 percent of remittances was used to repay loans and commission fees. Then, the rest of remittances were used for consumption,

⁷ It is important to note that both official figures of overseas workers and remittances through formal channels are underestimated (Sussangkarn & Chalamwong, 1994, p. 25-28). There were roughly 40,000-60,000 Thai workers migrated to Japan in most years between 1988 and 1995 (Chantavanich, 2001 cited in Huguet & Punpuing, 2005, p. 52). In addition, there were around 45,000-50,000 Thais illegally working in Singapore in 1996 (Wong, 2000, p. 59). Likewise, Kassim (1998) estimated the number of Thai illegal workers in Malaysia to be approximately 80,000. As for remittances, the figures only represent those remitted through formal, recorded channels. It is widely accepted that the true figures covering remittances through all transfer channels would be much larger (Sussangkarn & Chalamwong, 1994, p. 28; World Bank, 2006, p. 193).

⁸ This value of poverty line is based on poverty line for rural area in 2000, which is 1,009 Baht per person per month, times average household size for whole kingdom in 2000, which is 3.6 persons.

savings and investment, respectively (Poapongsakorn, 1989 cited in Sussangkarn & Chalamwong, 1994, pp. 29-30).

Table 5.4 Number of Thai Workers Overseas and Remittances Received 1977-2004

Year	Thai Workers Overseas (1,000 persons)	Remittances (million US Dollars)
1977	3.8	45
1980	n.a.	376
1982	117.3	618
1989	123.1	943
1992	71.7	1,127
1995	202.3	1,695
1996	185.4	1,806
1997	183.6	1,658
1998	191.7	1,424
1999	202.1	1,460
2000	137.8	1,500
2001	165.0	1,117
2002	160.8	1,481
2003	147.8	1,304
2004	148.6	1,509

Note: Data are collected from sources as appeared below. The data on the number of Thai Workers Overseas are considered consistent as the primary data source is the Ministry of Labour and Social Welfare. The data on remittances are treated with caution as data for 1977-1992 are available in Thai Baht while the rest are in US Dollars. For those in Thai Baht, they are converted by author's own calculation using annual averaged exchange rates from Dixon (1999, Table 4.1a). Dixon's primary source is the Bank of Thailand.

Source: Data are collected from two sources as follows; 1977-1992, data are from Sussangkarn and Chalamwong (1994, Table 3.2-3.3). From 1995 onwards, data are from Huguët and Punpuing (2005, Table 8).

It is apparent that remittances from overseas migration did benefit the low income group, though not the poorest. This means that the overseas migration might not contribute as much to poverty reduction as did the internal migration. Despite that, since majority of overseas workers came from low-income households, it certainly helped improve income distribution. Similarly, as majority of these workers came from the Northeast—the poorest region, overseas migration seemed to also help narrow regional

household income disparities. This consequently contributes to explaining the contradictory trends between GPP per capita divergence and per capita income convergence.

In summary, the results for absolute β -convergence in Thailand exhibit different trends when different data sets are used. By looking at per capita income between 1988 and 2007, the β -convergence is evident. However, evidence of long-term convergence cannot be found in GPP per capita. Rather, the result suggests a *β -divergence* for the period of 1988-2007. This means that the initially poor provinces grew at a slower rate than the initially richer provinces. In order to improve the performance of the poor provinces, it is important that the provincial growth determinants are considered.

5.4 Results: Provincial Growth Determinants

Table 5.5 shows results for cross-section regressions on provincial growth 1994-2008, using ordinary least-square (OLS) estimation methods. The results in column (1) suggested that GPP per capita diverged at 0.87 percent during the period. This is consistent with the results in Table 5.1. In growth-determinant context, it also means that provinces with higher initial GPP per capita would grow faster than those with lower initial GPP per capita. The low adjusted R-squares suggest that initial GPP per capita contributes weakly in explaining growth during 1994-2008. There must be other variables that are more important in determining provincial growth.

Column (2) and (3) show the OLS estimates with all factors considered in this chapter. Regression in column (2) examined the effect of the agricultural share of GPP on growth, among many other variables. Then, analysis in column (3) replaced agricultural share of GPP with industrial share of GPP and its change over the study

period. Results in column (2) suggest that, aside from initial GPP per capita, three other factors significantly determine growth during 1994-2008. These factors are population growth, initial inequality and initial FDI. All three factors show expected signs. Provinces with slow population growth, low initial inequality and high initial FDI would grow fast.

Meanwhile, infrastructure, agricultural labour productivity, initial agricultural share of GPP and initial human capital stock were found to be insignificant for provincial growth. Recall that there are two measures of human capital stock used in this chapter—educational attainment and share of labour force with post-primary education. Both of them are found to be insignificant for provincial growth. Given that the two measures do not give results that are significantly different from one another, only the regressions using educational attainment are shown.

The insignificance of education and infrastructure might be due to the fact that these two aspects had already been extensively developed prior to the economic boom. Infrastructure development was highlighted in the First National Development Plan (1961-1966). It continued as a mean to accelerate growth during the Second-, Third- and Fourth Plans (1967-1971, 1972-1976 and 1977-1981 respectively). From the Fifth Plan (1982-1986) onwards, although the policy shifted toward building the Eastern Seaboard, expansion of infrastructure to reach rural areas continued (Bhokha, Sangtian, Pannikul & Subsomboon, 2009). As a result, all regions became adequately equipped with basic infrastructure particularly electricity, telephone and roads (NESDB & World Bank, 2005)⁹. In 1994, except for Mae Hong Son, Chumphon and Surat Thani, at least 80 percent of all households in each province had electricity. For this reason, the

⁹ While the basic infrastructure seems to become more equally accessible across provinces, the more advanced infrastructure relevant for industries still differs largely. With limitations in statistical availability, such differences and their effect on growth cannot be captured here.

infrastructure variable—change in share of households with electricity—does not play an important role in determining provincial growth.

As for education, it has been an integral part of national development even before the First Plan (1960-1965). Since 1960, the policy focused on expanding primary education throughout the country. Then from 1990 onwards, the secondary education was extensively promoted. As a result, literacy rates and educational attainment have become similar across provinces over time. Thomas, Wang, and Fan (2000) found narrowing overall educational inequality in Thailand during 1960-2000. Meanwhile, differences in GPP growth were large and increasing over time. As the two trends did not go in the same directions, educational attainment was not the major cause of GPP growth.

It is important to stress here that the insignificance of education and infrastructure on provincial growth does not mean they are not essential to growth in general. It can hardly be denied that education and basic infrastructure are important for long-term economic development. Nonetheless, when the levels of education and infrastructure are similar while the growths differ, the major causes for growth have to be something else. It is likely that the results here reflect the fact that all provinces had similar levels of educational attainment and basic infrastructure. Consequently, they cannot be major factors causing growth to differ largely among provinces.

In addition to education and infrastructure, agricultural productivity and initial agricultural share of GPP were also found to be insignificant determinants of growth. As earlier stated, the initial agricultural share of GPP was included in the regression to see how its role changed over time. Unlike results from Southichack (1998), initial share of agriculture sector to GPP no longer contributes to provincial growth for period 1994-2008. Such result is, however, expected. The role of agricultural sector to the Thai

economy has become smaller over time. With this, the role of agricultural labour productivity also declined. At the same time, Thailand has seen industrial sector increasingly risen as a main driver for growth since the late 1980s. This is further supported by the results in column (3).

By replacing agricultural share with industrial share of GPP, it is apparent that industrial sector was a key factor determining growth. With both initial share of industrial sector to GPP and its change over the period included as determinants, the explanatory power increases from 37 percent to 70 percent. In fact, a single regression suggests that the change in industrial share of GPP alone accounts for 53 percent of the observed differences in growth rates. Both variables show expected signs. Provinces with larger increase in industrial share of GPP would grow faster than those with lower increase. Those that had a head start in industrial share would see even faster growth.

Notice that once industrial variables are included, initial FDI became insignificant. Although it continues to show positive relationship with growth, its magnitude fell from 0.07 to 0.02 percent. It is apparent that initial FDI plays only minor role in determining growth when compared to industrial sector. This is possibly because the measure for initial FDI used here is the value of FDI projects that obtain newly-issued certificates to GPP. Not all certified FDI projects went on to setting up their operations. Only those that actually completed the set up and continued to operate seem to matter for growth. Since most projects are in manufacturing sector, the ongoing FDI projects were already included as part of the industrial sector value-added. Consequently, when the industrial variables are added to the regression, FDI became insignificant.

Similarly, initial GPP per capita becomes negatively related to growth after the industrial variables are included. This could imply that once the initial share of

industrial sector to GPP is kept constant, there was an evidence of income convergence among provinces. Nonetheless, the coefficient was significant at the ten percent level and its explanatory power was quite weak. Alternatively, the change in coefficient sign could reflect the high collinearity between initial GPP per capita and initial share of industrial sector to GPP. The simple correlation between the two is 0.74. Moreover, there is also a high correlation (0.66) between initial GPP per capita and initial educational attainment. This may explain the change in sign and lack of significance of coefficient for initial educational attainment as well.

To eliminate the collinearity, initial GPP per capita is omitted from the regression. The results in column (4) suggest that explanatory power only declined by one percent when initial GPP per capita was dropped. All variables show expected signs. Initial inequality and educational attainment are insignificant at the ten percent level. On the other hand, share of households with electricity and change in agricultural labour productivity became significant at the ten percent level. Nonetheless, the magnitudes of their effects on growth are very small.

Aside from the full period of 1994-2008, an analysis for period 2000-2008 is also considered. This is to examine the growth determinants after the 1997/98 financial crisis. The results are displayed in Table 5.6 in the same manner as those in Table 5.5. The single regression in column (1) shows that provinces with higher initial GPP per capita continued to grow faster after the crisis. The coefficient is significant at a one percent level for this post-crisis period. However, when other factors are included, the initial GPP per capita became insignificant, as shown in column (2) and (3). In general, the regression results in column (2) (3) and (4) show similar results to those in Table 5.5. One exception is that population growth was no longer a significant determinant of growth during the period 2000-2008. It is also interesting that the effect of the industrial

sector on growth became stronger after the crisis. For the period 1994-2008, every one percent increase in industrial value-added would raise GPP growth by 0.14 percent. That effect has increased to 0.21 percent for period 2000-2008.

Table 5.5 Regression Results for Provincial Growth in Thailand 1994-2008

Independent Variables	Dependent Variable: GR 9408			
	(1)	(2)	(3)	(4)
GPP 94	0.0087 (0.0038)**	0.0089 (0.0051)*	-0.0079 (0.0047)*	
PopGr 9408		-0.0006 (0.0002)***	-0.0004 (0.0001)***	-0.0005 (0.0001)***
Gini 94		-0.1018 (0.0409)**	-0.0309 (0.0290)	-0.0375 (0.0291)
EduAttain 94		-0.0008 (0.0035)	0.0049 (0.0025)*	0.0022 (0.0020)
Electricity		0.0004 (0.0004)	0.0006 (0.0003)**	0.0005 (0.0003)*
Agperlabor		0.0000 (0.0000)	0.0000 (0.0000)*	0.0000 (0.0000)*
FDI 94		0.0007 (0.0002)***	0.0002 (0.0002)	0.0002 (0.0002)
AgrShare 94		-0.0002 (0.0002)		
IndShare 94			0.0006 (0.0001)***	0.0005 (0.0002)***
Δ IndShare			0.0014 (0.0002)***	0.0014 (0.0002)***
Constant	-0.0665	-0.0067	0.0745	0.0171
Adjusted R ²	0.05	0.37	0.70	0.69

Note: Standard error terms are in parentheses.

*** denotes statistical significance at the 1 percent level, ** 5 percent level and * 10 percent level.

Number of observations for all regressions is 76 for the 76 provinces of Thailand

Source: Author's own calculation

Table 5.6 Regression Results for Provincial Growth in Thailand 2000-2008

Independent Variables	Dependent Variable: GR 0008			
	(1)	(2)	(3)	(4)
GPP 00	0.0084 (0.0029)***	0.0042 (0.0041)	-0.0004 (0.0043)	
PopGr 0008		-0.0002 (0.0006)	0.0001 (0.0005)	0.0001 (0.0004)
Gini 00		-0.0914 (0.0468)*	-0.0407 (0.0357)	-0.0404 (0.0354)
EduAttain 00		-0.0021 (0.0029)	0.0003 (0.0021)	0.0003 (0.0019)
Electricity		0.0004 (0.0005)	0.0005 (0.0003)	0.0005 (0.0003)
Agperlabor		0.0001 (0.0000)**	0.0001 (0.0000)**	0.0001 (0.0000)**
FDI 00		0.0004 (0.0002)**	0.0002 (0.0001)	0.0002 (0.0001)
AgrShare 00		-0.0001 (0.0002)		
IndShare 00			0.0003 (0.0001)***	0.0003 (0.0001)***
Δ IndShare			0.0021 (0.0003)***	0.0021 (0.0003)***
Constant	-0.0552	0.0415	0.0353	0.0318
Adjusted R ²	0.09	0.23	0.56	0.57

Note: Standard error terms are in parentheses.

*** denotes statistical significance at the 1 percent level, ** 5 percent level and * 10 percent level.

Number of observations for all regressions is 76 for the 76 provinces of Thailand

Source: Author's own calculation

The regression results in Table 5.5 and Table 5.6 seem to fit well with the common understanding of the growth-engine of Thailand. Impressive growth performance was driven mainly by industrialisation starting in the 1960s (Poapongsakorn & Fuller, 1997, p. 145; Richter, 2006, p. 7). This phenomenon,

however, occurred mainly in and around Bangkok. Despite attempts to disperse industries out of this area, the government policies could only succeed in moving industries to the Eastern and Central regions. Both areas are still in close proximity from Bangkok. Accordingly, provinces that were able to expand industrial sector grew fast. The failure to draw industries toward other regions far from Bangkok was believed to be due to Bangkok's agglomeration economies. The issue of agglomeration will be examined and discussed in details in Chapter 7.

The role of industrial sector to economic growth became even more important after the crisis. In the post-crisis period, the Thai economy has been driven mainly by exports, which was increasingly dominated by manufacturing products. Share of exports went up from 45 percent of GDP before the crisis to around 65 percent after the crisis. At the same time, manufacturing accounted for 87 percent of total exports in 2004, increasing from 80 percent in 1993 (NESDB & World Bank, 2005, p. 65). Within manufacturing, high-tech products saw its share of production increased while textiles declined. These high-tech firms preferred to locate in Eastern and Central regions. This is because these provinces are close to Bangkok, allowing firms to benefit from strong enterprises linkages, better infrastructure and easy access to major ports and export facilities. At the same time, not being in Bangkok itself means that they could avoid high land prices and congestion (Richter, 2006, p. 38). As a result, provinces where these high-tech firms were concentrated grew fast after the crisis.

It is apparent that the industrial sector played a major role in determining growth in Thailand. As the industrial sector is only concentrated in certain part of the country, only provinces in this part grew fast. This consequently led to an increase in provincial disparities in GPP per capita. Recall from Table 4.1 in Chapter 4, the provincial disparities in industrial value-added trended upward since 1997. Provincial disparities

in GPP per capita also showed the same trend (see Figure 3.4 in Chapter 3). The disparities excluding Bangkok and BMR seemed to be catching up quickly with the overall provincial disparities after the crisis. This reflects the growth of fast-growing manufacturing sectors in the Central and Eastern regions, particularly after the crisis.

In summary, the analyses in this section reveal factors that contributed to the provincial growth in Thailand during the two periods. While 1994-2008 covers the entire period studied, the 2000-2008 period is added to see if the growth determinants changed after the crisis. Results did not differ significantly between the two periods. The industrial sector dominated as growth-determinant for both the entire period and post-crisis period.

5.5 Conclusion

This chapter began by examining the existence of β -convergence in Thai provincial income. Using per capita income data from household surveys as a measure, β -convergence occurred in all sub-periods. That is, the boom, the crisis and the post-crisis years. On the other hand, when data on per capita GPP were used, there was no evidence of β -convergence among provinces during the boom and post-crisis periods. This means that provinces with initially low GPP per capita did not grow faster than those with initially higher GPP per capita. The analysis then moved to examine whether the initial per capita GPP contributed to provincial growth at all. Ten other variables were also added to the estimation. For the entire period of 1994-2008, population growth, initial industrial share to GPP and its change over time were found to be significant determinants for provincial growth in Thailand. After the crisis, the population growth did not continue to be a significant determinant. Meanwhile, the

importance of industrial sector to provincial growth has increased. This is because exports in high-tech manufacturing products have become a growth-engine of the post-crisis period. As these high-tech firms concentrated in Eastern and Central regions, provinces in these areas grew much faster than the rest. This consequently widened the provincial disparities, which is consistent with the results in Chapter 3.

There is no doubt that the investigation of provincial growth determinants is important for a country's development direction. Perhaps a more important issue is the extent to which provincial growth affects poverty reduction. Although it is no longer debatable that economic growth helps reduce poverty, the magnitude of its effect differs across cases. For this reason, poverty in the Thai provinces and its relationship with provincial growth will be examined in the next chapter.

CHAPTER 6

Pre- and Post-Crisis Poverty Situation across the Thai Provinces

6.1 Introduction

The issue of poverty has always been at the centre of development. Thailand is no exception. Poverty reduction has been incorporated into the national development plans, particularly since the Fourth Plan (1977-1981). Despite impressive records of poverty reduction over the last four decades, problem of poverty continues to challenge Thailand's development process. This is particularly true when looking at the geographical aspect. Poverty in Thailand is a rural phenomenon, highly concentrated in the Northeastern and Northern regions (Warr, 2004, p. 6; Jitsuchon & Richter, 2006, pp. 242-243). This chapter looks at poverty in Thailand in detail.

The chapter will begin with the definition and measurement of poverty used in Thailand. At first glance, poverty seems to be a general term in which most people know the meaning of. However, its definition and measurement concept have been subject to much debate. As the problem of poverty persisted through development process, both definitions and measurements of poverty have evolved greatly over time. Consequently, there are now several definitions and approaches of poverty in use by scholars and policy-makers around the world. It is important that both of them are identified clearly in this chapter. This is because different definitions and measurement methods can lead to different individuals and groups being considered as poor (Stewart, Laderchi & Saith, 2007, pp. 1-2).

Once the definition and measurement of poverty are clearly specified, we can then look at the poverty situation in Thailand. Here, the overall picture of poverty in Thailand over the past four decades will be examined. Given that the focus of this research is at the provincial level, particular attention will be paid to provincial poverty. The disparities in provincial poverty rates between 1988 and 2008 will be considered. Their trends over time can reveal how concentration of poverty changed along with different stages of the Thai economy. In addition, the Thai economy had also gone through structural changes during the past two decades. An analysis of how these changes affect the provincial poverty disparities will also be made.

It is no longer debatable that economic growth leads to overall poverty reduction at the national level. However, there was little evidence on this relationship at the provincial level. Using per capita income from household surveys, Deolailikar (2002) found a positive relationship between provincial average per capita income growth and poverty reduction in 1992-1999. Meanwhile, NESDB and World Bank (2005) used GPP data as a measure of income growth. The study found similar relationship for period 1988-1996. However, it did not find the same evidence for period 1996-2002. Given that data in more recent years are now available, the growth-poverty relationship, particularly in the post-crisis period should become clearer. This will be investigated as part of this chapter.

In relation to the growth-poverty relationship, most studies also analyse the extent to which provincial growth contributes to poverty reduction. Some research works went further to include other factors as the determinants of poverty. This latter analysis is probably the most essential part for solving the poverty problem. To tackle the problem, it is important to know what causes poverty. Given such importance, the poverty determinants will also be analysed in this chapter.

This chapter is organised as follows: section 6.2 discusses the definition and measurement of poverty used in Thailand. Then methods and data for analyses in this chapter will be explained in section 6.3. Section 6.4 examines poverty in Thailand with an emphasis on poverty across provinces over the period 1988-2008. Section 6.5 and section 6.6 explores the contribution of provincial growth to poverty reduction and other poverty determinants, respectively. Section 6.7 discusses the anti-poverty programmes implemented in Thailand so far. Finally, section 6.8 summarises the findings in this chapter.

6.2 Poverty Definitions and Measurements

Definition

Like in the rest of the world, the definition of poverty in Thailand has been subject to intense debate (Jitsuchon, 2001, p. 6). At the international level, the term ‘poverty’ traditionally referred to material deprivation. That is, as UN describes, “inability to obtain food and other basic necessities.” This is still the definition most commonly used today. However, it has become widely accepted that poverty also involves other dimensions beyond monetary. The concept of poverty has been extended to include all aspects that constitute well-being¹. Here, poverty also covers the lacks of opportunity for education and health, voicelessness as well as powerlessness (World Bank, 2000).

For Thailand, the term ‘poverty’ generally refers to the lack of sufficient income for an individual to enjoy the minimum standards of living in the society (NESDB, 2008b). As with the wider academic world, the Thai scholars have also included other

¹ The broadest approach is introduced by Amartya Sen (1987). He suggested that well-being is reflected in capability to function in society up to the minimum level. All these approaches are discussed in details in Stewart et al. (2007).

dimensions into the poverty definition in recent decades. Jitsuchon (2001) found that the Thai academics and experts viewed attributes of social, economic and political structures as part of the poverty definition. These include, for example, social acceptance, basic public services, voices to be heard and opportunities in life. Despite that, the monetary dimension continued to dominate among policy-makers. As official poverty data are compiled by the policy-making agency—the NESDB, the official poverty definition in Thailand is limited to the monetary or income poverty².

To measure income poverty, poverty lines are needed as a threshold. Following the United Nations Development Programme (UNDP) concept, income poverty can be classified into extreme poverty and overall poverty. Extreme poverty is defined as lack of income sufficient to obtain minimum nutrition required for living. Overall poverty, on the other hand, is defined as lack of income sufficient to obtain all basic needs i.e. cloths, medicine, shelter as well as food. The official poverty lines in Thailand follow this latter concept of income poverty.

Poverty Lines

The measurement of poverty in Thailand can be compiled since 1962. This was made possible when the National Statistical Office (NSO) first conducted the household surveys. (Warr, 2004, pp. 2-4). During the early years, the Thai poverty lines were estimated by several different researchers. Nonetheless, the poverty lines based on basic needs did not come along until the World Bank introduced it in the late 1970s (Krongkaew et al., 1992, p. 202). For around two decades since then, the Thailand Development Research Institute (TDRI) was the source for the Thai poverty incidence data.

² It is important to stress here that income poverty means the monetary aspect of poverty, as opposed to other dimensions. This is a different issue from whether income or consumption approach is used to come up with the headcount ratio.

Over time, the TDRI approach received increasing criticism for not realistically reflecting the true poverty situation. In response, the NESDB issued new poverty lines under the recommendations proposed by Kakwani and Krongkaew (2000). Under this new method, the NESDB also revised the poverty lines back to the year 1988. Accordingly, the NESDB became an official source of poverty data since. Albeit with changes in the methodologies, the data source used to construct poverty lines remained the same, the SES. Given that the NSO conducted these surveys every two years during 1988-2006, poverty lines and all poverty measures are available at two-year intervals. From 2007 onwards, the surveys are done annually—hence poverty measures are available on an annual basis.

Before moving on, it is important to note that in 2004, the NESDB made a revision on the poverty line methods. The preliminary research for this revision was conducted by the TDRI with technical assistance from the UNDP (see Jitsuchon, Plangpraphan & Kakwani, 2004). The revised methods are still based on those proposed by Kakwani and Krongkaew (2000). However, due to changing consumption patterns and more up-to-date primary data, the revision was considered necessary. Among several changes made in this revision, the major change was the base year from 1992 to 2002. Upon the release of the new poverty lines in 2004, the NESDB revised all the poverty lines back to year 1988. This means that the poverty data are consistent throughout the time series. Since then, there has not been any further change to the poverty-line construction methods. To prevent confusion, only the current methods are discussed below.

The official poverty lines for Thailand reflect the minimum standard of living, which is divided into food and non-food poverty lines. The food poverty line is calculated from the minimum nutritional requirements. This is based on the assumption

that an individual has adequate food if he or she obtains sufficient nutrition. To come up with the monetary equivalent of nutritional requirements involves several steps. The first step is to calculate per capita household calorie requirements by summing up the calories per day each member needs according to age and sex. Then, the food baskets to meet requirements are estimated. Taking into account the differences in consumption patterns across regions, nine food baskets were estimated for Thailand. These nine baskets are for rural and urban areas of the four regions plus a separate one for Bangkok.

The third step is to calculate calories obtained from each of these nine baskets. This can be done by multiplying each food item in the basket by its calories value. The calories data are provided by the Nutrient Division, Department of Health at the Ministry of Public Health. Then, calories cost can be calculated by dividing total food expenditure by calories obtained. For the total food expenditure, only per capita food consumption expenditure of population in the lowest income quintile is used here. This is because it best represents the cost incurred by the poor. Here, calories cost is calculated for each food basket and hence there are nine sets of calories costs. The sum of these nine calories costs weighted by population share of each corresponding area gives the national average calories cost.

The fourth step involves deriving spatial food price indices. While the nine food baskets reflect different consumption patterns, they do not take into account the price differentials across the geographical areas. Given that prices do vary from one region to another, it is crucial that the price differences are allowed for in the calculation. The spatial price indices (SPI) measure the relative cost of food across community types and regions (Kakwani & Krongkaew, 2000). The SPI were calculated from food prices of 2002 supplied by the Bureau of Trade and Economic Indices, Ministry of Commerce.

Data contain prices of 125 food items, which cover almost all food consumed by Thai households. In consistence with the number of food baskets, nine SPI—for rural and urban areas of the four regions and Bangkok—were calculated. For detailed method, see Appendix D.

Finally, the food poverty line is estimated as monthly calorie requirement multiplied by the calories cost. As for non-food poverty lines, they are estimated from expenses on nine non-food categories occurred in households whose food expense was at food poverty lines. The nine categories are clothing, shelters, fuel and lights, home appliance, medicine, personal expense, transportation, telecommunication and education. Here, some non-food items in which low-income individuals are unlikely to consume e.g. necktie, swimsuit and housecleaning service have already been taken out of the calculations. Summation of food- and non-food poverty lines produces the total poverty lines.

Price Adjustments for Non-base Years

The current set of poverty lines uses 2002 as the base year. As mentioned earlier, the NESDB revised all poverty lines back to year 1988 for consistency throughout the time series. In other words, the current poverty lines for the years 1988-2000 are based on the 2002 poverty lines, with price-adjustment using consumer price indices (CPI). Likewise, poverty lines from 2004 onwards are also products of price-adjustments from the 2002 poverty lines. The price adjustments are made at two steps of poverty-line construction—the calories cost calculation and each item of non-food basket. That is, non-base year calories cost is a product of the 2002 calories cost adjusted by food CPI of that year. Meanwhile, each of the nine non-food categories is adjusted using each corresponding non-food CPI. This way, the purchasing power is kept rather constant over time.

6.3 Methods and Data

Methods

The poverty analyses in this chapter consist of two parts. The first part gives overview of poverty situation in Thailand, together with the provincial disparities in poverty. The Williamson's population-weighted coefficient of variation (v_w) will be used as a measure of disparities. Defined in the similar way as v_w in Chapter 3 and 4, the measure is calculated as follows:

$$v_w = \frac{\sqrt{\sum (p_i - p_{WK})^2 (f_i/n)}}{p_{WK}} \quad (6.1)$$

where f_i denotes population of the i^{th} province, n national population, p_i poverty rate of the i^{th} province and p_{WK} national poverty rate. The larger value of v_w indicates that there is a larger dispersion.

The second part examines relationship between poverty and provincial income growth as well as the poverty determinants. Simple OLS estimation will be used to investigate the poverty-growth relationship. For poverty determinant, the analysis will follow Deolailikar (2002) which examined poverty determinants for period 1992-1999. The model specification is as follows:

$$Pov_i = \alpha + b \log y_i + \sum \delta_i X_i + v_i \quad (6.2)$$

where Pov_i is the poverty headcount ratio of province i , y_i per capita income of province i , and v_i error term. Also, X_i represents other selected variables that determines provincial poverty rate. The estimation will be done using the pooled data least-square method. The coefficient b represents the growth elasticity of poverty. Based on

Deolailikar (2002), variables included as additional determinants are income inequality, average years of schooling, mean age of household head, percent of population residing in female-headed households, percent of urban population, mean household size, percent of population aged 0-15 years and those aged 60 years or over. All of them will be considered in this chapter. This is because these factors had been commonly cited as factors causing poverty at the national level (Krongkaew, 1993). It is therefore interesting to see if they are also relevant to poverty at the provincial level. More importantly, by including all of the above variables as poverty determinants, the results can be comparable to those of Deolailikar. Deolailikar's analysis covered the years 1992-1999 while this chapter considers the sub-period 2000-2007. With same source of data and same variables included in the models, the results should be consistently comparable. This way, we can see whether poverty determinants have changed after the crisis. For all regression analyses in this chapter, the estimations will be done using STATA programme version 11.

Data

Data in this chapter came from two major sources, the NESDB and the NSO. The GPP growth and the poverty measures are from the NESDB. Recall that GPP data are available on an annual basis from 1981 onwards. Meanwhile, data on per capita income and all other factors to be included in the poverty-determinant analysis are from the NSO. The details of these data are described below:

Poverty headcount ratio (Pov_i): is defined as the share of population whose per capita expenditure are below the provincial poverty line to the total provincial population. The official figures are provided by the NESDB. They are compiled based on household consumption, which is drawn from the SES. In accordance with the SES,

the provincial headcount poverty ratios can be computed every two years between 1988 and 2006 and every year from 2007. Despite that, the official data at provincial level are only available from 1994 onwards. They are published in the reports *Data/Indicators for Poverty and Income Distribution*, available only in Thai. For 1988-1992, the provincial poverty rates are computed using the raw SES data and each year's provincial poverty lines. These data are available at the NESDB for internal use. It should be noted that the provincial-level data prior to 1994 may have to be analysed with caution. This is because the sample size may not be sufficient to truly represent the situation at such a disaggregated level. Nonetheless, data for 1988-1992 are included as they allow the analysis to cover a longer time period.

For the remaining factors, which are described below, data are from the same sources. They can be obtained from the SES and, therefore, are available from 1988 onwards. The NSO usually publishes these data as part of the reports on the *Household Socio-economic Survey*. Nonetheless, only data at the national- and regional levels are reported. Since the interest of this research is at the provincial level, data has to be drawn from the raw SES. Hence, the following data are the products of the author's own calculation using the STATA programme on the raw SES data sets.

Provincial income per capita (Income): is the average nominal per capita current income of households within a province. Recall that in 2007, the NSO has changed the frequency of the survey to an annual basis. The NSO no longer surveys on income for even years, e.g. 2008. Only in the odd years does the SES cover both expenditure and income. As a result, data on per capita income are only available for the period 1988-2007. Given that the values are in nominal terms, the per capita income has to be converted to the real values. This will be done using the provincial GPP deflators which

can be easily derived from the GPP figures. Recall that GPP data are provided by the NESDB every year from 1981 onwards.

Income inequality by province (Gini): the data on provincial Gini index will be used as a measure of income inequality. The Gini index can be computed from the raw data of the SES (see Chapter 3 for details). Recall that Gini indexes can be obtained from both per capita income and per capita consumption expenditure. For consistency with the previous chapter, income Gini index will be used here.

Educational attainment (EduAttain): is measured as the average years of education in population aged 25 years or over³. As these data have already been introduced in Chapter 4, the details of data sources can be found there.

Mean age of household head (HeadAge): is defined as the average age of household head of each province.

Share of population residing in female-headed households (FHead): is measured as a percentage of an entire provincial population.

Percent of urban population (Urban): is the percentage of population in urban areas to the total provincial population. Prior to 1999, areas within a province were divided into three subcategories—municipal areas, sanitary districts and villages. While it has always been clear-cut that the municipal areas are considered urban and villages are rural, it has not been so for sanitary districts. The areas designated as sanitary districts were normally semi-urban areas (Nagai et al., 2008, p. 1). Their sizes were normally bigger than village but too small to be a municipal. In May 1999, all the

³ In Deolailikar (2002), the years of schooling covers population aged 18 years or over. However, the population aged 25 years or over is used here for consistency with the measurement used in Chapter 4 and 5. In regression analysis in this chapter, the author tried both the years of schooling of population aged 18 years or over and that of population aged 25 years or over. The results of the two measures did not significantly differ from one another. Therefore, only the regression results using years of schooling of population aged 25 years or over will be shown and analysed here.

sanitary districts were converted to municipal areas under the *Act on Conversion of Sanitary Area Status to Municipality, B.E. 2542 (1999)*. This means that from 1999 onwards, surveys such as the SES no longer distinguished sanitary districts from the municipal areas. Hence, the sanitary districts would be considered as urban areas. For consistency throughout the time series, all sanitary districts prior to 1999 have to be considered as urban.

Mean household size (HHsize): is defined as an average number of household members for each province.

Share of population aged 0-15 years (PopUnder15): is measured as a percentage of provincial population aged 0-15 years to the total provincial population.

Share of population aged 60 years or over (PopOver60): is measured as a percentage of provincial population whose ages are 60 years or over to the total provincial population.

6.4 Poverty in Thailand

Overview

In the 1960s, when poverty started to be measured, Thailand was considered a poor country. As much as 57 percent of total population was poor⁴ in 1962 (Meesook, 1979, Table 3.1). However, due to the implementation of the National Development Plan, the economy experienced steady growth during the 1960s and the 1970s. This was followed by rapid growth during 1987-1996. As a result, the poverty rate considerably declined. In 1981, 24 percent of the Thai population lived in poverty (Krongkaew, 1985, Table 1).

⁴ Data was based on poverty line of 1,981 baht per person per year in villages and 2,961 baht per person per year for municipal areas and sanitary districts (Meesook, 1979, Table 3.1).

The rate was further reduced to only 14.8 percent in 1996 (NESDB, 2009, Table 2). Although the crisis had an adverse effect on poverty, the headcount ratio started to decline again in 2000. As of 2008, 8.6 percent of population was considered poor (NESDB, 2009, Table 2).

In addition to the headcount ratio, poverty gap and severity of poverty⁵ also declined largely over time. Poverty gap measures the magnitude to which income of the poor fall below the poverty line. Severity of poverty, on the other hand, measures how income is distributed among the poor. Income poverty gap fell from 19.3 percent in 1986 to 3.8 percent in 2002. This means that the gap between income of the poor and the poverty lines narrowed over time. Similarly, severity of poverty fell from 9.5 percent to 1.5 percent during the same period (Jitsuchon et al., 2004, Table 15 and Table 17). This means that the distribution of income among those that fell below poverty lines improved over the period.

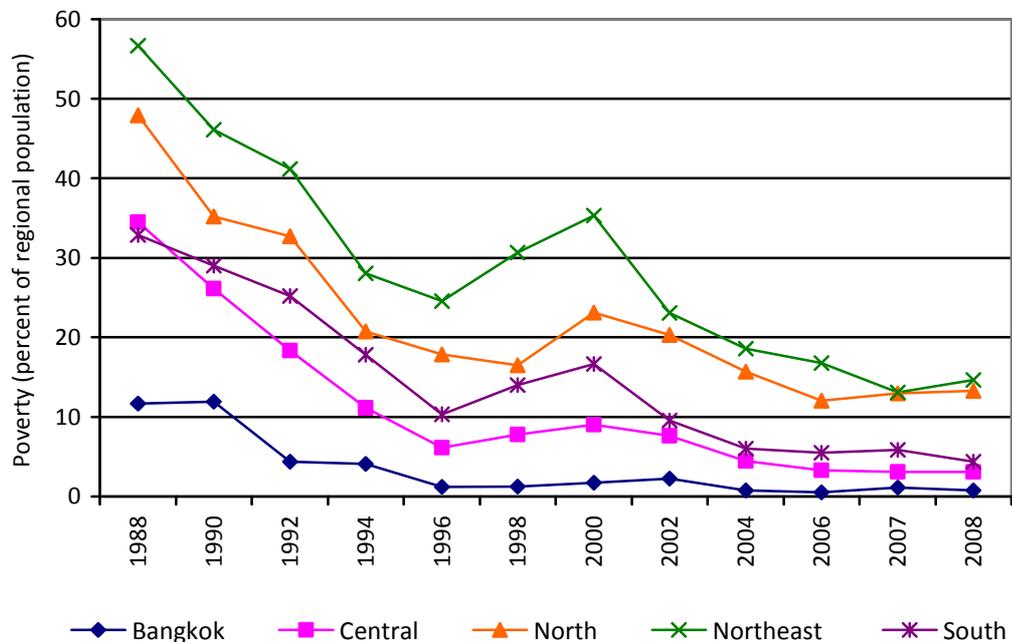
Despite the rapid rate of poverty-reduction at the national level, poverty continued to be concentrated in certain areas and household types. Poverty incidence in Thailand has been a rural phenomenon. Poverty was also found to be concentrated in the households engaged in agricultural production. Moreover, households with low educational-level heads were more likely to be poor than others. Households with larger size were more likely to be poor than the smaller households (Krongkaew, 1993; Warr, 2004).

⁵ Poverty gap = $\sum_{i=1}^n \alpha_i \varphi_i (1 - y_i)$ while severity of poverty = $\sum_{i=1}^n \alpha_i \varphi_i (1 - y_i)^2$

where $y_i = x_i/z_i$, x_i is the income of household i , z_i poverty line, α_i population ratio and φ_i an index which takes a value of 100 if income is below poverty line and 0 if income is above poverty line (Jitsuchon et al., 2004).

As for the geographic dimension, impressive poverty-reduction at the national level has also not been evenly experienced across regions and provinces. Figure 6.1 exhibits trends in headcount poverty rates by region over the period 1988-2008. The results suggest that there are large differences in both levels and trends of poverty rates among regions. Bangkok started off with the lowest poverty ratio in 1988 and experienced a continuous fall in poverty rate throughout the period. Meanwhile, the Northeastern region had the highest poverty ratio in 1988 and seemed to be most affected by the crisis. From 2000 to 2008, although all regions showed long-term downward trends, their short-term trends differed noticeably. For instance, during 2006-2007, poverty rates in the Northeast and Central declined while those of the North, South and Bangkok went up. This implies that there are disparities in poverty reduction across regions.

Figure 6.1 Headcount Poverty Rate by Region 1988-2008



Source: NESDB (2009, Table 2)

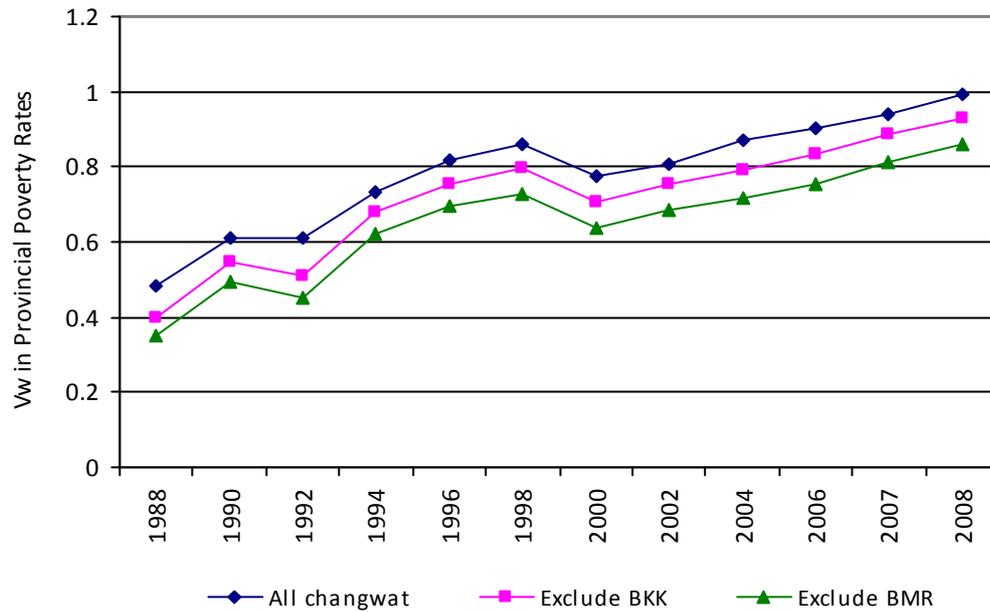
Provincial Disparities in Poverty Rates

The disparities in poverty rates across provinces can be depicted in Figure 6.2. Using Williamson's population-weighted coefficient of variation, the results show that disparities in provincial poverty rates trended upward during the boom period 1988-1996. Between 1998 and 2000, the disparities across provinces narrowed slightly. This is likely due to the effect of the crisis. As the richer provinces were harder hit by the crisis, they experienced larger increases in headcount poverty ratios. Hence, the disparities across provinces declined. From 2000 onwards, the disparities continuously widened. This coincides with the trends in GPP per capita disparities (see Table 3.4 in Chapter 3).

When Bangkok and the BMR are excluded, the magnitude of the disparities becomes lower. Nevertheless, the disparities exhibit the same trends. The upward trends in poverty disparities here also imply that the rates of poverty reduction vary across provinces. If the poverty-reduction rates were the same for all provinces, the disparities would have remained constant. An upward trend in disparities therefore reflects the different rates of poverty reduction across provinces.

Considering the two figures together, it is clear that the results in Figure 6.2 differ from those suggested in Figure 6.1. The gaps between regional poverty rates seem to narrow over time, whereas those across provinces have widened. This implies that the poverty ratios across provinces within each region vary quite significantly. In this case, the regional-level figures hide the great differences among provincial poverty within the each region. Bangkok and the BMR do not play as much role in contributing to the variations in poverty rates among provinces as they appear to do at the regional level.

Figure 6.2 Disparities in Provincial Poverty Rate in Thailand 1988-2008



Source: Author's own calculation. Provincial poverty headcount ratios used to compile Williamson's population weighted coefficients here are from NESDB (2008a, Table 4).

It is now clear that poverty ratios differ significantly across provinces and the differences have widened over the past two decades. Moreover, the rates of poverty reduction also differ across provinces. An investigation of factors that cause such large provincial differences in poverty and poverty reduction is therefore important. This issue will be examined in the next section.

6.5 The Poverty-Growth Relationship

As an important aspect of economic development, poverty has been studied quite extensively in Thailand. Most studies, however, analysed poverty from the national-level perspective. At the national level, it has become widely accepted that economic growth is crucial for poverty reduction (Warr, 2004, p. 10; Deolailikar, 2002, p. 8). Some other factors, such as education have also been found to play a role. But the number of studies at the provincial level has been exceptionally small.

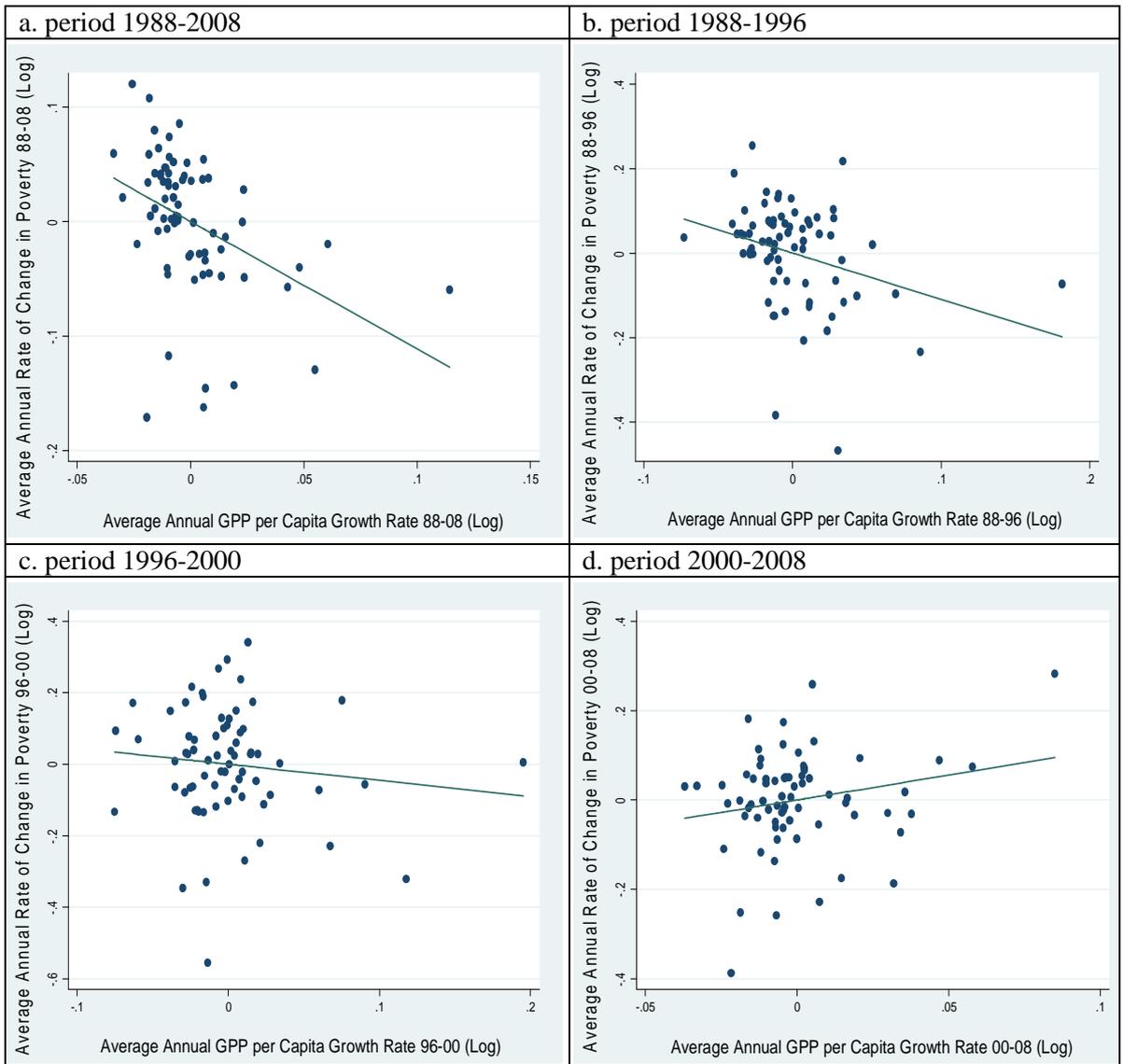
The provincial growth-poverty relationship can easily be examined using scatter plots. Figure 6.3 illustrates the scatter plots between average annual real GPP per capita growth rate and the average annual rate of change in headcount poverty ratios. The results suggest that sustained growth over a twenty-year period was highly associated with the provincial poverty reduction (see Figure 6.3a). The fitted line is significant at the one percent level. Figure 6.3 also shows scatter plots for three sub-periods. Here, the entire period is divided into pre-crisis (1988-1996), the crisis (1996-2000) and the post-crisis (2000-2008). It is obvious that provincial growth had a positive relationship with poverty reduction during the pre-crisis period (see Figure 6.3b). Nonetheless, such relationship was not evident during the crisis years (1996-2000). The fitted trend line was not significantly different from zero at the ten percent level (see Figure 6.3c).

As for the post-crisis period, the results in Figure 6.3d imply that provincial growth was not related to poverty reduction. In fact, it weakly suggests that provinces with higher growth rates experienced slower rate of poverty reduction. The fitted line is statistically significant at the ten percent level. Although surprising, this is consistent with the results found in the joint-research between the NESDB and World Bank (2005, pp. 50-52). Using provincial data, they also found that growth was not associated with poverty reduction during 1996-2002.

There may be many factors contributing to such results. One possible factor is the high level of income inequality in Thailand. Deolailikar (2002) found increasing income inequality to be a major obstacle to poverty reduction for the period 1992-1999. In his poverty-growth-inequality relationship study, he concluded that both income growth and inequality played major roles in poverty reduction in Thailand. Their relationships with poverty were, however, in opposing directions. While income growth had a strong positive effect on poverty reduction, inequality had an even stronger

negative effect. An income growth associating with an increasing inequality may cause poverty rate to remain the same or even increase. Accordingly, it is therefore possible that the result in Figure 6.3d was due to an increase in inequality during the post-crisis period. This issue will be analysed in more detail in the next section.

Figure 6.3 Provincial Poverty-GPP Growth Relationship in Thailand 1988-2008

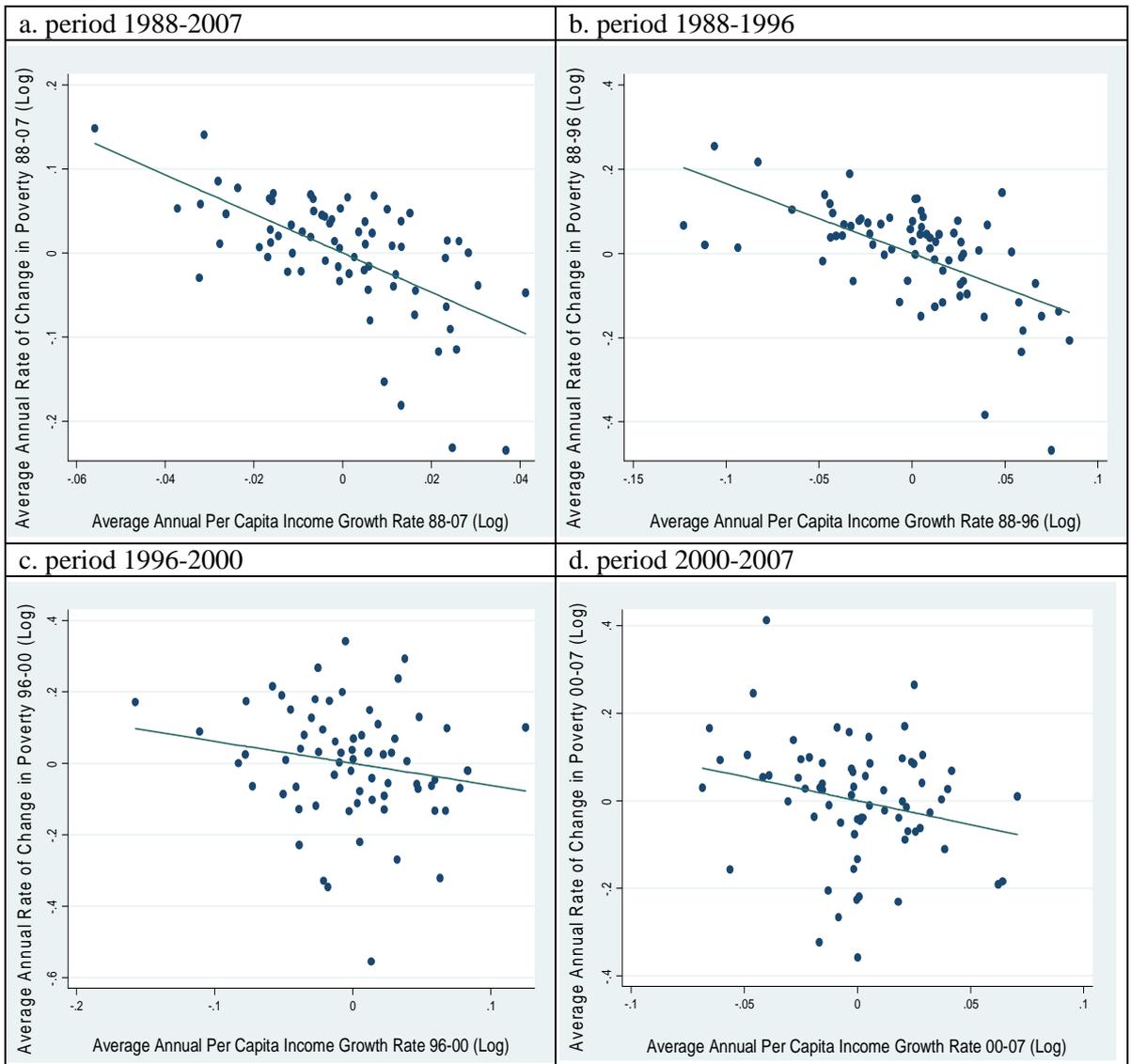


Source: Author's own calculation. Data on poverty and GPP per capita from NESDB.

Another possible explanation is that the poverty ratio may be more closely linked to household income than per capita GPP. Recall from Chapter 5 that per capita income and GPP of the same province can differ due to the Thai household income

composition. Figure 6.4 shows how household income growth associates with provincial poverty reduction. Recall that the SES did not collect data on income for year 2008, so the analysis only covers the years 1988-2007.

Figure 6.4 Provincial Poverty-Income Growth Relationship in Thailand 1988-2007



Source: Author's own calculation. Data on per capita current income from NSO, converting to real income using GPP deflator from NESDB.

The scatter plots show similar results with the poverty-GPP per capita growth relationship. This is particularly true for the entire period, the pre-crisis and the crisis sub-periods. However, the results differ noticeably when it comes to the post-crisis period. Here, the fitted line has a downward slope—contradicting the result from GPP

per capita. Using SES data, real per capita income growth rates continued to be positively associated with poverty reduction after the crisis. Nonetheless, the relationship became less strong, when comparing to other sub-periods. The fitted line for 2000-2007 was significant at the five percent level. This could also be due to the increase in inequality—which is expected to have an adverse effect on poverty reduction, during the period. Other factors may also contribute to poverty reduction. Both inequality and other factors are examined next.

6.6 Poverty Determinants

For the analysis of poverty determinants, my work directly follows Deolailikar (2002). He analysed poverty, growth and inequality in Thailand at the provincial level using SES data for 1992-1999. All variables used in his model can be extracted from the raw SES data. These variables are mean household size, mean age of household head, share of population residing in female-headed households, share of urban population, share of young population (aged 0-15 years old) and share of population aged 60 years or over. All of the above variables will be included in the regression. The data used here are from the same source as those in Deolailikar's work but with different time periods. Given the consistency in the data, the regression results should therefore be comparable between the two studies. In addition, this chapter also considers the sub-period 2000-2007. The comparison between this post-crisis period and Deolailikar's results (1992-1999) can show if poverty determinants have changed between the two periods.

In addition, variables that were included in Deolailikar (2002) are those normally considered as poverty determinants at the national level. Municipal areas, household size, dependencies in the households and educational attainment were often

seen as factors distinguishing the poor and the non-poor. In Thailand, relations of these factors to poverty at the national level have been clear and consistent over time. The relations of gender and age of household heads to poverty, on the other hand, have been ambiguous. The young and the male-headed household were more likely to be poor in 1981 but did not seem to be significantly affecting poverty in 1996 (Krongkaew, 1993; Shetty, Subbarao, Tzannatos, Rudra & Poshyananda, 1996). These are, again, from analysis at the national level. Therefore, by including all these variables in the analysis here, results will show whether these factors affect provincial poverty and, if so, in which directions.

It is important to note that, albeit the availability of raw data from 1988, the analysis will start from 1994. This is because the number of provinces was not stable prior to 1993. Recall from Chapter 5 that four additional provinces were created between 1981 and 1993. Moreover, it is more interesting to analyse the more recent years as the earlier years were already examined by Deolailikar (2002). Accordingly this chapter will cover the period 1994-2007. The sub-period 2000-2007 will also be analysed to show the poverty determinants for the post-crisis period.

The results for pooled data ‘level’ regressions between 1994 and 2007 are shown in Table 6.1. The coefficients of per capita income and Gini variables represent the growth- and inequality elasticity of poverty, respectively. The growth elasticity of poverty measures the percentage of the poor who will move out of poverty in response to one percent increase in average income (Kakwani, 2001). Similarly, inequality elasticity of poverty is defined as the percentage change in poverty rate in response to one percent change in inequality measure. The mathematical expressions of both growth- and inequality elasticity of poverty can be found in Appendix E.

The regression result suggests that the growth-elasticity of poverty for period 1994-2007 is -2.3 (Table 6.1). This means that a one percent increase in provincial per capita real income was associated with a 2.3 percent decrease in headcount poverty rate. This may at first seem to be a large impact. However, it is important to stress that the elasticity represents *percentage change* in poverty rate, not the *absolute change*. In addition, the elasticity of 2.3 for Thailand is considered to be reasonable when compared to previous researches. Deolailikar (2002) found the elasticity for Thailand between 1992 and 1999 to be 2.2. Other studies also found an average elasticity of developing countries to be between 2 and 3 (Bourguignon, 2003).

For the inequality-elasticity of poverty, the result shows a positive relationship. A one percent rise in the provincial Gini index would lead to 3.0 percent rise in poverty ratio. This value of the inequality elasticity of poverty is also consistent with the results in Deolailikar (2002). In his study, the elasticity for years 1992-1999 was 3.2. In addition, using a 1.25 US dollar poverty line, Fosu (2010) found the elasticity for East Asia and Pacific to be 2.7 for period 1980-2007. Comparing with the results of these other studies, the elasticity found here can be considered plausible.

Apparently, the two variables—per capita income and inequality—affect poverty in opposing directions. While an increase in per capita income reduces provincial poverty, inequality increases it. This implies that their effects on poverty are *ceteris paribus*. An increase in income can reduce poverty only if the inequality remains constant. If inequality also increases during the same period, poverty may decline only by a little; remain the same or even increase. This depends on which of the two elasticities of poverty dominates. Results also show that income per capita and inequality alone can explain as much as 77 percent of the poverty movements during 1994-2007 (Table 6.1).

When other variables are added, the explanatory power increases slightly to 80 percent. All variables, except share of population aged 0-15 years and that over 60 years old, are found to be significant, though at different significance levels. Results in column (2) suggest that the poverty ratio had significant positive relationships with age of household head and the share of urban population. Meanwhile, it was negatively associated with household size, share of population in female-headed households and educational attainment. The relationship between poverty and population in female-headed households is somewhat counter-intuitive. The results suggest that provinces with the larger share of population residing in female-headed households were found to have a smaller poverty rate. This seems to contradict the common understanding of gender and poverty. However, the positive relationship is consistent with Krongkaew (1993). He found female-headed households to be associated with lower poverty for the year 1981. ADB (1998) also found higher share of poor households among male-headed households than the female-headed households in 1992. This could partly be due to the fact that female-headed households are concentrated in Bangkok and its vicinity (ADB, 1998, p. 35). These provinces normally have higher per capita income and lower poverty rate than other provinces. Accordingly, provinces with higher share of female-headed households were expected to have lower poverty rates. Nonetheless, when Bangkok and its metropolitan region are excluded, the relationship between the share of female-headed households and poverty remained negative.

The negative relationship between female household heads and poverty rate could be related to the household income and size. In general, the gender gap in Thailand has been small compared to other countries (Klasen, Lechtenfeld & Povel, 2011). In 1996, per capita income of female-headed households—on national average—was higher than that of male-headed households. Based on the raw SES data, this

condition continued to hold in 2007. Note here that it is the *per-capita* income of female-headed households—not the household income—that was higher than the male-headed household. At the household-level, the income of female-headed households has still been less than that of male-headed households. However, the size of households headed by female was, on average, smaller than households headed by men. As a result, when household incomes are divided by the household sizes, the per-capita income of female-headed households were higher that of male-headed households. It is also possible that households headed by female might receive more financial assistance than households headed by men (NSO, 2011).

Findings in column (3) and the two-stage least square (2SLS) estimation gave further supporting evidence. Estimation in column (3) shows relationship between poverty and all other variables as the per capita income and Gini variables are omitted. Meanwhile, the 2SLS estimation is used to portray poverty determinants when variables are related in a more complicated way. Deolailikar (2002) found that per capita income and inequality might be endogenous to the poverty determinant regression. High level of poverty may also cause average provincial income to be low. It may also affect the inequality level. For this reason, he employed the 2SLS method with all other variables as instruments. With the 2SLS, both per capita income and Gini are treated as endogenous variables. Results are displayed in the last two columns of Table 6.1.

Comparing between column (2) and column (3), the results show consistent signs. When per capita income and inequality are omitted from the regression i.e. column (3), all variables had the same signs as those in column (2). In addition the share of population aged 0-15 years and those 60 years or over became significant variables. This means that, when per capita income and the Gini were not controlled for, a larger share of elder persons was associated with lower poverty. The result is consistent with

that of Deolailikar (2002). This seems to imply that the elder persons in Thailand helped generating income in poor households. Such an implication is in fact supported by Knodel and Chayovan (2008). They found income from work to be the second most common source of income for elder persons in Thailand, after income from children. In addition, as much as 48.2 percent of elder men and 25.7 percent of elder women were still economically active in 2007 (Knodel & Chayovan, 2008, Table 14).

Besides, there were also government policies to support financially the poor elder persons in Thailand. From 1993 onwards, elder persons have been eligible to receive a monthly allowance of 200 Baht—with priority given to the poor (Khamhom, Jongsatitmun, Sanitwong na Ayuthaya & Chuantrakul, 1999). The allowance was increased to 300 Baht in 1999. There is also an Elder Persons Fund allocated to individuals who take care of elder persons in the family. With these policies, households with elder persons received government transfers and hence constitute an asset in poor households. In other words, these policies help explain the negative relationship between the share of households with elderly and poverty.

There were also consistent results when comparing the estimates in column (1) with those using the 2SLS. The coefficients had consistent signs for both per capita income and Gini. The values of coefficients for both per capita income and Gini from the two methods were also very close. The values of R-squared in the last column further support the assumption that income was endogenous to the poverty-determinant model. However, note that the 2SLS results shown in Table 6.1 only treat income as an endogenous variable. This is because the first-stage regression of other variables on Gini suggests that these variables are weak instruments for Gini. The R-squared value for all these variables on Gini was only 0.18. In addition, the F-test critical value was only 15.50. Although it normally requires F value of more than 10 to pass the weak

instruments, 15.50 seemed to still be low. Accordingly, it is reasonable to say that they are not strong instruments for Gini. As a result, Gini is treated as exogenous variable.

Table 6.1 Regression Results for Provincial Poverty Determinants in Thailand (Pooled Data) 1994-2007

Independent Variables (Pooled 94-07)	Log of Poverty Headcount Ratio (Pooled 94-07)			2SLS Estimates	First-stage OLS on Income
	OLS Estimates				
	(1)	(2)	(3)		
Real Income	-2.3121 (0.0675)***	-2.0560 (0.1278)***		-2.3945 (0.0774)***	
Gini	2.9896 (0.2088)***	2.7013 (0.2101)***		2.9247 (0.2103)***	0.1378 (0.0676)**
HeadAge		0.0705 (0.0173)***	0.1655 (0.0213)***		-0.0396 (0.0053)***
HHsize		-0.2530 (0.1278)**	-0.3368 (0.1637)**		-0.0394 (0.0413)
Fhead		-0.8972 (0.4265)**	-3.4334 (0.5230)***		0.7357 (0.1338)***
EduAttain		-0.2247 (0.0465)***	-0.6474 (0.0514)***		0.1858 (0.0129)***
Urban		1.3833 (0.2913)***	1.4169 (0.3697)***		0.2269 (0.0936)**
PopUnder15		0.5111 (1.0531)	8.0843 (1.2636)***		-2.1714 (0.3282)***
PopOver60		-0.8186 (1.6488)	-5.9099 (2.0619)***		3.0557 (0.5174)***
Time	0.1559 (0.0244)***	0.1719 (0.0236)***	0.1694 (0.0304)***	0.1589 (0.0244)***	0.0033 (0.0076)
Time ²	-0.0098 (0.0015)***	-0.0113 (0.0015)***	-0.0118 (0.0019)***	-0.0098 (0.0015)***	0.0003 (0.0005)
Constant	21.4784	17.9115	-2.4947	22.0193	8.5723
Adjusted R ²	0.77	0.80	0.66	0.77	0.80

Note: Standard error terms are in parentheses.

*** denotes statistical significance at the 1 percent level, ** 5 percent level and * 10 percent level.

Number of observations for all regressions is 608 for the 76 provinces each year for 8 years

Source: Author's own calculation

Table 6.2 Regression Results for Provincial Poverty Determinants in Thailand (Pooled Data) 2000-2007

Independent Variables (Pooled 00-07)	Log of Poverty Headcount Ratio (Pooled 00-07)			2SLS Estimates	First-stage OLS on Income
	OLS Estimates				
	(1)	(2)	(3)		
Real Income	-2.3348 (0.0917)***	-1.9223 (0.1827)***		-2.532 (0.1035)***	
Gini	3.3145 (0.2800)***	2.926 (0.2895)***		3.1923 (0.2833)***	0.1905 (0.0829)**
HeadAge		0.0606 (0.0226)***	0.1314 (0.0270)***		-0.0279 (0.0063)***
HHsize		-0.3301 (0.1926)*	-0.6886 (0.2340)***		0.0343 (0.0556)
Fhead		-0.8411 (0.5406)	-3.5626 (0.6191)***		0.9510 (0.1477)***
EduAttain		-0.2620 (0.0653)***	-0.7243 (0.0644)***		0.2123 (0.0152)***
Urban		1.4117 (0.3900)***	2.3186 (0.4709)***		-0.1189 (0.1123)
PopUnder15		1.2558 (1.5975)	11.4821 (1.7449)***		-3.0999 (0.4310)***
PopOver60		-0.1380 (2.1701)	-1.1770 (2.6596)		1.1311 (0.6233)*
Time	0.1156 (0.1370)	0.0748 (0.1309)	-0.0944 (0.1607)	0.1243 (0.1364)	0.0660 (0.0376)*
Time ²	-0.0084 (0.0065)	-0.0075 (0.0062)	-0.0008 (0.0076)	-0.0086 (0.0064)	-0.0025 (0.0018)
Constant	22.2070	18.3601	0.7561	22.9353	7.7934
Adjusted R ²	0.78	0.80	0.70	0.78	0.81

Note: Standard error terms are in parentheses.

*** denotes statistical significance at the 1 percent level, ** 5 percent level and * 10 percent level.

Number of observations for all regressions is 380 for the 76 provinces each year for 5 years.

Source: Author's own calculation

In order to see whether the poverty determinants have changed after the crisis, the regressions covering period 2000-2007 are considered. Results for this post-crisis period are shown in Table 6.2. Similar to the results for the entire period (1994-2007),

per capita income and Gini continued to show strong relationships with poverty. The values of both growth- and inequality-elasticity of poverty also remained stable, with that of inequality slightly larger than the results for 1994-2007. When all other variables are added to the regression, as shown in column (2), the results remained consistent with those in Table 6.1. The relationship of each variable to poverty showed the same sign for both periods. The average age of the household head and the share of urban population had positive correlation with poverty. Meanwhile, average household size, share of population residing in female-headed households and educational attainment had a negative association with provincial poverty. The results for the 2SLS are also similar to those of the period between 1994 and 2008.

In summary, the poverty determinants for the post-crisis period did not differ significantly from those for the entire period. Even the magnitudes of the per capita income and inequality elasticities remained around the same levels. It can be concluded that the crisis did not have a significant effect on provincial poverty determinants. The effect of inequality on poverty has slightly increased. This means that a percentage point increase in inequality was associated with a higher rise in the provincial poverty ratio after the crisis. With the same growth-elasticity of poverty, it would imply that a higher income increase was required in order to achieve the same rate of poverty reduction.

6.7 Government Policies and Critics

Anti-poverty Policies

The targeted anti-poverty policies in Thailand began in 1982. Anti-poverty policies were first clearly stated in the Fifth National Economic and Social Development Plan (1982-1986). Although policies in the first four National Development Plans (1961-

1966, 1967-1971, 1972-1976 and 1977-1981) helped improve the welfare of the poor, they were not aimed directly toward the poor (TDRI, 2011). This was partly because the first four Plans emphasised largely on stimulating economic growth via infrastructure development. Although poverty eradication was included as part of the Fourth Plan, it was only seen as a mechanism to achieve the income-distribution target (NESDB, 1977).

In the Fifth Plan particular attention was paid to reducing rural poverty (NESDB, 1982). The main anti-poverty project during the Fifth Plan was the Rural Job Creation Programme (RJCP). Under the project, rural villagers were hired to build basic facilities such as irrigation, transportation networks and rice banks in their own communities. There was also an in-kind transfer targeting the poor, which was implemented by the Ministry of Public Health in 1984. The low-income cards were given to the poor households enabling them to receive free medical services. The programme covered approximately 20 percent of population (Shetty et al., 1996).

The Sixth Plan (1987-1991) basically continued on with the poverty-reduction projects implemented in the Fifth Plan. Between 1988 and 1992, the Green Earn Programme (GEP) was implemented in order to specifically improve the living conditions in the Northeastern region. In contrast with the Sixth Plan, the Seventh Plan (1992-1996) shifted policy toward distribution of income and growth across regions as means to alleviate poverty. Accordingly, many new projects were created under this Plan. The RJCP and GEP were replaced by Tambon Development Programme (TDP), which extended the coverage of the programme beyond facility construction. The TDP also covered career development, environmental conservation, strengthening of rural institutions as well as inter-Tambon development (TDRI, 2011). In addition, the School

Lunch Programme was enacted in 1992 to provide free lunch to students from poor households.

In addition, the Poverty Alleviation Project (PAP) was formed in 1993 to lend interest-free loans to the poor. Under this project, households with per capita incomes less than 5,000 Baht per year can borrow. The loans have to be used for income-generating activities such as buying seeds, domestic manufacturing production and retail trade. There were also cash-transfer programmes implemented since 1993. These programmes include monthly allowances to the elderly and the poor families. Similarly, 12,500-Baht village funds were set up in 1995. The programme gave village committees authority to decide on how to use the funds—with a guideline that assistance was intended to help poor households in emergencies. All of these programmes were carried on through the Eighth Plan (1997-2001) despite the economic crisis.

In 2000, the Thai government committed to the Millennium Development Goals (MDGs) along with 188 other countries around the world. According to the MDGs, the Thai government aimed at eradicating extreme poverty by the end of the decade. At the same time, the new government led by Thaksin Shinawatra implemented several populist policies favouring the poor. These policies include the Village Fund, People's Bank, Debt Suspension and Debt Reduction for Small Farmers, and the 30-Baht Health Care Scheme.

Under the Village Fund, each village received a one million-Baht fund from the government to be used as short-term loans to the villagers in need. The borrowers were expected to pay back the loans within one year. Along with the funds, the village committees were set up to administer and manage the funds. People's Bank was the programme operated by the Government Savings Bank. The poor who had permanent addresses could open a savings account for two months before being eligible to borrow.

Meanwhile, the debt-suspension and debt-reduction for small farmers was set up for farmers in debt to the Bank of Agriculture and Agricultural Cooperatives (BAAC). Farmers with no more than 100,000 Baht debt can choose to either suspend the debt for 3 years or reduce the debt burden. For those with the latter option, the government agreed to pay 3 percent of the interest rates incurred to the farmers' debts for 3 years. This means that farmers who normally had to pay the interest rate of 8 percent to the BAAC would have to pay only 5 percent.

As for the 30-Baht Health Care Scheme, it was a universal health care scheme enacted in April 2001. Everyone not covered by the Social Security Scheme were eligible to receive a 30-Baht card. The cardholders only paid 30 Baht for their medical services they received at participating health-care units (MOPH, 2006). In 2007, according to the Constitution of the Kingdom of Thailand 2007, the scheme was made free for everyone (MOPH, 2010).

Policy Evaluation

Since the start of targeted anti-poverty policies in 1982, the government budget for these programmes has increased considerably. The budget rose from approximately 868 million Baht in FY1982 to 35 billion Baht in FY1999 (NESDB & World Bank, 2005, p. 48). The budget further increased after several new policies were introduced in 2001. As of FY2007, the budget for anti-poverty policies stood at 71.9 billion Baht. This accounted for 7.2 percent of total government expenditure (NESDB, 2008b, pp. i-ii).

Despite continuous increase in the government expenditure, the programmes normally suffered from low coverage (Shetty et al., 1996; NESDB & World Bank, 2005; NESDB, 2008b). This was particularly true for programmes implemented prior to

2001. As of 1995, the Tambon Development Programme could only create 30,000 person days of unskilled employment. With the wage set at the national minimum wage rate, which was higher than the provincial rates, the project ended up attracting non-poor. Similarly, the in-kind transfer programmes i.e. the low-income health card and the school lunch programme also had low coverage. Although the programmes were more specifically geared toward the poor, they still experienced leakage to the non-poor (Shetty et al., 1996).

Meanwhile, the cash-transfer programmes to elderly poor and poor households seemed to succeed in reaching the target groups. However, the small budget allocated for the programmes not only resulted in low coverage, but were also unable to pull most recipients out of poverty. The Poverty Alleviation Project also set an income criterion that was low enough to reach only the very poor. However, the evaluation by Shetty et al. (1996) found that a third of participants suffered declines in incomes while in the programme.

With a substantial increase in the budget, the anti-poverty programmes after 2001 succeeded in solving the low-coverage problem. The universal health care scheme covered 96.7 percent of the total poor in Thailand in 2007. Similarly, the school lunch programme covered 67.4 percent of all poor students (NESDB, 2008b, p. v). Nevertheless, by covering large populations, some of these new programmes ended up benefiting the non-poor (NESDB & World Bank, 2005; NESDB, 2008b). Both the Village Fund and the debt suspension and reduction programmes seemed to benefit the non-poor as much as the poor (Siamwalla & Jitsuchon, 2007). Table 6.3 summarises the accessibility of the poor and non-poor to these services.

Given the above policy evaluation, it is apparent that there is still room for improvement in the anti-poverty policies in Thailand. This is particularly true for the

programme targeting. Better selection and monitoring procedures are required for these programmes to reach the poor more than the non-poor. Perhaps the allocation of the anti-poverty budget should be proportional to the density of the poor in the area rather than an equal proportion to all areas. In addition, programme evaluations should be systematic in order to continuously improve the policy targeting toward the poor (Shetty et al., 1996; NESDB, 2008b).

Table 6.3 Accessibility to Public Services in 2007

Service	Non-poor	Poor	Total
Elderly allowances	80.4	19.6	100.0
Disabled allowances	78.9	21.1	100.0
Scholarships	90.9	9.1	100.0
Education loans	99.8	0.2	100.0
People's Bank	97.9	2.1	100.0
Village Fund	91.2	8.8	100.0
Other funds	89.2	10.8	100.0

Note: NESDB data based on the households Socio-economic Surveys (NSO)

Source: NESDB (2008b: Table 3)

6.8 Conclusion

This chapter looked at provincial poverty in Thailand. It started off with the definition of poverty and how it has been measured in the Thai context. Then, the chapter examined provincial poverty situation over the past two decades. While overall poverty in Thailand seemed to be declining overtime—except for the crisis—the provincial disparities in poverty constantly increased. When Bangkok and the BMR were excluded, the disparities continued to show increasing trends. These trends were similar to the disparity trend in GPP per capita, as shown in Chapter 3.

One commonly claimed benefit of sustained economic growth is that it reduces overall poverty. The analysis then investigated this relationship at the provincial level

for 1988-2008. Using GPP per capita, the evidence suggested a strong positive relationship between provincial growth and poverty reduction during the boom period (1988-1996). Nonetheless, there was no significant relationship between the two after the crisis (2000-2008). On the other hand, provincial growth was found to be strongly associated with poverty reduction for all periods when using income data from household surveys. With these results, the analysis took a further step by examining the determinants of provincial poverty.

The regression results suggested that income as well as inequality were crucial determinants of poverty. Per capita incomes seemed to help reduce provincial poverty rates while inequality adversely affected poverty rates. This suggests that income growth can only reduce poverty if the level of inequality remains unchanged or decreases. In addition, educational attainment, household size, age of household heads, share of population residing in female-headed households and the share of urban population to the total provincial population also contributed to poverty differences across provinces. The 2SLS regression then further suggests that poverty also simultaneously determined per capita income at the provincial level. The analysis then reviewed the anti-poverty policies implemented in Thailand so far.

Findings in this chapter provide a better understanding about provincial poverty over the past two decades. They also highlighted important factors which contributed to poverty in Thailand. Provincial growth undeniably plays a crucial role in reducing poverty at provincial level. This implies that stimulating growth at provincial level can lead to provincial poverty reduction. While Chapter 5 already examined several factors determining provincial growth, there seem to be some other important factors that the analysis failed to capture. One possible alternative explanation, it has been argued, could be agglomeration forces. The issue of whether this is the case for Thailand, and to

what extent agglomeration explains provincial income disparities will be investigated in the next chapter.

CHAPTER 7

Agglomeration Economies and Provincial Output Divergence

7.1 Introduction

This chapter tries to explain differences in output per capita across provinces using economics of agglomeration approach. The analyses in Chapter 5 showed that there was provincial GPP per capita divergence during the boom and the post-crisis periods. This implies that initially poor provinces grew at slower rates than the initially richer ones. Agglomeration theory proposes that this could be due to the agglomeration forces stimulating growth in the initially rich provinces. Both firms and labour benefit from clustering together in big cities, which normally locate in rich provinces. This in turn attracts more firms and labour into such already-established regions. As a result, the growth of these provinces becomes self-reinforcing (Krugman, 1995, pp. 46-47).

This agglomeration theory seems to fit well with economic development patterns in Thailand. The country has long been known for its concentration of urbanisation in and around Bangkok (Poapongsakorn & Fuller, 1997, p. 145; Webster, 2005, pp. 289-292). Although there were policies driving economic activities away from Bangkok, they could at best move activities to the capital's surrounding areas. Since the early 1990s, factories started to relocate to areas out of Bangkok. However, the relocation was only toward the Eastern Seaboard and the Central region. All of these provinces are within proximity of Bangkok.

While both Thai researchers and policy-makers had been well aware of the dominance of Bangkok, there was not much empirical research on this issue. Perhaps

the first empirical analysis on agglomeration in Thailand was done by Southichack (1998). He examined the interaction between agglomeration- and congestion forces using provincial employment density and labour productivity. The results suggested that agglomeration forces were causing concentration of industrial activities around Bangkok during 1975-1995. In addition, provincial labour productivity was also found to be negatively associated with the agricultural share of GPP and positively related with infrastructure and human capital stock. These relationships were consistent with the situation described in agglomeration theory.

While the industrial sector continued to concentrate in areas close to Bangkok, the economic structure of the Thai economy changed after the crisis. In response to the devaluation of the Thai baht, manufacturing for exports expanded. At the same time, manufacturing for domestic consumption struggled. Some sectors, such as construction has not yet reached its pre-crisis level. On the other hand, services sectors—particularly the tourism industry have increased their importance as growth drivers. Consequently, areas that saw growth in tourism started to develop into new cities. In addition, regional integration such as ASEAN, the East-West Corridor and Greater Mekong Sub-region¹ (GMS) also stimulate growth in the trade sector. Together with economic growth in neighbouring countries, this enhanced development of border cities (Patmasiriwat & Pachuei, 1999).

With these changes in the Thai economy after the crisis, the agglomeration effect on provincial growth may have also changed. It is therefore interesting to re-examine the interaction between agglomeration and congestion effect across provinces in Thailand once again. Given the rise the New Economic Geography in the 1990s, the

¹ The GMS covers six countries along the Mekong River. It includes the Yunnan Province of China, Lao PDR, Myanmar, Thailand, Cambodia and Vietnam. The area was first known as Hexagonal Growth Area, which was established in 1992 (Krongkaew, 2004).

issue of agglomeration has received much attention worldwide. As for Thailand, there were also research works on this issue in recent years, although very limited. Sajarattanachote (2006) analysed the relationship between industrial agglomeration and spillovers from foreign direct investments to peripheral areas. According to the new economic geography, spillovers from industrial-concentrated urban to peripheral areas are possible via forward- and backward linkages. Using GPP per capita and firm-level survey data, he found limited spillovers from FDI firms to peripheral areas during the period 1981-2003. This means that the positive externalities only occurred within and around the industrial areas. Here, the results suggest that agglomeration effects continued to accelerate provincial income divergence.

Similarly, Preechametta (2009) examined the existence of the increasing returns hypothesis under the new economic geography theory in Thailand. Using manufacturing sector growth at provincial level, he found that increasing returns existed during the years 2000-2005. This seems to be consistent with the implication drawn from Sajarattanachote (2006). Despite the existence of these two research works, there is still room for more study on agglomeration in Thailand after the crisis. Both works only looked at the manufacturing sector. Although this is sensible as agglomeration arises from clustering industrial activities, it would also be interesting to analyse the process from a wider perspective. The approach taken by Southichack (1998) seems to offer this possibility. Since no empirical analysis of this type is available for the period after 1995, this chapter therefore fills this gap.

The chapter is organised as follows: section 7.2 looks at the primate city of Bangkok and how it has changed over time. Government policies to de-concentrate industries away from Bangkok will also be discussed. Then section 7.3 reviews the theory on agglomeration and the new economic geography. Model specification and

data description are given in section 7.4. Section 7.5 analyses the regression results and, finally, section 7.6 concludes.

7.2 Agglomeration in Thailand

Thailand is considered as a prime case study on agglomeration. The country has been known for the dominance of Bangkok. The primacy of Bangkok had been very extreme. There are only a few other cities in the world considered as equally primate (Kittiprapas, 1999a; Webster, 2005). Bangkok has dominated the country's urban development throughout the process of industrialisation since the 1960s. Efforts to develop other urban centres far from Bangkok in the 1980s and 1990s seemed to be unsuccessful. Industries only moved to provinces within proximity of Bangkok. As a result, the benefits of rapid economic growth had been unevenly concentrated in and around the capital city.

The primacy of Bangkok is largely due to its geographic location as well as to economic history. Bangkok is located right in the middle of the country which is also a delta plain of the Chao Praya River—the main commercial route. It also is connected to the sea through the Gulf of Thailand. This suggests that the location of Bangkok by itself is strategically advantageous for both international trade and centralisation of power. Historically, Bangkok became the capital of Thailand in 1782 when the Chakri Dynasty was founded. From the beginning, as Glassman (2004) observed, the dynasty relied on trade. The government drew income from exporting rice which was produced extensively on the Central Plain near Bangkok. To prevent regional powers rising against them, the early kings of Chakri Dynasty centralised power in Bangkok. They

also suppressed activities in areas that had potential for economic agglomeration (Biggs et al., 1990). This consequently induced the primacy of Bangkok.

Then, Thailand integrated into the world economy when the Bowring Treaty was signed with Britain in 1855 (Sajarattanachote, 2006). As exports became a key driver of the Thai economy in the 19th centuries, Bangkok grew even further. Meanwhile, the outlying regions continued on subsistence farming with limited role in exports. It was not until the launch of the First National Economic Plan in 1961 that the roads to other parts were built (Biggs et al., 1990). While the First- and Second Plans (1961-1966 and 1967-1971) emphasised infrastructure development and industrialisation, most activities took place in and around Bangkok.

As problems of income disparities between Bangkok and rural areas got worse, the Third Plan (1972-1976) started to look at industrial dispersion. Tax incentives as well as industrial estates were set up to encourage industries toward outlying regions. However, industries seemed to move only to the surrounding provinces. The failure to attract industries to areas far from Bangkok was believed to be due to the first-mover agglomeration economies of Bangkok (NESDB & World Bank, 2010). By the time the deconcentration policies were implemented, Bangkok already benefited from much better transport facilities, economies of scales and centralised administration (Biggs et al., 1990). In order to effectively drive industries away from Bangkok, the Fifth Plan (1982-1986) initiated the development of the Eastern Seaboard. Given a mega-infrastructure development under the Eastern Seaboard programme, it was successful in drawing industries away from Bangkok. However, it is likely that the success was partly due to its close proximity with Bangkok.

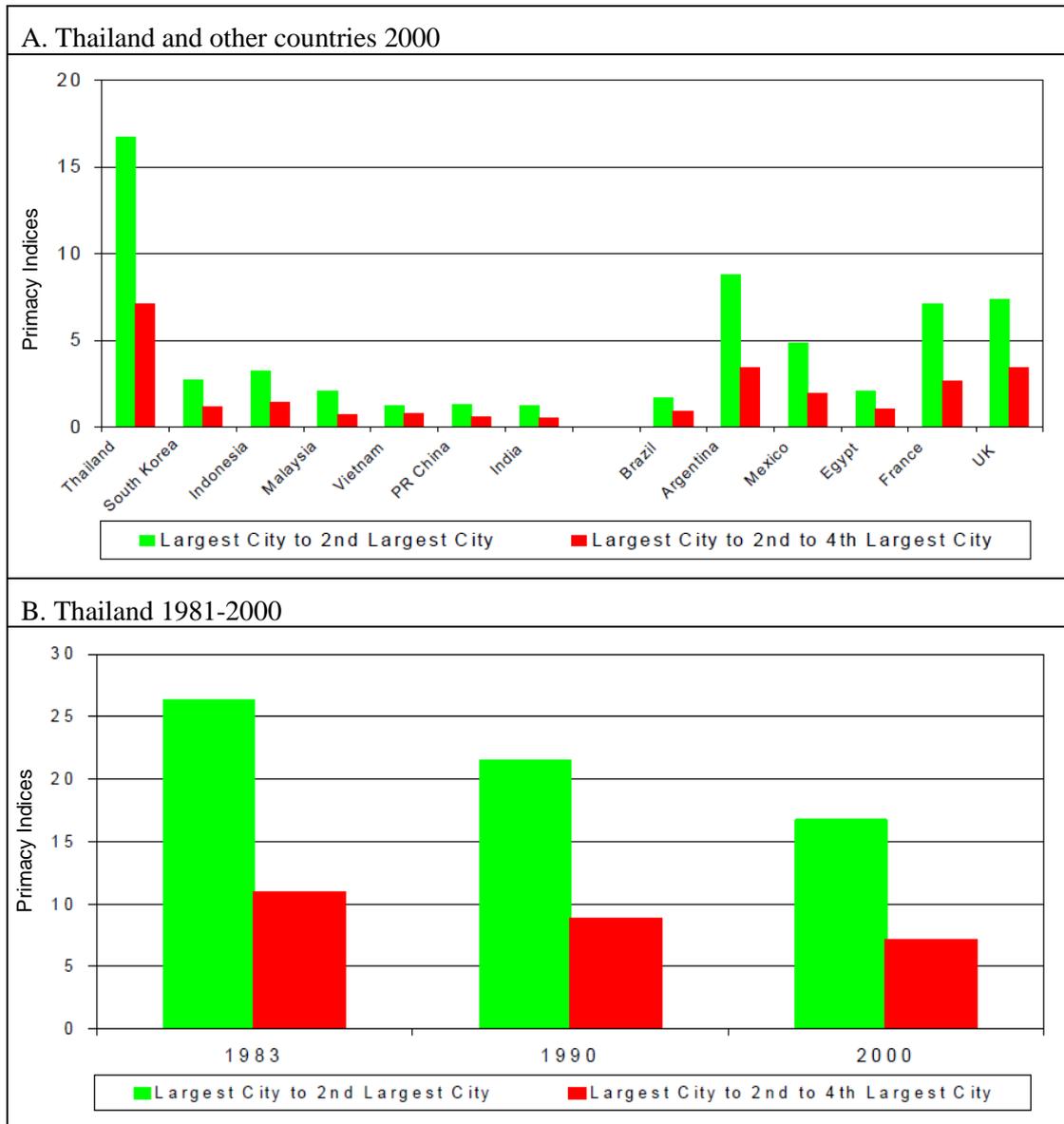
With the relocation of industries out of Bangkok toward surrounding provinces and the Eastern Seaboard, the primacy index began to improve. The primacy index

presents the numbers of population of the largest city compared to that of the second-largest city (or to that of the second- to fourth-largest cities combined). As shown in Figure 7.1B, population of Bangkok was 27 times larger than the urban population of Nakhon Ratchasima—the second largest city in 1983. The index fell to 17 times in 2000. However, the second largest city was no longer Nakhon Ratchasima, but Samut Prakan—the province adjacent to Bangkok. In fact, both second- and third-largest cities were in Bangkok’s vicinity (Richter, 2006). This suggests strong agglomeration effects causing firms to continue to locate near Bangkok despite better incentives to locate in outlying regions.

It is apparent that the growth of cities surrounding Bangkok, and later the Eastern Seaboard, contributed to the fall in primacy index. As these provinces grew rapidly, the gap between this so-called *Bangkok urban region*² and the rest of the country widened. To counter the strong pull of Bangkok, the Thai government kept on promoting regional urban growth centres. Following the Third Plan (1972-1976), the government continued to build industrial estates as well as transportation networks in the outlying regions during the Fourth- to Seventh Plans (1977-1981, 1982-1986, 1987-1991 and 1992-1996). Investment promotion policy was maintained throughout the years with major improvements in 1987. New investment zones were assigned to all provinces. The incentive packages were granted in reversal to distance from Bangkok. That is, the further was the firm located from Bangkok, the better the tax incentives and other privileges the firm could enjoy.

² According to the NESDB and World Bank (2010), the Bangkok urban region is comprised of provinces in the BMR (except Nakhon Pathom), three provinces in the East which made up the Eastern Seaboard and Phra Nakhon Si Ayuthaya. Provinces in the BMR are Nonthaburi, Nakhon Pathom, Pathum Thani, Samut Prakan and Samut Sakhon. Provinces in the Eastern Seaboard are Chon Buri, Chacheongsao and Rayong.

Figure 7.1 Primacy Indices



Sources: The graphs are from Richter (2006, Figure 18).

The Thai economy fell into economic crisis in 1997—the beginning of the Eighth Plan (1997-2001). As a result of the crisis, Thailand had to, instead, implement adjustment programmes suggested by the IMF—particularly on financial and public sectors. At the same time, the crisis also brought about structural changes in the Thai economy. Owing to the devaluation of the Baht, exports became even more important as the main driver for growth. The tourism sector was booming, partly as a result of

government's tourism-promotion policy. Economic cooperation with neighbouring countries was also emphasised, stimulating trade—hence, generating growth in the border towns.

Coming out of the crisis, the Ninth- and Tenth Plans (2002-2006 and 2007-2011) emphasised provincial cluster development policy. In addition, projects under the Greater Mekong Sub-region (GMS) cooperation began to materialise. The East-West Corridor Road Project linking Lao PDR, Myanmar, Thailand and Vietnam was approved by the ADB in 1999 (Krongkaew, 2004). Then, in 2001 the GMS country members also agreed on 11 flagship programmes to be developed in the next decade (see Appendix F). Among them, the East-West Corridor, together with the North-South and the Southern Corridors were selected as the three priority projects. All of them involved Thailand. The construction of roads on the East-West Corridor was completed and officially opened on June 11, 2009. Construction on the other two corridors is in progress. Once the trade facilitation is completed, it is expected to boost growth in regional cities on the corridors. For example, through the East-West Corridor, Khon Kean will become attractive for export industries. This is because the corridor will connect the Northeast region to Danang Sea Port, which is closer than Bangkok or the Eastern Seaboard.

As a result of these post-crisis changes, together with decades of government attempts to promote regional cities, results began to show. Migration destinations became more diverse. Instead of moving to Bangkok, regional centres such as Hat Yai in the South, Chiang Mai in the North, Nakhon Ratchasima and Khon Kean in the Northeast and the Eastern Seaboard became attractive. Moreover, tourism areas such as Phuket, Samui and Hua Hin also saw large in-migration (Webster, 2005). This suggests

that urban development in Thailand has changed noticeably, particularly after the crisis. Despite that, some researchers believed Bangkok and its surrounding areas will continue to dominate the growth of Thailand (Webster, 2005; NESDB & World Bank, 2010). Whether this is the case or not, the role of Bangkok in Thailand's urbanisation context has clearly changed. It is therefore important to examine in which direction the urbanisation pattern has changed after the crisis.

7.3 Theoretical Background

When geography is considered in the field of economics, economists have often asked why economic activities are distributed unequally across space. In response to this question, several branches of modern economics emerged. Recall from Chapter 2, these fields are location theory, urban economics, industrial organisation, economics of agglomeration and new economic geography. In addition, new theories of international trade and economic growth now also consider the geographical dimension. Among these economic fields, the theory of agglomeration tries to explain such uneven distribution of economic activities through two simultaneous opposing forces. The agglomeration (or centripetal) forces pull resources into the cities while dispersion (or centrifugal) forces drive the resources away from the centres.

There are several forces that lead to agglomeration. Perhaps the most important ones are (1) transport and resource advantages, (2) increasing returns to scale, (3) positive externalities (Fujita, 1988) and (4) spatial competition (Fujita & Thisse, 1996). Obviously, firms as well as labour cluster in cities in order to minimise transport costs as well as being close to a large pool of resources. The recent technological development and high-speed transportation infrastructure may imply a declining role of

this factor to agglomeration. However, Fujita and Thisse (2002) argued that “*agglomeration happens provided that transport costs (in the city) are below some critical threshold*” (p.4). In addition, Krugman (1993b) suggested that transportation may continue to generate agglomeration forces due to economies of scale in transportation. Buses can run more often in a day as there are higher numbers of customers in big cities.

Increasing returns to scale suggest that cities normally have a large variety of specialised, non-tradable intermediate services as well as the final goods. These specialised products and services have to locate in the city in order to have enough demand. On the other hand, having a large variety of such inputs enhances productivity of final products. This leads to higher specialisation, which in turn drives the wage upward (Mills, 1967; Fujita & Thisse, 2002). The higher wage then attracts more resources to flow in, stimulating further growth. As for externalities, the term normally refers to benefits which are external to the firm. Externalities are generated through interactions among firms, typically in the form of information exchanges (Fujita & Thisse, 1996). Having a public-good characteristic, information used by one firm does not reduce the amount available to others. Being close to other firms then allows each firm to benefit from information-sharing with other firms through interpersonal communications. Accordingly, firms would prefer to cluster together. New firms would also prefer to be in the cluster in order to benefit from the externalities. As more firms are concentrated together, it creates even bigger externalities and hence, stimulates further growth in the area.

For spatial competition, it is suggested that firms in imperfect market competition will choose to be close to the market. Hotelling (1929) found that price

competition is a centrifugal force pushing firms to be away from others. On the other hand, when products are differentiated such that firms are able to set their own price, they will choose to agglomerate at a market centre. It is widely argued that most firms differentiate their products from others to some extent. By differentiating their products from the rest of the same industry, firms are able to avoid getting into the price war. Under this monopolistic competition, each firm can—to a certain degree—set its own price. In this case, firms will prefer to gather at the centre so that they are close to consumers.

All these four forces normally co-exist and work together to generate agglomeration effects. Along with these agglomeration forces, there are also dispersion forces. In contrast to agglomeration, dispersion forces push firms and households away from urban centres. These forces include congestion, high land rents, and price competition. High concentration of economic activities also creates pollution and high crime rates. Firms and households tend to move out of the cities if these dispersion forces outweigh agglomeration forces.

The magnitudes of agglomeration as well as congestion effects are normally associated with the size of the city. That is, the size of city or industry determines the equilibrium between the two opposing forces. For example, the size of market demand is expected to give rise to the variety of specialised intermediate- as well as final products. This will, in turn, enhance increasing returns to scale. Likewise, the economies of scale in transportation also seem to depend on the size of the city. At the same time, the dispersion forces increase with the city size.

Ciccone and Hall (1996) argued that density, rather than size, of the city is a more accurate factor determining the two forces. In their study, they used employment

per physical space (acres) as a measure of density, which determines the labour productivity within each state of the USA. Following Ciccone and Hall method, Southichack (1998) elaborated that size may be important for returns to scale and variety of intermediate- as well as final products. However, density seems to have more effects on externalities and distance-cost saving. An increase in population density leads to a decline in transport costs and search costs. Higher density also reduces learning costs for producers e.g. it is easier and cheaper to attend conferences held in the area. In addition, the higher density of workers and firms in the same industry increases the knowledge spillovers in the industry. Aside from agglomeration effects, density simultaneously generates dispersion effects. An increase in density creates congestion and drives up the land price.

The work of Ciccone and Hall (1996) has since been widely adopted for empirical studies on agglomeration. Following the conventional practice, the method used in this chapter will also be based on Ciccone and Hall (1996). In addition, Southichak (1998) adjusted the Ciccone and Hall model to better suit the case of Thailand. He proposed that in the case of Thailand, it was important that agricultural labour was differentiated from non-agricultural labour. Accordingly, the analysis in this chapter will incorporate these sectoral differences into the Ciccone and Hall's model. In addition, Ciccone and Hall (1996) provided evidence that density rather than size of employment is a better determinant of productivity. To see if this is also the case in Thailand, this chapter will also compare the role of size to that of density in determining agglomeration economy.

Before moving on, it is worth noting that the Ciccone and Hall model is regarded as a neoclassical model. It is based on Cobb-Douglas production function with idealistic

assumptions—to be discussed in the next section. This means that while the model allows us to see the interaction between agglomeration and congestion effects, it also limits us to analyse only factors included in the model. Accordingly, as Martin (1999) puts it, *'messy social, cultural and institutional factors involved in spatial economic development are neglected.'* In addition, as the model is based on production function, it can only explain why productivity—not income—differs across provinces. Although provincial labour productivity and per capita GPP are closely related in the case of Thailand, they can differ significantly from provincial income per capita. Recall that the difference between per capita GPP and income was extensively discussed in Chapter 5. Despite these limitations, the use of the model is still beneficial in a sense that it at least provides us with empirical evidence on agglomeration. Nonetheless, the results should be interpreted with these limitations in mind.

7.4 Methods and Data

Method—Model Specification for Agglomeration

To empirically investigate agglomeration economies, most studies used data on labour productivity instead of per capita output. This is because the models are based on the production function, which is more closely related to the productivity. In addition, productivity and per capita output are normally closely related. For Thailand, the simple correlation between GPP per capita and labour productivity is 0.952. This means that provinces with higher output per worker tended to also have higher output per capita.

The models used here will be based on methods and concepts introduced by Ciccone and Hall (1996) and Southickack (1998). In their study, Ciccone and Hall (1996) started off the analysis at the county level—a geographic subdivision of the

states in the USA. This is, however, not applicable to the case of Thailand as the labour data are not available at the district level—the level equivalent to US county. Meanwhile, Southichack (1998) adjusted the Ciccone and Hall model by distinguishing between agricultural and non-agricultural labour. He argued that this is necessary because the agricultural sector is the major employment sector in Thailand. Despite its declining role in the Thai economy, agricultural sector still employed 39.7 percent of Thailand’s total labour force³ in 2008. Given the availability of sectoral data at provincial level, the models here will start off at the provincial sectoral level.

Based on the simplest Ciccone and Hall model, the effects of externalities are shown through the relationship between density and productivity. The model assumes that externalities depend multiplicatively on output density. Output density is measured as output per unit of land (y/a). The production function of sector j in province i describing output (y) produced by a unit of land (a) and l workers is given by

$$f_j(l, y, a) = l_j^\alpha \cdot \left[\frac{y_j}{a_j} \right]^{(\lambda-1)/\lambda} \quad (7.1)$$

where:

- y_j = output of sector j in province i
- a_j = land area of sector j in province i in Rai
- l_j = number of workers in sector j of province i
- α = a constant representing elasticity of output with respect to employment
- $(\lambda - 1)/\lambda$ = a constant representing elasticity of output with respect to density

³ The figure is the averaged share of agricultural labor force from four rounds of 2008 *Labor Force Surveys* conducted by NSO. The four rounds were for four quarters of the year. This means that the surveys cover all seasons including harvesting season and the slack season.

The constant α represents the effect of congestion i.e. dispersion force. It is expected to have a value less than one ($\alpha < 1$). This is because the addition of more labour into a unit of land can generate inverse effects on productivity. On the other hand, the constant $(\lambda - 1)/\lambda$ represents the agglomeration effect. The value of λ is expected to be greater than one ($\lambda > 1$) as it measures the positive effect of adding more labour into a unit of land.

Assume that workers are distributed evenly across sectoral land area within each province, the sectoral output is:

$$y_j = a_j \cdot \left(\frac{l_j}{a_j} \right)^\alpha \cdot \left[\frac{y_j}{a_j} \right]^{(\lambda-1)/\lambda} \quad (7.2)$$

Solving the equation for output per Rai yields:

$$\frac{y_j}{a_j} = \left(\frac{l_j}{a_j} \right)^\gamma \quad (7.3)$$

where $\gamma = \alpha\lambda$ representing an interaction between agglomeration effect (λ) and congestion effect (α). If $\gamma > 1$, the agglomeration effect dominates the congestion effect. This means that an increase in density leads to higher output per Rai.

From here, the total provincial output can be derived by aggregating the sectoral output. That is, $Y_i = \sum l_j^\gamma a_j^{(1-\gamma)}$ where Y_i is the total output of province i . Dividing both sides by total labour (L_i) gives average labour productivity as follows:

$$q = \frac{Y_i}{L_i} = \frac{\sum l_j^\gamma \cdot a_j^{1-\gamma}}{L_i} \quad (7.4)$$

Accordingly, the density index is defined as:

$$D_i(\gamma) = \frac{\sum l_j^\gamma \cdot a_j^{1-\gamma}}{L_i} \quad (7.5)$$

Now, let D be the national average number of workers per Rai and d_j be the number of workers per Rai in sector j of province i . The density index can be written as:

$$D_i(\gamma) = D^{\gamma-1} \left(\frac{D_i}{D} \right)^{\gamma-1} \cdot \frac{\sum l_j \cdot \left(\frac{d_j}{D_i} \right)^{\gamma-1}}{L_i} \quad (7.6)$$

Here, the density index depends on relation of average provincial density to the national density, as well as the sectoral density within each province. The latter factor represents the distribution of workers across sectors within a province. If $\gamma > 1$, then provinces with higher average density relative to the national average tend to have higher labour productivity. Similarly, provinces with higher inequality in labour distribution across sectors are also likely to have higher labour productivity.

So far, the model assumed that factors of production only consist of labour and land. Capital, both physical and human capital, can be added to the model and equation (7.1) becomes:

$$f_j(e, l, k, y, a) = T_i [(e_j l_j)^\beta \cdot k_j^{1-\beta}]^\alpha \cdot \left[\frac{y_j}{a_j} \right]^{(\lambda-1)/\lambda} \quad (7.7)$$

where e is the measure of human capital, k the amount of physical capital, T a Hicks-neutral technology multiplier and β a labour share. Following similar rearrangements as equation (7.2) and (7.3) yields the function of output per Rai:

$$\frac{y_j}{a_j} = T_i^\lambda \left[\left(\frac{e_j l_j}{a_j} \right)^\beta \cdot \left(\frac{k_j}{a_j} \right)^{1-\beta} \right]^\gamma \quad (7.8)$$

where $\gamma = \alpha\lambda$. Assume that rental price of capital (r) is the same throughout the country. Then, the capital demand can be derived from equation (7.7) as:

$$k = \frac{\alpha(1-\beta)}{r} \cdot y \quad (7.9)$$

Substituting capital demand in the equation (7.8) with simplification to the results yields:

$$\frac{y_j}{a_j} = \phi T_i^\omega \left(\frac{e_j l_j}{a_j} \right)^\theta \quad (7.10)$$

where:

$$\begin{aligned} \phi &= \text{a constant} \\ \omega &= \frac{\theta}{\alpha\beta} \text{ the elasticity for technology multiplier} \\ \theta &= \frac{\gamma\beta}{1-\gamma(1-\beta)} \text{ the elasticity of employment density} \end{aligned}$$

Now further assume that human capital (e) depends log-linearly on worker's average years of education (h). That is, $e = h^\eta$, where η is the elasticity of education.

Substituting this into equation (7.10) arrives at the total output function as:

$$\frac{y_j}{a_j} = \phi T_i^\omega (l_j h_j^\eta)^\theta a_j^{1-\theta} \quad (7.11)$$

Finally, dividing both sides by total labour force gives average labour productivity function:

$$\frac{Y_i}{L_i} = \phi T_i^\omega D_i(\theta, \eta) = \phi T_i^\omega \left(\frac{\sum (l_j h_j^\eta)^\theta \cdot a_j^{1-\theta}}{L_i} \right) \quad (7.12)$$

The density index here suggests that if $\theta > 1$, higher density will lead to higher productivity. It also implies that agglomeration effects outweigh congestion effects. This equation (7.12) is the base for model specification of this chapter. The actual estimation can be done by taking logarithms on both sides of equation (7.12). This yields the following:

$$\log\left(\frac{Y_i}{L_i}\right) = \log\phi + \log\left(\frac{\sum (l_j h_j^\eta)^\theta \cdot a_j^{1-\theta}}{L_i}\right) + u_i \quad (7.13)$$

Here, the technology is assumed to be log-normally distributed at the country-wide level. The measurement error of productivity is also assumed to be log-normally distributed with zero mean (Southickack, 1998, p. 110). Also, the production sectors will be disaggregated into agricultural and non-agricultural sectors. As mentioned earlier, the agricultural sector is the largest employment sector in Thailand. To account for this fact, disaggregating into agricultural and non-agricultural sectors should suffice. In addition, there is also data limitation on the provincial land utilisation. Total land area for each province is only categorised into farm holdings, forest area and non-agricultural areas. This means that we can only disaggregate provincial land into agricultural and non-agricultural sectors.

In addition to density and human capital, regional dummies will be added to the regression. This is because productivity differences across provinces may partly be due to variation in natural and cultural features. A province may be more productive because the area is well-endowed with better soil or located closer to port. To account for these exogenous differences across geographical dimension, regional dummies are added. Accordingly, the equation (7.13) becomes:

$$\log\left(\frac{Y_i}{L_i}\right) = \log\phi + \log\left(\frac{\sum (l_j h_j^\eta)^\theta \cdot a_j^{1-\theta}}{L_i}\right) + \text{Regional Dummies} + u_i \quad (7.14)$$

Method—Size versus Density Effects

In order to prove that density is more accurate determinant of agglomeration and congestion forces than size of employment, Ciccone and Hall (1996) extended their model a bit further. Assume that elasticity of firm output with respect to provincial sectoral output is a constant v . Then the production function becomes:

$$f_j(l, y, a) = l_j^\alpha \cdot \left[\frac{y_j}{a_j}\right]^{(\lambda-1)/\lambda} \cdot y_j^v \quad (7.15)$$

Solving for provincial labour productivity, we obtain:

$$\frac{Y_i}{L_i} = \frac{\sum (l_j^\gamma \cdot a_j^{1-\gamma})^{1/(1-v\lambda)}}{L_i} \quad (7.16)$$

If $v = 0$, there is no size effects and the equation (7.16) is the same as equation (7.4). On the other hand, if $\gamma = 1$, then there is no density effects. Again, the human capital can be augmented into the model such that the model specification is:

$$\log\left(\frac{Y_i}{L_i}\right) = \log\phi + \log\left(\frac{\sum ((l_j h_j^\eta)^\theta \cdot a_j^{1-\theta})^\sigma}{L_i}\right) + u_i \quad (7.17)$$

where $\sigma = 1/(1 - v\omega)$. All estimations will be done using non-linear least squares (NLS) method in STATA programme version 11.

Data

Data used for estimation in this chapter includes GPP, provincial labour force, share of agricultural labour to total provincial labour force, educational attainment of

provincial labour force—categorised into agricultural and non-agricultural labours, land area by province and by major sector. The first three variables have already been introduced in earlier chapters. Recall that GPP data were fully described in Chapter 3 while provincial labour data are discussed in Chapter 4. The data sources and descriptions of all variables are as follows:

Gross Provincial Product (GPP): is defined as value-added of goods and services produced within a province during one-year period. Recall from Chapter 3 that the GPP data have been compiled annually by the NESDB and are available from 1981 onwards.

Provincial labour force (L): covers population aged 15 years⁴ or above who are employed or unemployed in a province. Recall from Chapter 4 that the provincial-level data on the LFS are available since 1994. Also, the labour force data collected for the third quarter (July-September) will be used in this study. In the LFS, disaggregation of labour force into production sectors is also available. In this chapter, labour force will only be distinguished into agricultural and non-agricultural sectors.

Labour force years of education (LFedu): is defined as average years of formal education completed by provincial labour force. These data are also available as part of the LFS. Although the years of education for total provincial labour force are published in the quarterly report *The Labour Force Survey*, the years of education by production sector are not. These data can only be obtained from the raw data of the LFS, which are available on request at the NSO. The raw data are processed into years of education by major sector i.e. agricultural and non-agricultural sectors using the STATA programme version 11.

⁴ Note again that in 2001, the definition of labor force has been changed from population aged 13 years and over to 15 years and over.

It might be worth-noting here that the years of education in the LFS are probably less precise than the population years of schooling in the SES. In the SES, household members are categorised by the highest educational level achieved. In contrast, in the LFS, labour force is categorised only by the highest award achieved. That is, the labour force is divided into (1) no education, (2) not finishing lower primary (3) lower primary education, (4) primary school diploma, (5) lower secondary school diploma, (6) upper secondary school diploma or equivalent, (7) undergraduate degrees or higher. This means that a worker who completed the first year of upper secondary education will be categorised as having a lower secondary school diploma. Despite that, this disaggregation should give a good representation of provincial human capital. It is therefore worth examining in this chapter.

Farm holding land area (AgrLand): is defined as the total number of Rai—a Thai unit of land⁵—within a province’s borders used for agricultural purpose. These data are collected and published by the Office of Agricultural Economics (OAE), the Ministry of Agriculture and Cooperatives. Provincial-level data are available from 1986 onwards.

Non-agricultural land area (NonAgrLand): is the land area within a province not used for agricultural purposes, nor considered as forest area. It is therefore the residual of the provincial land subtracted by farm holdings and forest area. These data are available as part of the provincial land utilisation collected and published by the OAE. They are, hence, available from 1986 onwards.

Given that the provincial-level LFS data are available from 1994 onwards, analysis in this chapter will start from 1994. Since the empirical examination here is a cross-country analysis, the estimation will be done one year at a time. For this chapter,

⁵ Approximately, 1 Rai is equivalent to 0.16 hectare.

years 1994, 2001 and 2008 are selected for estimation. This way the evidence of agglomeration economies for each year can be seen along with the dynamics of agglomeration economies in Thailand over time.

7.5 Results

Empirical Evidence of Agglomeration in Thailand

Following equation (7.13) and (7.14), estimation results are shown in Table 7.1. The top half of the table show regression results following equation (7.13) i.e. regional dummies are not included. When regional labour productivity differences are not controlled for, the estimated value of θ is 1.170 for 1994. The coefficient is significant at the one percent level. As the estimated value of θ is greater than 1 ($\theta > 1$), the agglomeration effects outweigh congestion effects in Thailand. An increase in provincial labour density would result in an increase in provincial labour productivity.

Similarly, the estimated elasticity of productivity with respect to labour education (η) is 2.577. The coefficient is also significant at the one percent level. This highlights the importance of educational level in determining the labour productivity in Thailand. The value is much higher than the estimate for the USA in Ciccone and Hall (1996), which was 0.410. This is probably due to the larger inequality in educational levels across both provinces and sectors in Thailand. In 1994, the average educational attainment for agricultural workers was 4.7 years. Meanwhile, educational attainment for non-agricultural sectors was 7.6 years—almost doubled that of agricultural sector. Educational disparities across provinces were even greater. Mae Hong Son had the lowest average years of schooling, which was 4.0 years while Nonthaburi had the highest—9.0 years. Highly educated workers seek jobs in non-agricultural sectors,

which were concentrated in few provinces of Thailand. Consequently, the elasticity of education on labour productivity was very high compared to that of the USA.

Table 7.1 Non-linear Least Square (NLS) Estimates on Provincial Total Labour Productivity in Thailand 1994, 2001 and 2008

Parameters	1994	2001	2008
With labour density & human capital variables			
θ	1.1699 (0.0925)***	1.2212 (0.0983)***	1.3787 (0.1122)***
η	2.5770 (0.7568)***	2.4699 (0.8460)***	1.7226 (0.7608)**
Constant	0.0352	0.2795	2.6300
Adjusted R ²	0.38	0.43	0.40
With labour density, human capital & regional dummies			
θ	1.0467 (0.0844)***	1.0441 (0.0839)***	1.1445 (0.1024)***
η	2.1414 (0.6766)***	2.5191 (0.7735)***	1.8790 (0.8129)**
North Dummy	-0.6327 (0.1481)***	-0.5639 (0.1555)***	-0.7038 (0.1812)***
South Dummy	-0.2361 (0.1570)	-0.3160 (0.1588)**	-0.4791 (0.1815)*
NE Dummy	-1.0980 (0.1384)***	-1.0586 (0.1506)***	-1.1586 (0.1753)***
Constant	0.8151	-0.0607	1.6458
Adjusted R ²	0.67	0.66	0.62

Note: Standard error terms are in parentheses.

*** denotes statistical significance at the 1 percent level, ** 5 percent level and * 10 percent level.

Number of observations for all regressions is 76 for the 76 provinces of Thailand.

Source: Author's own calculation

The NLS regressions for the years 2001 and 2008 produced similar results. The estimated values of θ were 1.221 and 1.379 for 2001 and 2008, respectively. As for η , they were 2.470 and 1.723 for the same periods. All coefficients are significant at the

one percent level, except for η in 2008 which is significant at the five percent level. Considering the estimation results over time, it suggests that agglomeration effects became bigger between 1994 and 2008. Meanwhile, the elasticity of education on labour productivity became smaller. Apparently, agglomeration economies played a crucial role in generating provincial output divergence in Thailand.

The increasing role of agglomeration overtime seems to be consistent with the results in Chapter 5. Recall from Table 5.5-5.6 that the adjusted R^2 decreased from 0.70 for the period 1994-2008 to 0.56 in 2000-2008. This means that the explanatory powers of provincial growth determinants in Chapter 5 declined over time. Results in Table 7.1 imply that this decline must be due to an increase in the role of agglomeration. The agglomeration effects significantly determine provincial labour productivity, which in turn is closely associated with GPP growth. The agglomeration economies therefore played a vital role in explaining GPP growth divergence in Thailand.

In addition to labour density and human capital variables, regional dummies are added to the regressions. Results are shown in the bottom half of Table 7.1. When regional dummies are added, the explanatory power of overall determinants increased noticeably. The values of adjusted R^2 increased from 0.38 to 0.67 for the year 1994, from 0.43 to 0.66 in 2001 and from 0.40 to 0.62 in 2008. Accordingly, the regional-specific factors seem to be important in explaining the variation in labour productivity across provinces. This is further supported by looking at the significance of the three dummies. Both North and Northeast dummies are significant at the one percent level for all three years. The geographical and cultural features of the North- and Northeast regions must contribute to labour productivity of provinces within these two regions. On the other hand, the South dummy was not significantly different from zero in 1994. It was found to be significant at the five percent level in 2001 and at the ten percent level

in 2008. This implies that region-specific factors did not play a major role in explaining productivity variations between the Southern provinces and the rest of the country.

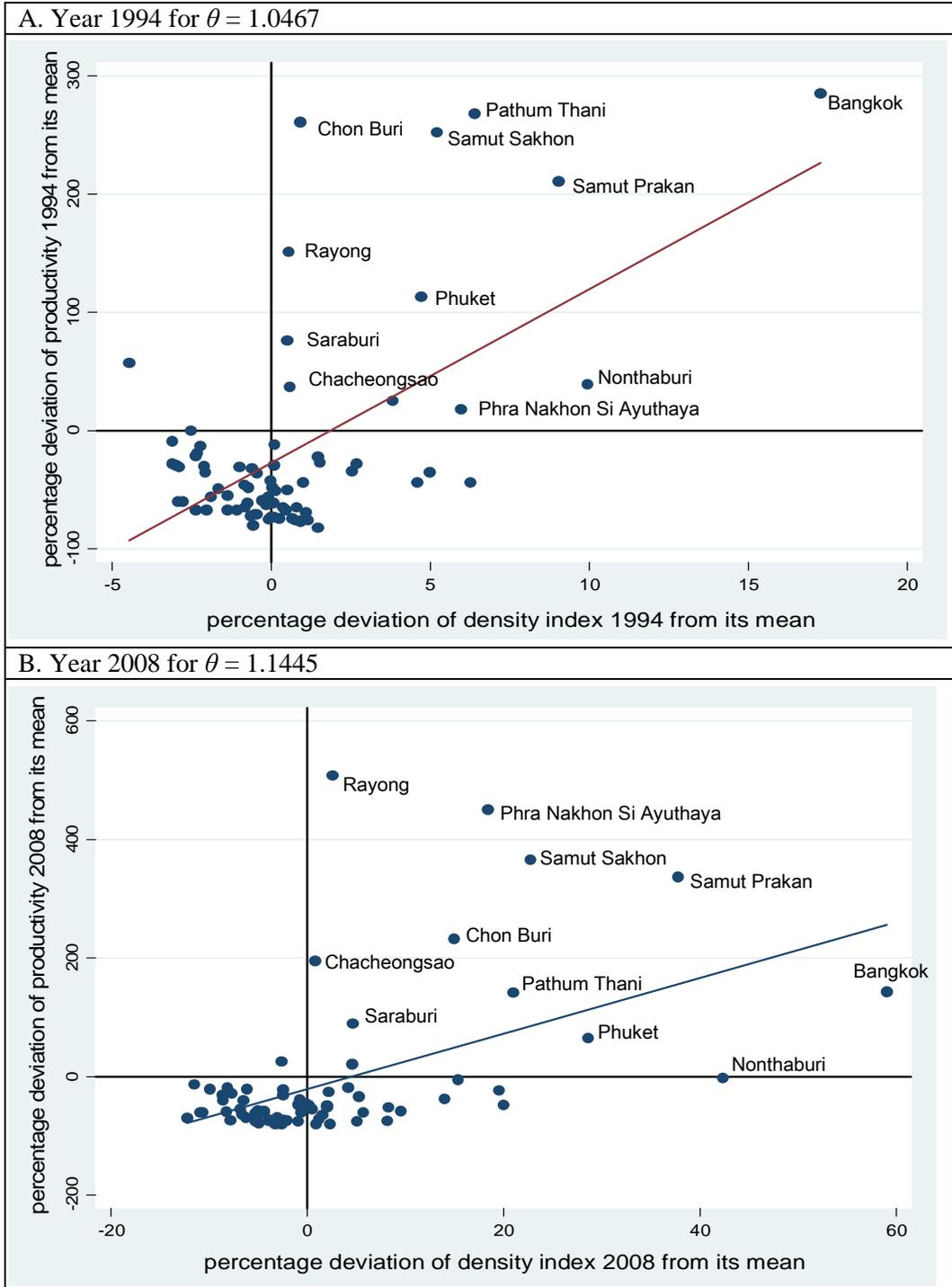
Once the regional productivity differences are controlled for, the value of θ fell from 1.170 to 1.047 in 1994. This is very close to the value found by Ciccone and Hall (1996) for states in the USA, which was 1.052. The values of θ for 2001 and 2008 also fell from 1.221 to 1.044 and from 1.379 to 1.145, respectively. The fall in θ after controlling for regional dummies further supports the conclusion that regional factors were significant determinants of provincial productivity. It also implies that the agglomeration forces within each region were not as strong as the agglomeration forces across all provinces. The values of θ over time suggest that, even when regional factors were controlled for, agglomeration forces became stronger between 1994 and 2008. This trend is consistent with the regression results without regional dummies.

The stronger agglomeration forces over time in the case of Thailand here clearly support the agglomeration theory. The theory proposed that an economy with highly concentrated activities tends to grow fast due to several so-called '*agglomeration forces*.' Recall from earlier sections that these forces are increasing returns of scale, transport and resource advantages, positive externalities and spatial competition. The results in Table 7.1 show that densely populated provinces tended to have higher labour productivity, which attract more labour into them. As these provinces became denser, labour productivity further increased. Hence, provinces with a head start continued to grow faster and stay ahead—a result consistent with agglomeration theory.

This positive relationship between density and labour productivity across provinces is clearly displayed in Figure 7.2. Here, the density index for each province is calculated from equation (7.5) using estimated values of θ from the last three columns of Table 7.1. The density index and provincial labour productivity showed positive

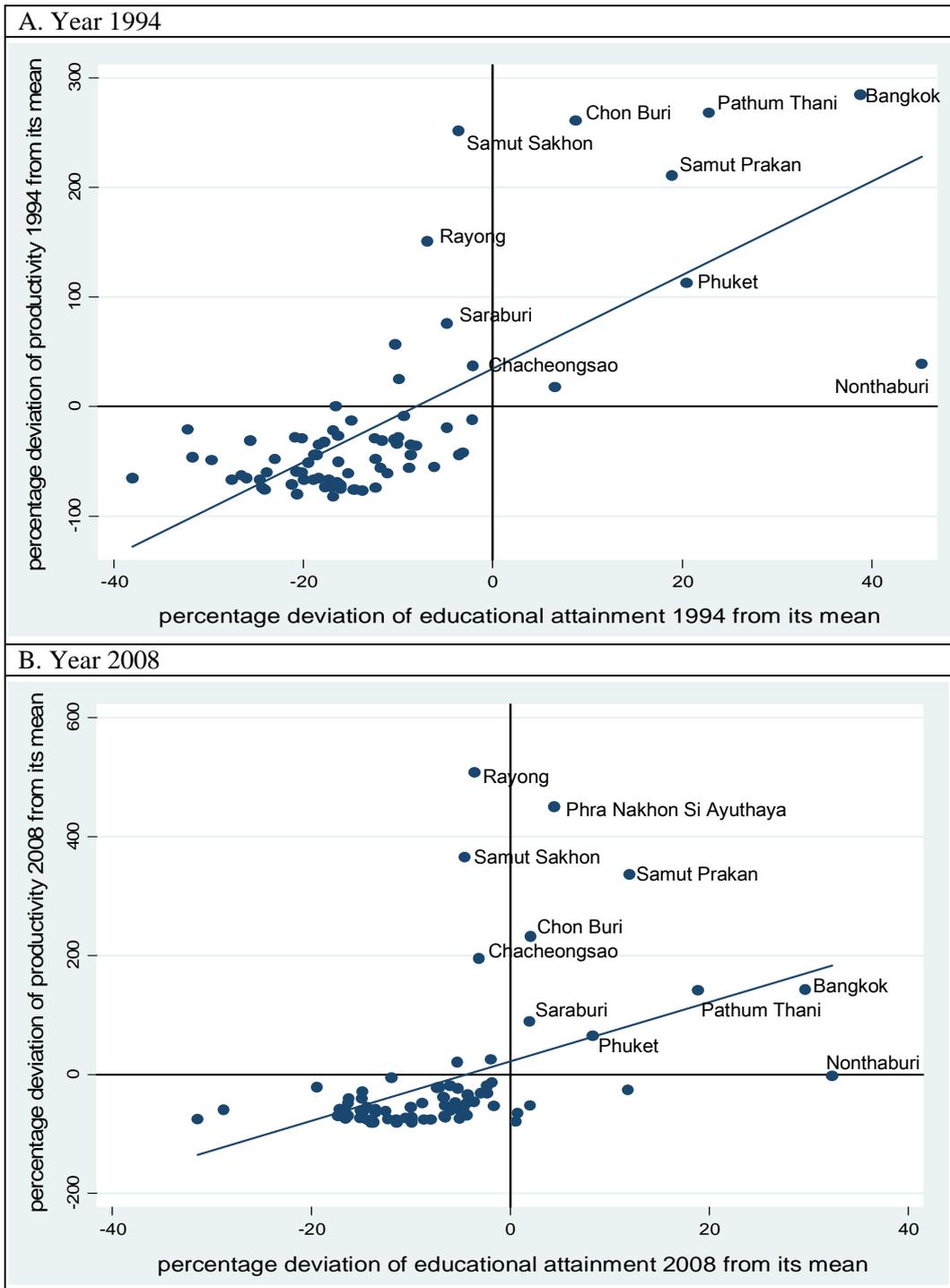
relationships for both 1994 and 2008. The simple correlation was 0.58 in 1994 and 0.50 in 2008.

Figure 7.2 Density and Productivity by Province 1994 and 2008



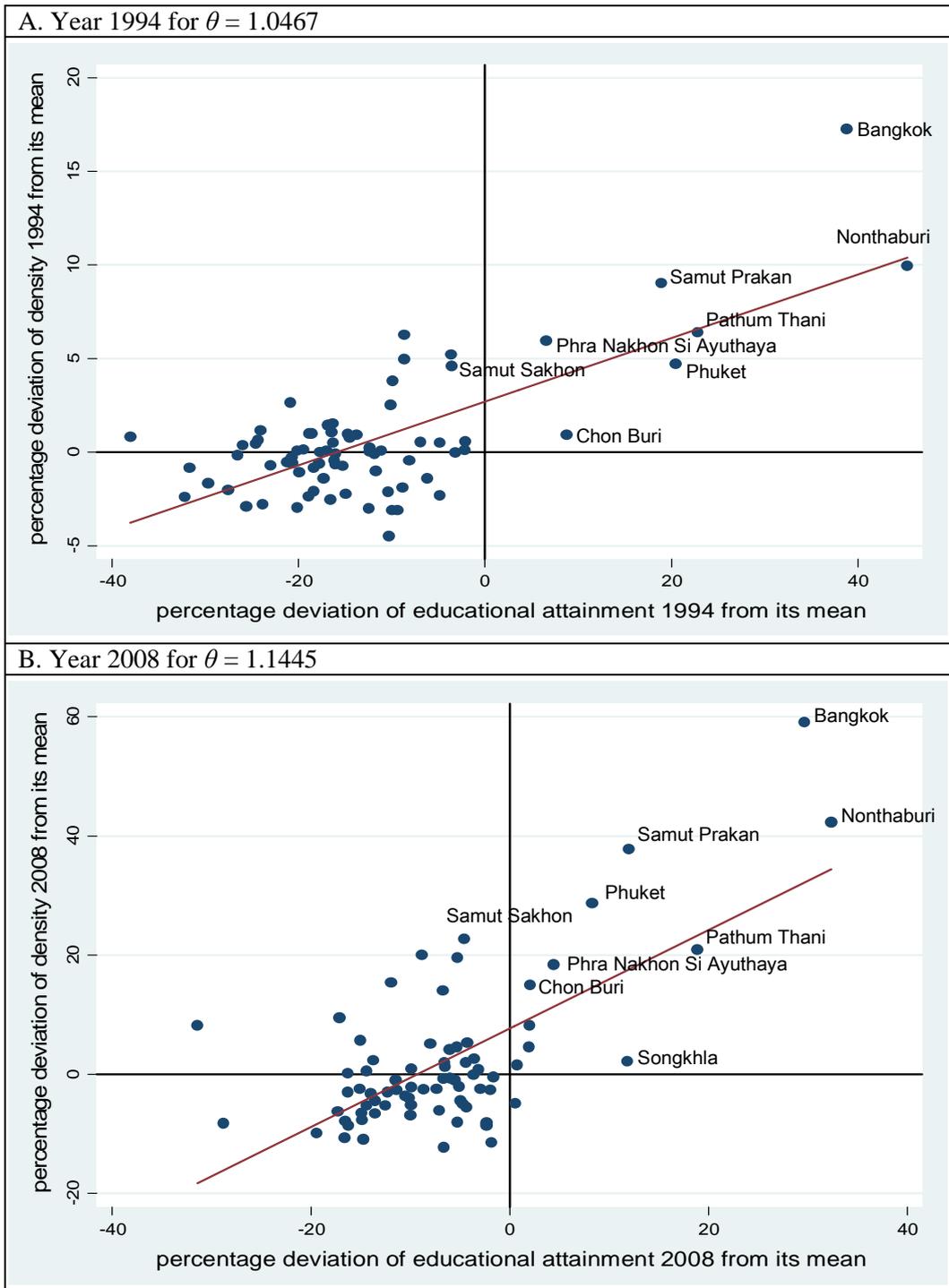
Source: Author's own calculation

Figure 7.3 Labour Educational Attainment and Productivity by Province 1994, 2008



Source: Author's own calculation

Figure 7.4 Labour Educational Attainment and Density by Province 1994, 2008



Source: Author's own calculation

Obviously, Bangkok had the highest employment density in Thailand both in 1994 and 2008. It also had the highest labour productivity in 1994. Nonetheless, Bangkok's rank in productivity fell to the sixth in 2008—with provinces in its vicinity and Eastern Seaboard surpassing productivity of Bangkok. Comparing Figure 7.2A to Figure 7.2B, it is also apparent that employment densities of provinces in the BMR were catching up with that of Bangkok. In fact, except for Phuket⁶, the six densest provinces were Bangkok and its vicinity in 2008. This seems to suggest that workers continued to prefer to be close to Bangkok despite its decline in labour productivity.

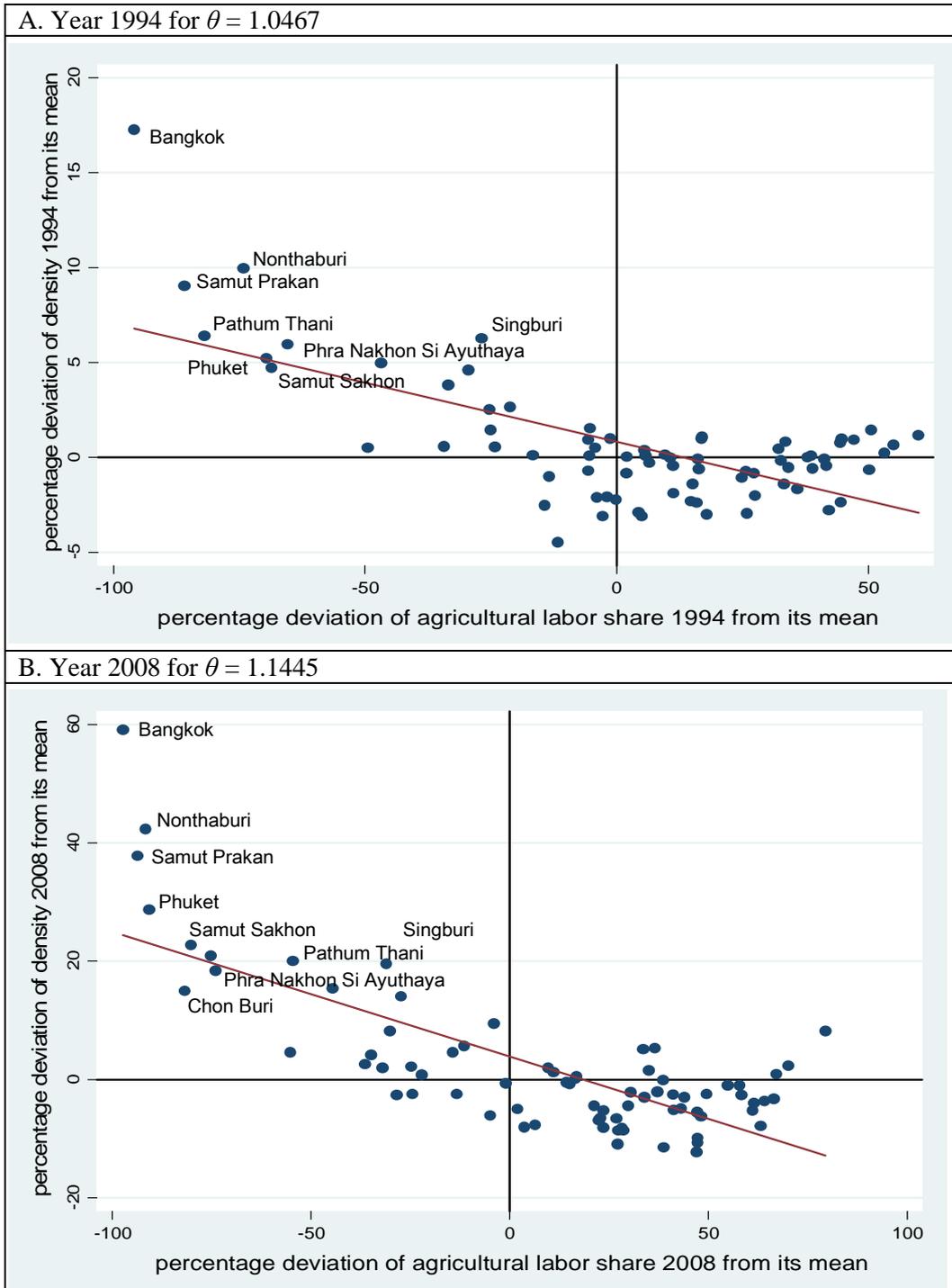
Figure 7.3 displays relationship between average labour educational attainment and provincial labour productivity. Similar to the density results, labour education also positively correlated with provincial labour productivity with simple correlation of 0.71 in 1994 and 0.44 in 2008. Here, the top-ranked provinces in term of educational attainment were the same as those with highest density appeared in Figure 7.2. It implies that high-skilled labour was clustered together in small number of rich provinces. Comparing Figure 7.3A and 7.3B, the relationship between educational attainment and productivity became less strong in 2008. Nonetheless, the high-skilled labour continued to concentrate in certain provinces, particularly Bangkok and its surroundings. This can be seen in Figure 7.4.

Apparently, Bangkok—the densest province had the highest average labour educational attainment for both 1994 and 2008. In addition, four out of five provinces following Bangkok in terms of density and educational attainment were those adjacent to Bangkok. The simple correlation between density and educational attainment was 0.72 in 1994 and 0.67 in 2008. While labour productivity of provinces in the Eastern Seaboard and Central region surpassed that of Bangkok, high-skilled labour continued

⁶ Phuket had high employment density because the province specialises in tourism.

to stay in and around Bangkok. This confirms the continued existence of agglomeration forces around Bangkok.

Figure 7.5 Agricultural Labour Share and Density by Province 1994 and 2008



Source: Author's own calculation

As mentioned earlier in this chapter, the agricultural sector is expected to play an important role in the Thai labour markets. This is because the agricultural sector accounted for the largest share of labour force. Figure 7.5 shows the relationship between agricultural labour share and provincial density. The simple correlation equals to -0.68 in 1994 and -0.76 in 2008. Clearly, provinces with a high density index had a low agricultural share of labour.

When comparing Figure 7.5A and 7.5B, Chon Buri emerged as one of the provinces with the highest density and lowest agricultural labour share in 2008. Recall from Figure 7.2, it can be seen that Chon Buri had high productivity in 1994. This high productivity possibly attracted more concentration of non-agricultural activities in Chon Buri. Consequently, the province experienced a fall in the agricultural labour share and a rise in the density index between 1994 and 2008. Meanwhile, provinces in the BMR also witnessed further reduction in agricultural labour share and higher density. This suggests that density in the non-agricultural sector generated agglomeration forces, which induces even higher concentration of these activities within and around the area.

Size versus Density Effects

Ciccone and Hall (1996) showed in their study that density effects were more relevant in generating agglomeration economies. To see if this is the case in Thailand, an estimation using equation (7.17) is examined. Results are shown in Table 7.2. When there are no size effects, the estimation results are the same as those in the top half of Table 7.1. The estimated density parameters are 1.170, 1.221 and 1.379 for period 1994, 2001 and 2008, respectively.

When there is no density effects, the estimated size parameters (σ) are 0.9778 for 1994, 1.0296 for 2001 and 1.1137 for 2008. They are all smaller than the

corresponding estimated density parameters. In addition, the explanatory powers of the size-effect estimations are also lower than those of the density-effect estimations. The adjusted R^2 was 0.34 for the estimation with size effect parameter in 1994. This was slightly lower than the adjusted R^2 of 0.38 when size effect parameter was replaced by density effect parameter. Similar conclusions can be drawn when looking at results for the year 2001 and 2008. This clearly suggests that labour density effects are more important than labour size in generating agglomeration economies in Thailand.

Table 7.2 NLS Estimates for Size- and Density Effects in Thailand 1994, 2001 and 2008

Parameters	1994	2001	2008
<i>DENSITY EFFECTS</i>			
θ	1.1699 (0.0925)***	1.2212 (0.0983)***	1.3787 (0.1122)***
η	2.5770 (0.7568)***	2.4699 (0.8460)***	1.7226 (0.7608)**
Constant	0.0352	0.2795	2.6300
Adjusted R^2	0.38	0.43	0.40
<i>SIZE EFFECTS</i>			
σ	0.9778 (0.0956)***	1.0296 (0.0982)***	1.1137 (0.1280)***
η	3.4014 (0.7832)***	3.5412 (0.9402)***	2.9929 (1.1771)**
Constant	-1.9426	-3.0307	-3.1608
Adjusted R^2	0.34	0.38	0.28

Note: Standard error terms are in parentheses.

*** denotes statistical significance at the 1 percent level,

** 5 percent level and * 10 percent level.

Number of observations for all regressions is 76 for the 76 provinces of Thailand.

Source: Author's own calculation

7.6 Conclusion

This chapter investigated agglomeration economies in Thailand between 1994 and 2008. The analyses in Chapter 5 suggested that there was a provincial growth

divergence in Thailand during the period 1988-2008. This implies that initially rich provinces grew faster than those with initially lower per capita GPP. An investigation of provincial growth determinants indicated that it was the industrial sector share of GPP, rather than initial GPP, that played a key role. Despite that, the magnitude of the effect was found to be small. This led to the question of whether there were other factors causing growth divergences in Thailand.

Theorists in the recent decades proposed that the underlying factors causing such divergence were the agglomeration forces. The higher income in the rich provinces normally attracts resources to flow into those provinces. Consequently, these rich provinces enjoy better and cheaper transport and resource advantages. In addition, increasing returns to scale and positive externalities are created as resources cluster together in these rich provinces. This stimulates further growth in the rich provinces, causing them to grow faster than the poor ones. Although concentration of resources also creates adverse effects, they tend to be smaller than the agglomeration effects. Hence, the rich provinces continue to grow faster. This chapter therefore analysed whether agglomeration forces were the major factor behind provincial growth divergence in Thailand.

Following methodology developed by Ciccone and Hall (1996), results suggested that agglomeration effects did play a significant role in explaining growth divergence in Thailand. In 1994, doubling employment density would increase provincial labour productivity by 4.67 percent, controlling for regional productivity differences. The agglomeration effects were found to become even stronger over time. In 2008, doubling of density—number of labour per Rai—would increase labour productivity by as much as 14.45 percent, again controlling for regional differences.

Moreover, the educational attainment of labour was also found to be significant in creating agglomeration effects. It is apparent that highly educated workers in Thailand came to search for non-agricultural work in urban centres. Bangkok and its vicinity continued to be main destinations with provinces in the Eastern Seaboard and the Central region catching up as major centres. This seems to further stimulate growth in these provinces. Clearly, the top-ten provinces in labour productivity in 2008 continued to be the same as those in 1994.

The findings here suggest that the economic development in Thailand is likely to continue to be uneven. With even stronger agglomeration effects over time, the growth across provinces may diverge even further. It is therefore important that government policies are at least not stimulating such divergence. In order to come up with proper policy suggestions, all findings in this thesis need to be summarised first. The next chapter summarises the empirical results of this thesis followed by policy implications and further research recommendations.

CHAPTER 8

Conclusion and Policy Implications

8.1 Research Conclusion

This study has examined the pattern of provincial income disparities in Thailand over the past few decades. It mainly covers the period between 1988 and 2008. This period is particularly interesting as the Thai economy went through several phases of economic development. From mid-1980s to mid-1990s, the country experienced an economic boom. The rapid growth ended in 1997 with a bust followed by an economic crisis. From 1999 onwards, the Thai economy was gradually recovering from the crisis. Accordingly, this study examines how the provincial income disparities changed through these phases of the Thai economy. In addition, patterns of provincial disparities in other social aspects e.g. education, health, and poverty and how they relate to the pattern of income disparities are also examined. Finally, this study investigates the determinants of provincial disparities in Thailand including agglomeration economies.

Conducting a study on provincial disparities in the late-2000s is considered to be timely for many reasons. First, the new economic geography, which was developed in the 1990s, has become well-established. Though still considered a new area of study, the new economic geography has received a remarkable attention over the past two decades. Empirical methods were also developed, making this study possible. Despite that, in Thailand studies on the geographical dimension of economics, particularly at the provincial level has so far been limited. Findings in this research therefore fill the empirical gap in geographical economics in Thailand.

The second reason why it is timely to conduct this research now has to do with data availability. Although the GPP data have been available since 1981, other provincial-level data in Thailand only became available in the 1990s. Now that more than a decade has passed, time-series analyses at provincial level can be possible. Thirdly, it is now a good time to examine the Thai economy in the post-crisis period. Thailand fell into economic crisis in 1997, posting adverse effects on both economic and social aspects of national development. With indicators showing that the economy has partially returned to normal since 2000, conducting research now enables us to analyse the provincial disparities in the post-crisis period. Some comparisons with the pre-crisis period can also be made.

This research began by examining the pattern of provincial income disparities over the period 1981-2007. This was followed by analyses on other aspects of provincial disparities, namely labour productivity, government expenditure, educational attainment and health services. Given that income disparity is considered to be one dimension of growth convergence, the research then moved on to look at another dimension. Here, the provincial income β -convergence and provincial growth determinants were investigated. Then, the issue of provincial poverty and its determinants were analysed. Finally, agglomeration economics were considered whether it plays a major role in causing provincial disparities in Thailand. The findings are summarised below.

The σ -Convergence: Provincial Disparities

In Chapter 3, the pattern of provincial income disparities during the years 1981 to 2008 was examined. Two measures of provincial per capita income—the GPP per

capita and the household income were used¹. Results showed that income disparities across provinces narrowed during the rapid economic growth in the 1990s. This was evident for both measures of provincial income. It implies that the benefits of rapid economic growth did spread to all other provinces aside those in and around Bangkok.

However, the downward trends in provincial disparities did not seem to continue after the crisis. In fact, the patterns of disparities for the two measures showed different trends in the post-crisis period. Using GPP per capita, provincial disparities widened over time particularly those excluding Bangkok and the BMR. This was due to the export boom after the crisis. In result of the baht devaluation, exports became the single main driver of Thai economic growth. As export activities were concentrated in the East and Central regions, provincial disparities in GPP per capita increased. On the other hand, when household income is used as a measure of income, the disparities continued to narrow after the crisis. Nonetheless, the declining disparities only occurred when all provinces were considered. Once Bangkok and the BMR are excluded, disparities in household income showed widening trends. This reflects the catching up of household income in the East and Central regions with the BMR, hence deviating from the rest of the country.

It can be implied from the above findings that the industrial sector play a major role in determining the pattern of income disparities. This was made clearer in the analysis in Chapter 4. The decomposition of disparities into three sectors showed that disparities in industrial output displayed the closest trends to those in GPP per capita. The simple correlation between the two was 0.885. Moreover, from 1995 onwards the industrial sector provided the largest and increasing contribution to the overall

¹ According to the data availability, the time periods used for the two measures differ slightly. For GPP per capita, the analysis covered the years 1981-2008. For income data from household surveys (SES), the analysis only covered the years 1988-2007.

disparities. From 2002, disparities in industrial output alone explained more half of disparities in GPP per capita.

In addition to the decomposition of provincial output disparities, Chapter 4 also explored three other aspects of provincial disparities in Thailand. These aspects are disparities in labour productivity, government expenditure and social indicators. The disparities in overall labour productivity showed a continuously increasing trend between 1995 and 2008. This upward pattern was very similar to that of GPP per capita—reflecting a close relationship between the two. The simple correlation between GPP per capita and provincial labour productivity further suggests that provinces with high labour productivity also had high GPP per capita. In addition, the disparities in labour productivity by sector were also examined. Results showed that disparities in overall labour productivity had the closest correlation with disparities in industrial labour productivity. However, these disparities did not display similar trends when Bangkok and the BMR were excluded. Bangkok and the BMR seemed to play a significant role in causing the disparities in overall labour productivity, but less so in agricultural- and industrial labour productivity. Particularly after the crisis, disparities in industrial labour productivity excluding Bangkok and BMR exceeded those for all provinces. This was due to the clustering of highly capital-intensive industries in the Eastern provinces. As labour productivity of these industries was much higher than the labour productivity of labour-intensive sectors in all other provinces, the disparities between them became very large.

For disparities in government expenditure across provinces, the results are somewhat ambiguous. This was mainly due to the centralised fiscal system of Thailand. Having all of the ministries located in Bangkok, the salaries for the government officials in Bangkok alone accounts for 25.2 percent of the total personnel budget in FY2007. In

addition, there are also some expenditure items e.g. contingency budgets that are kept at the central government but normally spent elsewhere. With these items included as government budget in Bangkok, it distorts the true picture of government spending. Without Bangkok, the disparities seem to be narrowing between 2000 and 2007. This is particularly apparent when looking at the disparities in capital expenditure on transport and communication. It implies that the government expenditure has been distributed more equally over time. The disparities using the BMA's budget as Bangkok's expenditure confirmed trend toward more equal budget distribution.

Similarly, the disparities in educational attainment and health service personnel across provinces also narrowed over time. Provincial variation in average years of schooling in population aged 25 years or over decreased between 1988 and 2008. The role of Bangkok as a cause of disparities also declined. This was largely due to government's intensified educational expansion since the 1980s. For health services, the disparities across provinces displayed downward trend during the period 1994-2008. This was also due to the government policy, particularly the implementation of universal health care in 2001. It can be concluded here that the geographical dimension had not been entirely ignored by the Thai government. Although development of Eastern Seaboard caused income disparities to widen over time, the Thai government has at least tried to ensure that social services are distributed more equally.

The β -Convergence: Provincial Growth

Chapter 5 took a look at another dimension of development across geographical units. While σ -convergence focuses on the gap across provinces, β -convergence examines whether the poor provinces grow faster than the rich. If β -convergence persists for long period of time without external shocks, per capita income of the poor provinces will catch up with the rich. Like the analysis on σ -convergence, two measures

of income—GPP per capita and household income—were examined. Using GPP per capita, no evidence of absolute β -convergence was found during the period 1981-2008. When dividing into four sub-periods, β -convergence occurred during the steady growth (1981-1985) and the crisis (1997-1998) sub-periods. Meanwhile, no evidence of β -convergence was found during the boom (1986-1996) and the post-crisis (1999-2008) sub-periods.

When per capita income data from household surveys were used, absolute β -convergence was evident during the period 1988-2007. Evidence of β -convergence was also found for all sub-periods. However, the rate of convergence and the significant level declined over time. During the boom sub-period, per capita income among provinces converged at the rate of 6.8 percent per year. The estimate was statistically significant at the one percent level. By the post-crisis sub-period, the rate of convergence was 1.7 percent per year and this estimate was statistically significant at the ten percent level. This means that over time the poor provinces were catching up with the rich but at the slower rate.

The difference between the results of these two data sets was mainly due to the change in income composition of rural households. As the Thai economic structure shifted toward the industrial sector in the 1980s, rural farmers started to diversify their income by engaging in the industrial sector. It became common that farmers migrated to find wage-labour jobs during the slack season. Consequently, the results using GPP data—measuring income where it is generated—differed from those using household surveys which measures income where it is received. Despite that, results from the two measures seem to suggest similar long-term trends. That is, the evidence of β -convergence has worsened over time. These trends are also consistent with the σ -

convergence results in Chapter 3. Disparities in GPP per capita across provinces widened while those in per capita income narrowed down at slower rate over time.

In order to tackle the worsening provincial disparities, the analysis then looks at factors contributing to provincial growth in Thailand. As expected, growth in GPP per capita for the period 1994-2008 was found to be driven mainly by the industrial sector. Provinces that were able to expand their industrial sector would grow fast. The relationship was even stronger in the post-crisis period. As mentioned earlier, high-tech manufacturing for exports became the main growth engine for the Thai economy after the crisis. With these high-tech firms concentrated in the Eastern and Central regions, these provinces saw their GPP per capita grow rapidly. Clearly, the concentration of industrial growth within only few provinces was the major cause of worsening provincial income disparities.

Provincial Poverty and its Determinants

In relation to growth, researchers and particularly policy-makers are usually interested in the extent to which growth translates to poverty reduction. Chapter 6 looks at poverty disparities, the growth-poverty relationship and poverty determinants at provincial level. Poverty disparities in Thailand displayed widening trend between 1988 and 2008. Only during the crisis—between 1998 and 2000—did poverty disparities narrow down. The narrowing disparities were a result of rich provinces being harder hit by the crisis; hence they experienced a larger increase in poverty than poor provinces.

The widening poverty disparities over the past two decades also imply that the rate of poverty reduction varied across provinces. Accordingly, factors contributing to provincial poverty reduction should be investigated. Since economic growth was widely accepted as a crucial factor for poverty reduction, the poverty-determinant analysis

began by examining growth-poverty relationship. Results suggested that per capita income growth did lead to poverty reduction at the provincial level during the years 1988-2008. This means that provinces with higher GPP per capita also had a higher rate of poverty reduction. Despite that, when divided into sub-periods, this relationship was not evident in the post-crisis period. In other words, provincial growth was not related to poverty reduction after the crisis. To find out what are the factors contributing to such results, poverty determinants were then examined.

Regression results suggested that, aside from provincial income growth, inequality within each province also played crucial role in determining provincial poverty. In fact, the inequality-elasticity of poverty was even higher than growth-elasticity of poverty. For the period 1994-2007, the growth-elasticity of poverty was -2.4 while inequality-elasticity of poverty was 2.9. Apparently, income growth and inequality affect poverty in opposite directions. This means that if inequality increases at the same time as provincial income increases, the poverty rate may not fall.

When considering only the post-crisis period (2000-2007), the results showed that the inequality-elasticity of poverty became larger while the growth-elasticity remained more or less the same. This must be the major factor explaining why the positive relationship between growth and poverty reduction was not evident after the crisis. In addition to income growth and inequality, other factors were also added to the regressions as determinants. The OLS results showed that household characteristics also play important roles in determining poverty. Provincial poverty was negatively related to household size, the share of population residing in female-headed households, the share of households with elderly members and educational attainment. On the other hand, it was positively associated with age of household head, share of households with

children, and share of urban population to the total provincial population. For the post-crisis period, these relationships did not differ significantly from the entire period.

Furthermore, the 2SLS method was also employed in poverty-determinant analysis as income might be simultaneously determined by provincial poverty. Results supported the assumption that provincial income was endogenous to poverty-determinant model in the case of Thailand. In summary, the provincial income growth was crucial for poverty reduction at provincial level. However, the growth effect on poverty would be reduced if inequality level also increases during the same period. It is therefore important that inequality level within each province is at least kept constant, if not reduced.

Agglomeration Economics

In Chapter 7, the analysis took an alternative approach to explaining the increasing GPP per capita disparities in Thailand. Based on the agglomeration theory, the widening disparities were caused by agglomeration forces stimulating more growth in rich provinces. This seems to be consistent with the development pattern in Thailand. Despite government policies encouraging industries to locate in outlying regions, industries continued to concentrate near Bangkok. While both Thai researchers and policy-makers have long been aware of the dominance of Bangkok, empirical works on this issue are rather limited. Accordingly, Chapter 7 provided empirical evidence on agglomeration in Thailand.

For empirical analysis on agglomeration, most studies used output per worker instead of output per capita². This is because the models are based on production functions, which are more closely related to productivity measures. Following the

² The use of output per worker here should be valid in the case of Thailand as it is closely correlated with the output per capita. The simple correlation between the two measures is 0.9521 for pooled provincial data between 1994 and 2008.

empirical model developed by Ciccone and Hall (1996), an increase in labour density within an area normally creates two opposing effects. Agglomeration forces attract more labour, hence generating more productivity growth. On the other hand, dispersion forces discourage labour to stay in the area. The regression results for Thailand in 1994, 2001 and 2008 all suggested that agglomeration forces outweigh dispersion forces. An increase in density—particularly in already highly productive provinces—would increase productivity even further. This implies that the rich provinces tended to grow faster than the poor provinces. Not only that, the agglomeration effects seemed to be increasing over time.

In addition to labour density, the regression model also added labour educational attainment and regional dummies as other productivity-determinants. Results showed that education was crucial in increasing labour productivity in Thailand. The elasticity of productivity with respect to labour education was 2.577 for the year 1994. The value, however, decreased over time to 2.470 in 2001 and 1.723 in 2008. As average educational attainment has become more equal across provinces, the degree to which education contributes to productivity declined. For regional dummies, results suggested that regional-specific factors also play an important role in determining provincial productivity.

When plotting provincial density against productivity, Bangkok and its surroundings dominated both in terms of density and productivity. As expected, Bangkok was the densest province in Thailand throughout the study period, followed by its 5 adjacent provinces. Although Bangkok's rank in productivity fell from the first in 1994 to the sixth in 2008, it continued to attract more workers into it. This clearly suggested that workers and firms still preferred to be close to the capital city. Finally, the analysis further looked into sectoral density and productivity. Results showed that it

was the density in non-agricultural sectors that generated agglomeration forces, which induces even higher density in these already-dense provinces.

In summary, all findings in this study seem to suggest that provincial growth in Thailand has been driven mainly by the growth in industrial sector. While the government tried to stimulate industrial growth in outlying regions, they only succeeded in bringing industries to provinces close to Bangkok. This was clearly due to the agglomeration forces of the capital city. It is therefore the main factor causing provincial disparities in GPP per capita to widen over time. Nonetheless, when looking at provincial household income per capita, the disparities were somewhat different. Overall disparities seemed to be narrowing over time, although disparities excluding Bangkok slightly widened in recent years. The differences between the two data sets suggested that provinces where income is generated differ from those where it is received. Thus, there must be some mechanisms redistributing income across provinces in Thailand. Aside from income transfer programmes by the government, the main mechanism was the change in household income composition. However, even with such mechanisms, growth in provincial household income no longer translated into poverty reduction during the post-crisis period. This was due to the increase in inequality levels within provinces.

Linking back to the experiences in other countries explored in Chapter 2, the findings here show similar patterns with China and the Philippines. The persisted, if not widening, disparities in provincial per capita output seemed to be caused mainly by trade openness in all three countries. Trade openness stimulated the growth of manufacturing for exports in geographically-advantaged or government-promoted areas. These areas are the coastal area of China, the export-processing zones in the Philippines and the BMR and the Eastern Seaboard of Thailand. In addition, attempts to

deconcentrate industries away from the old cores ended up with reconcentration in the nearby areas. Again, this pattern was found in all three countries. The case of Thailand, therefore, adds more support to the theory of agglomeration.

There are two major development issues that come out of this study. First, the agglomeration forces around Bangkok were indeed strong. They seem to become even stronger over time. The second issue has to do with inequality level. Inequality problems have persisted to the point that they have started to dampen poverty reduction in Thailand. It is, therefore, important that policies regarding these issues are explored so that effective policy recommendations can be given.

8.2 Policy Summary and Recommendations

Regional Development Policy

As already mentioned in Chapter 7, the Thai government has been aware of the primacy of Bangkok since the Third Plan (1972-1976). Consequently, policies to disperse growth centres to other regions have been included in the national development strategy since the Fourth Plan (1977-1981). These policies include the BOI investment promotion packages from the Fourth Plan onwards, development of regional cities in the Fourth- and Fifth Plans (1982-1986) and the development of Eastern Seaboard and other economic zones in the Sixth- and Seventh Plans (1987-1991 and 1992-1996).

Despite these many policies, most of them did not find much success in drawing industries away from Bangkok, except for the Eastern Seaboard. The success of the Eastern Seaboard was partly due to its proximity to Bangkok. In addition, the complete infrastructure development i.e. roads, sea ports and industrial facilities for the project

itself also contributed significantly to its success. This seems to suggest that government infrastructure is crucial for urban development in Thailand.

Following the Eastern Seaboard, the Thai government also proposed development of Southern- and Western Seaboards in the Eighth Plan (1997-2001). Unfortunately due to the crisis in 1997, the two projects were put on hold. Then, after the crisis, regional integration with neighbouring countries has been promoted as a tool for economic development. Thailand has also been actively involved in several regional integration programmes. These programmes include the Greater Mekong Sub-region (GMS) programme, Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT), Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Corporation (BIMSTEC) and ASEAN. As these programmes, particularly the GMS and IMT-GT focus on infrastructure development, both SSB and WSB became parts of these wider regional integration projects (NESDB, 2011a).

Recall from Appendix F that the GMS main projects include road networks linking Thailand with Myanmar, Lao PDR, Vietnam, Cambodia and China. Once complete, the project is expected to stimulate growth in cities and provinces along these roads—specifically those in the North and the Northeast regions. As these two are the backward regions of the country, the programme will therefore help them catch up with other regions. Similarly, the IMT-GT also involves improvement of infrastructure and transport networks of the region, including the Southern provinces of Thailand. It would allow these provinces to catch up with the fast-growing Central and Eastern regions. Ultimately, the catching up of the South, North and Northeast regions will cause regional disparities to narrow.

It may still be too early to see the clear result of these programmes at this time. The road network for the East-West Corridor was just completed in 2009 while the rest

of the GMS programme is still ongoing. Meanwhile, the development under IMT-GT has not yet been implemented to date. Despite that, increase in movement of labour from the neighbouring countries into Thailand and the growth of border towns have already been apparent (Sciortino, Caouette & Guest, 2008). It is, therefore, very likely that the regional integration will progress further. This will stimulate growth in provinces away from Bangkok and hence bring down the role of Bangkok as the agglomeration core.

In addition to regional integration, creating strong linkages between rural and urban areas should also help spread the benefit of the growth more equally. Despite continuous expansion of rural road development in Thailand, ten percent of all the roads are still unpaved. Regular users of the non-paved roads were found to incur higher fuel consumption as well as higher vehicle-maintenance costs than those of the paved roads (NESDB, 2011b, p. 59). As these non-paved roads are in rural areas in lagging provinces, these higher costs must also contribute to the provincial income disparities. Making transport and communication across areas more easily connected should therefore help narrowing provincial income disparities.

Tourism Promotion

Tourism-promotion has been recently used as another tool for economic development. Tourism policy has been included as part of the National Economic and Social Development Plans since the Fourth Plan. However, it did not become the main policy until after the crisis (Tourism Authority of Thailand [TAT], 2000). The devaluation of the baht in 1997 boosted not only the export-, but also the tourism sectors. Being seen as a potential growth engine, the Thai government became more active in promoting the tourism sector. This can be depicted from the launch of the “Amazing Thailand” campaign in 1998. The campaign aimed at both attracting foreign

tourists as well as encouraging domestic tourism among Thais. Accordingly, the Ninth- and Tenth Plans (2002-2006 and 2007-2011), along with administrative decentralisation, encouraged each province to set up a provincial tourism strategy. The Plans also emphasised tourism at the provincial-cluster level e.g. beautiful beaches cluster, world heritage cluster and national park cluster. The linkages between tourist attractions and other tourist activities in each area were seen as a channel for sustainable income distribution.

As a result, the number of foreign tourists more than doubled from 7.7 million in 1998 to 14.5 million in 2007. At the same time, domestic tourist statistics also increased from 51.7 million trips to 83.2 million (TAT, 2008). While such impressive increases in tourism figures must imply a considerable increase in tourism revenue and output, these data are not yet available in Thailand³. Accordingly, the role of the tourism sector on provincial disparities cannot be analysed. For now, it is probably most important that these data are developed and made available on a regular basis as soon as possible.

Policy to Tackle Inequality

Unlike anti-poverty policy in Chapter 6, inequality and income distribution received less priority in Thailand's development policy. Though included since the Third Plan, income inequality had usually been approached indirectly via poverty-reduction and rural development policies. This is probably because there were no clear targets on income distribution stated in any of the Plans up until the Eighth Plan. These indirect policies include expansion of basic infrastructure and government services to outlying regions and remote areas, measures to raise income of the poor, rural job-

³ There was a pilot project on compilation of the Tourism Satellite Account (TSA) in Thailand in 2001. It was conducted by the Tourism Authority of Thailand (Amnuaysilp, 2001). The TSA is a satellite account under the National Account System, which measures tourism economic impacts on the national economy (OECD, 2011). The findings from the pilot project was, however, not available to public. The World Travel and Tourism Council estimated that for 1998-2005, tourism sector generated around 13 percent of total GDP of Thailand—both directly and indirectly (Wattanukuljarus, 2007, p. 7).

creation project, tax incentives for low-income housing projects and administrative decentralisation. Nonetheless, income across five income groups did not become more equal during these Plans. Similarly, the income differences between urban and rural areas did not narrow over time. This is mainly because these policies did not receive much attention in practice. Both resources and budgets were allocated with priority given to export-oriented industrialisation. With such limited resources, these income-distribution policies were rather ineffective.

The inequality issue seemed to receive more serious attention from policy-makers in the Eighth Plan. The target was clearly set that the lowest three quintiles should get 50 percent of national income by the end of the Plan. Unfortunately due to the economic crisis, policies in the Plan were barely implemented and the target was not met. In the Ninth Plan (2002-2006), there was no inequality target clearly stated in the Plan. This was possibly because the government at the time focused on their populist policies, which already targeted the poor. Recall from Chapter 6 that the major policies were the Village Fund, Universal Health Care Scheme and Debt Suspension programmes. While these policies helped improve the living conditions of the poor, the inequality did not show any improvement during the Ninth Plan (NESDB, 2011b).

In the Tenth Plan (2007-2011), the inequality target was set once again. This time, the target was for income of the richest quintile to be no more than 10 times that of the poorest quintile. Similar to all the previous Plans, this target was to be achieved by indirect policies e.g. further expansion of infrastructure and government services, building strong community financial institutions and devolution of the fiscal system. Although the result at the end of the Tenth Plan has not yet been available, the data in 2009 showed quite an improvement. The ratio between the richest quintile and the

poorest quintile fell from 12.8 times in 2007 to 11.9 times in 2009 (NESDB, 2011b, Table 51).

Yet, the inequality level is still considered very high. Perhaps income inequality may improve faster if the direct policy on income distribution is implemented. One important mechanism is the tax policy. Tax structure in Thailand has been biased toward the rich—particularly the capital owners. It relies heavily on indirect taxes, which means that low-income individuals end up paying more tax as a share of their income than the high-income individuals. As of 2010, indirect taxes accounted for 51.8 percent of total tax revenues while direct taxes accounted for 36.6 percent (NESDB, 2011b, p. 68). In addition, wealth and property tax bases have not been adjusted for decades⁴. This also benefits the better-off individuals who own land in more developed areas.

It is apparent that the tax structure in Thailand has been favouring the better-offs more than the poor. This means that there are still various points in the tax structure that can be made fairer to the lower-income individuals. By doing that, the income inequality should be reduced. Although there were many attempts in the past, none of them has succeeded in pushing these fairer tax adjustments into practice. This was due to the lack of commitment by Thai politicians and the intervention by capitalists, who would be adversely affected. In order to make such changes, a strong commitment by the Thai government is critically required. This may start by stating clearly in the next National Economic and Social Development Plan that the tax structure must be made fairer.

⁴ Land tax is currently based on average land prices 1978-1981. This makes taxes in, for example, Bangkok suburban areas very low compared to their current land prices. In addition, there are also various channels for tax reduction which favour those in the high-income brackets (see NESDB, 2011b).

In addition to tax adjustments, inequality may also be tackled by improving the selection process and monitoring system of existing anti-poverty programmes. Recall from Chapter 6 that existing anti-poverty policies already proved to help the poor. However, better targeting of these programmes can make them even more effective. This would consequently help the budgeting for these programmes to be more sustainable. With continuation of these anti-poverty programmes for a long period of time, income inequality should constantly decline.

To seriously tackle the inequality, it may also require looking at other geographical dimension of inequality—the rural-urban differences. While the rural-urban inequality was not explored in this thesis, it does not mean that it is unimportant. Like the provincial disparities, rural-urban income differences have also widened after the crisis. In 2000, the average total income in urban areas was 1.72 times that of the rural areas. In 2007, the ratio increased to 1.96 times (NSO, 2009). Accordingly, policy to close this rural-urban gap is also another way to reduce the overall income inequality in the country.

Sustainable Development Policy

Perhaps it is important to note here that, regardless of the policy to pursue from now on, the issue of sustainability should not be ignored. This is a lesson learned from previous development results. While the development of Eastern Seaboard proved to be a success, it also posed environmental problems. Both water and air quality in the Eastern Seaboard area was found to be lower than the standard limits. They were polluted by heavy metal e.g. zinc, manganese and volatile organic compounds (Kunjara na Ayuttaya & Chanda, 2011, p. 8-9). This was due to the lack of enforcement and monitoring mechanisms in Thailand. Moreover, there were also changes in the land-use

zoning from housing areas to industrial zones, which caused the pollution to exceed the limits.

Similarly, there were also environmental problems occurring in tourism-driven locations such as Phuket and Pattaya. Not only was there environmental degradation but also invasion of resorts into agricultural land areas (NESDB, 2007b). As their beautiful nature is the selling point, degradation of environment and congestion of resorts can adversely affect the tourism business in the future. This, therefore, seems to suggest that regional development from now on should put sustainability concerns as a priority. Environmental standards and regulations should be strictly enforced. Environmental awareness should also be widely promoted. Moreover, land-use regulations must also be strictly monitored. This is to make sure that regional development goes according to land potential. With sustainability as a fundamental, improvement of people's lives as a result of development policies should be permanent.

8.3 Concluding Remarks

It has become clear in this research that geographical inequality is quite severe in Thailand. Provincial output per capita disparities continuously widened over the past few decades. Not only that, there was no evidence of provincial GPP per capita convergence, particularly after the crisis. This means that initially poor provinces did not seem to be catching up with the initially rich provinces. By looking at the past policies in Thailand, we can see that the Thai government did try to expand development into less-developed regions. However, only the large, fully-committed programmes such as the Eastern Seaboard ended with success. This seems to suggest

that the only way to develop lagging provinces is through a mega-industrial infrastructure project.

Despite saying that, there are in fact many opportunities through which provincial disparities can be reduced. This is because, in this dynamic globalised world market, the Thai economy is continuously changing. After the crisis, the tourism sector was seen as both a potential growth-driver and a regional development tool. It has been heavily promoted at all administrative levels. Also, several regional integration programmes recently emerged as neighbouring countries integrated into the world economy. These programmes, particularly the Greater Mekong Sub-region should stimulate growth in lagging regions. It is, however, too early to see the actual results of these recent development activities on provincial growth and disparities. Research work on this issue in the future should therefore be encouraged.

As the Thai economy has continuously changed along with the global market, the political dimension has also become more dynamic. In the past few years, the country has seen larger population—particularly those from the rural areas, taking more active role in the Thai politics. With an on-going political conflict, it is largely believed that geographical inequality is one of the underlying causes. Despite that, no thorough research has been done on this issue so far. A study on the relation between geographical inequality and the political divide should, therefore, be very interesting. Meanwhile, inequality at all other dimensions is also likely to continue to be a challenging issue for Thailand's economic development. Serious attention should thus be given to these dimensions as well. This is to ensure that the Thai economy move forward in a more equitable and sustainable direction.

APPENDIX A—DERIVING GINI COEFFICIENT

The Gini coefficient can be calculated in two ways. The direct method is to calculate the index from the mathematical formula. For income, the formula is as follows:

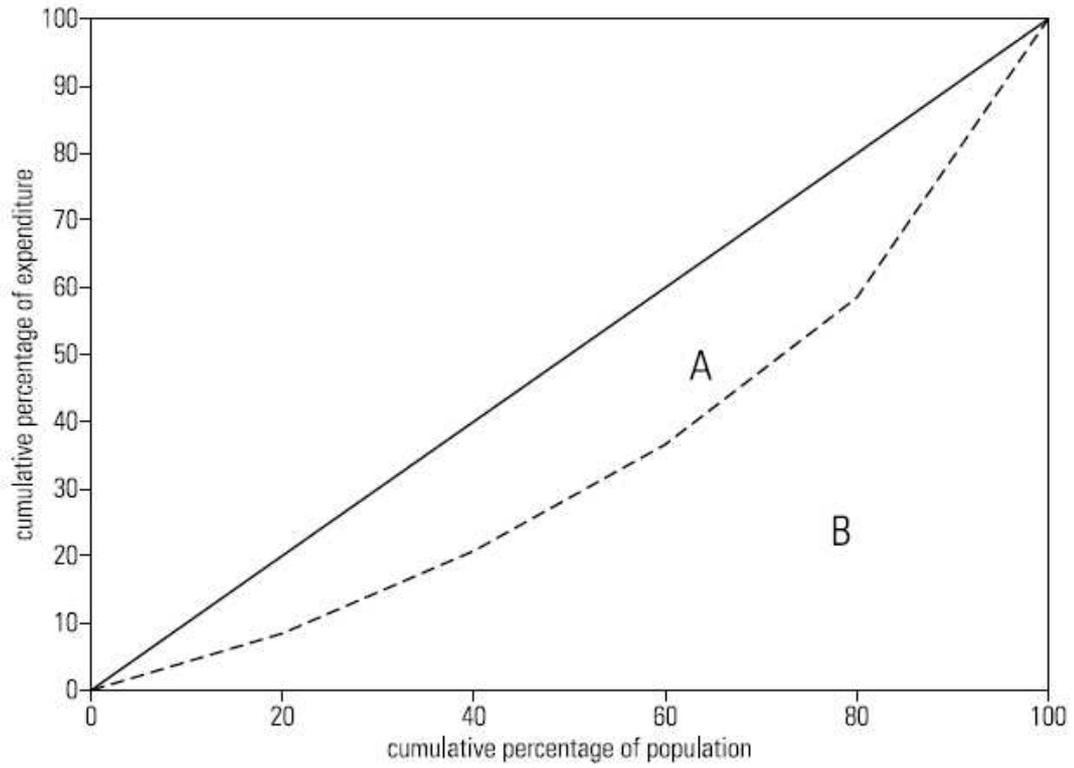
$$Gini = \frac{1}{\mu N(N-1)} \sum_i \sum_j |y_i - y_j|$$

where

- μ = the mean of the variable e.g. income
- N = total number of observations
- y_i, y_j = income per capita of i^{th} and j^{th} province, respectively

Secondly, the Gini index can be derived from the Lorenz Curve. The Lorenz curve has been widely used to assess the distributional properties of income and wealth. For income, the Lorenz curve shows a relation between cumulative percentages of population and the cumulative percentages of income. The Gini coefficient is defined as the ratio of the area between the Lorenz curve and the diagonal line to the area of the entire diagonal triangle (see Figure 4.4). The Gini coefficient takes a value between zero—indicating perfect equality across regions, and one—indicating perfect inequality.

Figure A.1 The Lorenz Curve of Income



Source: Houghton & Khandker (2009)

APPENDIX B—BARRO & SALA-I-MARTIN MODEL

Based on Barro and Sala-i-Martin (1991), the model specification is written as

$$\frac{1}{T} \log \left[\frac{y_{iT}}{y_{i0}} \right] = B + \left[\frac{1 - e^{-\beta T}}{T} \right] \bullet \log \left[\frac{y^*}{y_{i0}} \right] + u_{i0,T} \quad (\text{B.1})$$

where:

- y_{i0} = initial per capita income
- y_{iT} = per capita income of the final year
- y^* = the steady-state level of per-capita income
- $u_{i0,T}$ = error term

The coefficient β represents the speed of convergence. Per capita income convergence exists when the value of $\beta > 0$. The term $\left[(1 - e^{-\beta T} / T) \cdot \ln(y^*) \right]$ implies that the per capita income growth rate also depends on the steady-state level of income. The positive value of β , therefore, means that the poorer economies grow faster than the rich after conditioning on the steady state.

For within-country analysis, the steady-state income y^* is normally assumed to be the same across provinces. Consequently, the equation (B.1) becomes

$$\frac{1}{T} \ln \left[\frac{y_{iT}}{y_{i0}} \right] = c - \left[\frac{1 - e^{-\beta T}}{T} \right] \cdot \ln(y_{i0}) + w_i \quad (\text{B.2})$$

where $c = B + \left[(1 - e^{-\beta T} / T) \cdot \ln(y^*) \right]$ and w_i is a disturbance term. Here, if $\beta > 0$, the economies with lower initial per capita incomes grow faster than those with higher

income and converge to the same long-run steady state (Balisacan, 2007, p. 405). That is, “absolute convergence” exists.

Comparing equation (B.2) with the equation (5.2) in Chapter 5, they only differ in the coefficient of $\ln(y_{i0})$. That is, the term $-\left[1 - e^{-\beta T} / T\right]$ here, as compared to a linear estimator $-\beta$ used in the chapter. The term $-\left[1 - e^{-\beta T} / T\right]$ means that the coefficient gets smaller as time T gets larger. This means that as time period of study becomes longer, the impact of initial per capita income on growth declines. The linear estimator $-\beta$ in equation (5.2) does not take this into account. Nonetheless, the estimators β 's from both equations do not differ largely from one another. The difference is only at 0.001 digits at most. Because the analysis extends beyond absolute convergence in chapter 5, it is more convenience to follow Balisacan (2007) than Barro and Sala-i-Martin (1991).

APPENDIX C—DESCRIPTIVE STATISTICS FOR PROVINCIAL GROWTH MODEL

Table C.1 Descriptive Statistics for Cross-Sectional Estimation of Provincial Growth Determinants 1994-2008

Variable	Description	Mean	S.D.	Min	Max
GPP 94	Log of per capita GPP 1994	10.206	0.694	9.134	11.977
GR 9408	Average annual growth of per capita GPP 1994-2008	0.022	0.023	-0.023	0.134
PopGr 9408	Growth rate of population between 1994 and 2008	16.379	13.644	-3.122	66.033
Gini 94	Income Gini ratio 1994	0.451	0.055	0.327	0.625
EduAttain	Change in average years of schooling 1994-2008	5.124	0.870	3.095	8.309
Electricity	Change in share of households with electricity 1994-2008	5.784	6.477	-2.310	38.050
Agperlbour	Change in agricultural value-added per unit of labour 1994-2008	54.034	72.440	-67.200	483.84
FDI 94	Ratio of FDI to GPP 1994	5.819	12.339	0.000	76.490
AgrShare 94	Share of agricultural sector to GPP 1994	24.406	13.156	0.560	62.810
IndShare 94	Share of industrial sector to GPP 1994	28.544	18.559	8.71	81.34
Δ IndShare	Change in industrial sector share of GPP 1994-2008	0.905	8.782	-16.12	23.68

Source: Author's own calculation.

Table C.2 Descriptive Statistics for Cross-Sectional Estimation of Provincial Growth Determinants 2000-2008

Variable	Description	Mean	S.D.	Min	Max
GPP 00	Log of per capita GPP 2000	10.265	0.774	9.152	12.538
GR 0008	Average annual growth of per capita GPP 2000-2008	0.032	0.020	-0.005	0.117
PopGr 0008	Growth rate of population between 2000 and 2008	6.837	4.509	-0.964	20.417
Gini 00	Income Gini ratio 2000	0.449	0.053	0.318	0.590
EduAttain	Change in average years of schooling 2000-2008	5.900	1.134	3.068	10.012
Electricity	Change in share of households with electricity 2000-2008	2.005	4.648	-4.038	36.843
Agperlbour	Change in agricultural value-added per unit of labour 2000-2008	25.932	47.297	-72.590	289.21
FDI 00	Ratio of FDI to GPP 2000	4.301	13.418	0.000	87.490
AgrShare 00	Share of agricultural sector to GPP 2000	23.760	13.379	0.120	56.920
IndShare 00	Share of industrial sector to GPP 2000	28.068	22.298	8.500	88.310
Δ IndShare	Change in industrial sector share of GPP 2000-2008	1.381	5.432	-15.940	25.450

Source: Author's own calculation.

APPENDIX D—SPATIAL PRICE INDEX

In calculation of poverty lines by region and community type, it is important that spatial price indices (SPI) are derived and employed in the process. Let f_r be the population share of each area to the national population and r be the nine regions used for the nine food baskets. They are comprised of rural and urban areas of the four regions—Central, North, Northeast and South, and Bangkok. The SPI can be derived as follows:

1. Calculate the national average price for each food item ($\overline{p_i}$) using average price of each area weighted by population share of that area. That is,

$$\overline{p_i} = \frac{\sum_{r=1}^9 f_r P_{ri}}{\sum_{r=1}^9 f_r} \quad (\text{D.1})$$

2. Derive normalised price for each area (p_{ri}) by dividing average price of the area by the national average.

$$p_{ri} = P_{ri} / \overline{p_i} \quad (\text{D.2})$$

3. Calculate SPI for each income quintile of each region and community type using the normalised price weighted by share of food expenditure to total expenditure in households of each income quintile (E_{qi}).

$$SPI_{qr} = \frac{\sum_i p_{ri} E_{qi}}{\sum_i E_{qi}} \quad (\text{D.3})$$

The SPI for the year 2002 are presented in Table D.1 below. Note that for poverty line calculation, only the SPI for the lowest income quintile ($q=1$) will be used.

Table D.1 Spatial Price Indices by Income Quintile and Area 2002

Region/Area	Income Quintile					Total
	1	2	3	4	5	
Municipal						
Bangkok	112.53	112.52	112.96	113.56	112.49	112.83
Central	103.31	103.34	103.78	104.36	104.72	104.15
North	101.91	101.40	101.21	100.91	100.72	101.06
Northeast	104.98	105.88	107.00	108.48	109.58	107.93
South	107.88	108.00	108.46	109.42	109.69	109.01
Non-municipal						
Central	97.38	97.01	96.49	95.75	95.31	96.05
North	93.77	93.64	93.15	92.32	91.80	92.60
Northeast	96.82	97.05	97.12	97.07	99.37	99.34
South	99.67	99.36	99.07	99.34	99.37	99.34
National Average	100.00	100.00	100.00	100.00	100.00	100.00

Source: Jitsuchon et al. (2004, Table 4)

APPENDIX E—GROWTH- & INEQUALITY ELASTICITY OF POVERTY

The mathematical expressions on both growth- and inequality elasticity of poverty here follow those derived by Kukwani (2001). Let $F(x)$ denotes distribution function of individual income and z the poverty line. Then, $H = F(z)$ is the proportion of the poor in the society, where H is the headcount ratio. A more general term of poverty, which can be applied to all other measures of poverty can be written as

$$\theta = \int_0^z P(z, x) f(x) dx \quad (\text{E.1})$$

where $\frac{\partial P}{\partial x} < 0$, $\frac{\partial^2 P}{\partial x^2} > 0$, $P(z, z) = 0$

and $P(z, x)$ is a homogeneous function of degree zero

The degree of poverty depends on two factors: average income and inequality.

This can be written as

$$\theta = \theta(\mu, L(p)) \quad (\text{E.2})$$

where μ is average income and $L(p)$ is the Lorenz function representing income distribution of the bottom p percent of population. The growth elasticity of poverty measures the change in θ with respect to the change in μ while keeping $L(p)$ constant. It can be written as

$$\eta_\theta = \frac{1}{\theta} \int_0^z x \frac{\partial P}{\partial x} f(x) dx \quad (\text{E.3})$$

The value is always negative as $\frac{\partial P}{\partial x} < 0$.

For inequality elasticity of poverty, it is more complicated as inequality can change in infinite way. Following Kukwani (1993), the Lorenz curve is assumed to shift by 1 percent. Here, the Gini index is used as the measure of inequality. The elasticity of poverty with respect to Gini is given by

$$\varepsilon_{\theta} = \frac{1}{\theta} \int_0^z \frac{\partial P}{\partial x} (x - \mu) f(x) dx \quad (\text{E.4})$$

If the economic growth raises the Gini index by 1 percent, the poverty will increase by ε_{θ} percent.

APPENDIX F—THE GREATER MEKONG SUB-REGION (GMS) PROGRAMME

The Greater Mekong Sub-region Economic Cooperation Programme (GMS Programme) was established in 1992 comprising of six countries along Mekong River. These countries are Cambodia, the People's Republic of China, Lao PDR, Myanmar, Thailand and Vietnam. The programme aims at promoting economic and social development in the region (Krongkaew, 2004). The cooperation involves nine areas; transportation, telecommunication, trade facilitation, investment, agriculture, environment, tourism and human resource development.

While the development projects under the programme were continuously implemented since the establishment in 1992, the programme took a major step at the Tenth Ministerial Conference in November 2001. The ministers agreed on strategic framework of the GMS for the next ten years along with the eleven flagship programmes. These programmes, in the priority order, are:

- (1) North-South Economic Corridor
- (2) East-West Economic Corridor
- (3) Southern Economic Corridor
- (4) Telecommunications Backbone
- (5) Regional Power Interconnection and Trading Arrangement
- (6) Facilitating Cross-border Trade and Investment
- (7) Enhancing Private Sector Participation and Competitiveness
- (8) Developing Human Resources and Skills Competencies
- (9) Strategic Environment Framework
- (10) Flood Control and Water Resource Management
- (11) GMS Tourism Development

Figure F.1 Greater Mekong Sub-region Economic Corridors



Source: ADB (2012, p.11)

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Among these, the first three are considered the most important projects. The economic corridors are shown in Figure F.1. The corridors involve mainly the construction of road networks connecting cities along the corridors. The road network between Thailand, Lao PDR and Vietnam on the East-West Corridor was completed and opened on June 11, 2009 (Ministry of Commerce [MOC], 2010). Construction of road and other transport networks on North-South and Southern Corridors are also in progress.

In addition to the transport infrastructure, the GMS countries also agreed to implement GMS Cross-border Transport Agreement (CBTA). Under the CBTA, there will be a single-stop inspection at the border, simplified visa regulations and exchange of traffic rights. This will reduce transport costs among countries in which each corridor passes through. Hence, the CBTA is expected to enhance transportation, tourism, trade and investment across member countries. The implementation of CBTA, however, not yet been succeeded. This is mainly due to the difficulties in integrating the border control and customs regulations across countries (MOC, 2010).

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