

Regional Disparity of Output and Income Growth in Thailand

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Abstract

This paper attempts to investigate the trend of inequality from the contribution of inter and intra regional disparity to the validation of convergence hypothesis and determinants of growth and level of income. The study shows that relationship between economic growth and inequality in Thailand is not clear to have followed Kuznets' pattern. Decomposition of inequality indices indicate that inter region inequality component accounts for the most of overall inequality though its contribution has decreased gradually. Furthermore, there seems to be no absolute convergence but conditional convergence across provinces in Thailand. Regression results show that FDI has positive relationship with growth of gross provincial product and household level of income. Finally, the study confirms the fact that demographic factors and characteristics of household head are important in determining level of household income.

1. Introduction

Kuznets (1955) proposed the idea of a nonlinear, inverted-U shaped relationship between growth and income inequality in what is widely known as "Kuznets curve". Based on his observation on cross-country data, income inequality increases as economic growth accelerates and then falls after it reaches a certain point. Up until now, there are ample of cross-sectional empirical studies and time series studies¹ on this subject in which some provide evidence in favour of Kuznets hypothesis and some reject it. Examples of countries whose pattern of growth and inequality do not follow the inverted-U path are Taiwan and South Korea.

In Thailand, a surge in foreign direct investment and manufacturing export boom, made Thailand become one of the fastest growing economies in the world, with a two-digit growth rate several years from the late 1980s to the beginning of 1990s. During this period, it is evident that poverty had declined due to rapid growth but income distribution did not seem to improve overtime.²

In terms of regional distribution, despite a high rate of growth, the pattern of development in Thailand was remarkably uneven. Economic growth has been disproportionately concentrated in the Bangkok and its vicinities. Bangkok, the adjacent areas of the Central Plain, and Eastern area are wealthier and more commercialised than the rest of the Kingdom. Bangkok and its vicinities output

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account for almost 50 percent of GDP. Its per capita GRP when compared to Northeast, the poorest region in term of GRP, in year 2001 is more than 8 times whilst the per capita GRPs of the Eastern and Central regions are 7 and 3 times that of the Northeast respectively. In terms of measures of urban primacy, with high degree of concentration of population, manufacturing and amenities, Bangkok is almost the most primate city in the world (Dixon 1999).

Regarding regional industrial structure, there seems to be an imbalance between agriculture and nonagricultural sectors, in which rapid transformation of the structure of production and slow change in employment structure has led to sectoral disparities in labour productivity and income earnings (Bhongmakapat 1990). It is also pointed out by Ikemoto (1991) that regional gap can be attributed to difference in industrial structure; pattern of the distribution of manufacturing industrial and traditional sector. In Thailand, government policies to promote industrialization in Bangkok and surrounding area, and later in the Eastern area since 1972 by establishing industrial complexes to attract investment from abroad have pushed these regions further ahead and left the others behind.³

This paper aims to examine the regional disparity in Thailand, first by examining the trend and components of inequality utilising decomposable inequality indices. It also provides empirical evidence on convergence, determinants of income growth, and the determinants of household income in Thailand using both macro data and micro data. The objectives of the analyses are to test the validation of convergence and to identify the crucial factors for catching up. The study also purposes to identify characteristics of households of rich/poor group and of seven regions, and determinants of level of household income using data from household survey. In addition, effects of foreign direct investment on output growth and household income are investigated in the regression parts.

The paper proceeds as follows. Section 2 shows income inequality indices, its decomposition, and the implication for Kuznets hypothesis. Section 3 introduces a convergence framework and growth regressions. Section 4 describes the characteristics of the rich and the poor, and households in seven regions of Thailand, with the regression to confirm the fact from the descriptive analysis. Section 5 concludes the paper.

Data Source and Scope of Study

The study utilises gross provincial product (GPP) data from National Economic and Social Development Board (NESDB), investment data from Board of Investment (BOI), and other statistics from National Statistical Office (NSO) and Thailand in Figure books. A Socio-Economic survey (SES) year 2000 of 24,747 sample size, conducted by the National Statistical Office (NSO) is used to study characteristics of household in Thailand. The separation of Sa Kaeo from Prachin Buri, Nong Bua Lam Phu from Udon Thani, and Am Nat Chareon from Ubon Ratchathani in 1993 resulted in a total of 76 provinces in Thailand. However, data from the initial 73 provinces are analysed in this study, to

accommodate the longitudinal data collected prior to 1993. They are classified into seven regions; Bangkok Metropolitan Region (BMR⁴), Central region, Eastern region, Northern region, Northeastern region, Southern region and Western region, in compliance with NESDB.

2. Trend of Inequality and Regional Disparity

In Thailand, there are large regional and provincial differences in output. Ranging in order of per capita Gross Regional Product (GRP), Northeast has been the area with the lowest regional per capita output, followed by North, South, West, Central, East region and BMR subsequently. While it is apparent that poverty has decreased during rapid growth and increased in the midst of economic crisis, the relationship between growth and inequality seems to be somewhat perplexing. Trend of

Table 1 Inequality Indices

	1984	1985	1986	1987	1988	1989	1990	1991	1992
Gini	0.431	0.420	0.410	0.446	0.459	0.463	0.479	0.481	0.484
CV	1.014	0.977	0.986	1.033	1.066	1.075	1.124	1.117	1.109
Theil T	0.180	0.170	0.175	0.189	0.198	0.201	0.215	0.215	0.215
Tb	0.134	0.127	0.131	0.144	0.153	0.157	0.169	0.168	0.167
Tw	0.045	0.043	0.044	0.045	0.045	0.045	0.047	0.048	0.048
Theil L	0.138	0.131	0.136	0.149	0.159	0.162	0.175	0.177	0.179
Lb	0.121	0.116	0.121	0.133	0.141	0.144	0.155	0.156	0.157
Lw	0.017	0.015	0.016	0.016	0.018	0.018	0.020	0.020	0.022
LV	0.301	0.295	0.300	0.314	0.326	0.332	0.355	0.361	0.368
LVb	0.196	0.195	0.200	0.212	0.221	0.227	0.242	0.245	0.250
LVw	0.105	0.101	0.100	0.102	0.105	0.105	0.113	0.115	0.118
	1993	1994	1995	1996	1997	1998	1999	2000	2001
Gini	0.496	0.491	0.487	0.483	0.488	0.472	0.477	0.479	0.480
CV	1.134	1.089	1.074	1.063	1.080	1.064	1.083	1.091	1.086
Theil T	0.227	0.224	0.221	0.218	0.221	0.209	0.216	0.214	0.216
Tb	0.175	0.170	0.166	0.161	0.159	0.145	0.147	0.147	0.146
Tw	0.052	0.054	0.055	0.058	0.062	0.064	0.069	0.068	0.069
Theil L	0.190	0.187	0.184	0.182	0.185	0.171	0.175	0.177	0.178
Lb	0.167	0.163	0.160	0.156	0.158	0.144	0.147	0.147	0.148
Lw	0.023	0.023	0.024	0.025	0.028	0.027	0.028	0.030	0.031
LV	0.383	0.385	0.385	0.384	0.390	0.372	0.378	0.383	0.387
LVb	0.262	0.262	0.263	0.261	0.262	0.249	0.253	0.256	0.260
LVw	0.121	0.122	0.122	0.124	0.128	0.123	0.125	0.126	0.127

Note: CV = coefficient of variation

LV = the log-variance of income or variance of the logarithms of income

Tb, Lb, and LVb refer to between-region inequality.

Tw, Lw and LVw refer to within-region inequality.

Source: Author's calculation based on GPP data

inequality based on Gross Provincial Product (GPP) and the role of regional disparity in overall inequality are discussed here.

Table 1 shows inequality indices computed from GPP data from 1984 to 2001. Inequality rose perpetually from the late 1980s which is the period that Thailand experienced rapid growth, export boom, and influx of money from abroad in the form of foreign direct investment, and portfolio investment after Thailand adopted liberalization policy in the early 1990s. Most indices including Gini, Coefficient of variation (CV), Theil T, and Theil L indices, reached their peak value in 1993 before gradually declining.

Inequality indices heightened again in 1997, the year economic crisis broke out. A year after the crisis saw an improvement in income distribution as all indices showed a decline in value. Leading regions, BMR and Central region, were severely affected by the crisis that their GRPs contracted sharply. Other regions with larger share of agriculture in total output benefited from favourable agricultural term of trade due to exchange rate depreciation so that their GRPs did not fall much in 1998. After 1998, exchange rate appreciated and inequality has increased.

The Thai experience differs from experiences of other countries such as South Korea, and Taiwan, where inequality had fallen in the course of growth. It is still inconclusive when it comes to Kuznets inverted-U hypothesis. Thai economy between 1985 until mid 1990s was characterized by growth in national output along with an increase in inequality which supposed to reach the peak in 1993 before falling down. Nonetheless, because of the crisis, no clear trend is observed afterwards.⁵

Some inequality indexes such as Theil T index, Theil L and variance of logarithms of income (LV) can be further decomposed into subgroups. Here, the decomposition of total income inequality into within-region and between-region shows high between-region inequality and low within-region inequality. All measurements employed are consistent in this fact. Within-region inequality contributes from less than 20 percent of total inequality in case of Theil L index, to around 20 to 30 percent when LV and Theil T indices are used. It is also observed from the table that within-regional disparity has been slowly growing overtime.

By region, the order of contribution is not the same across inequality measurements because it depends on the formula of each measurement.⁶ Nonetheless, broadly speaking, BMR and Eastern regions are among the top two regions with highest inequality while the region which has the least inequality tends to be Western region.

3. Growth Empirics

Neoclassical growth model developed by Solow (1956) and Swan based on aggregate production function assumes exogenous technology progress. Growth is subject to diminishing returns and is a temporary phenomenon. Diminishing return to the accumulation of capital causes growth rate to

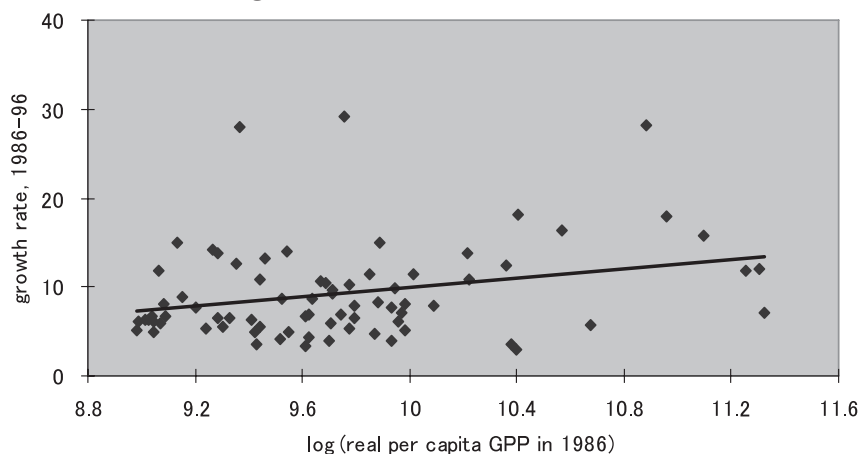
decline as the economy approaches its steady state level. It implies convergence in per capita incomes. Poor countries will catch up with rich countries because they grow faster. Endogenous growth theory in contrast, views capital in a broader sense. It combines human capital with physical capital which is then not subject to diminishing returns. In this sense, growth can be sustained indefinitely because diminishing returns would not apply when capital accumulates overtime, making it possible for rich countries to always grow faster than poor countries.

The concept of convergence is to test whether economies with lower starting level of income will grow faster than ones with higher starting level of income. In brief, if the convergence hypothesis is validated, poor economy will catch up with rich one. In this sense, it is absolute convergence. Conditional convergence, on the other hand, is the convergence under condition that some specific characteristics of the economies are controlled for.

Many studies on the topic of convergence have been done on the basis of cross-country regression. Ones of these numerous works are those of Barro and Sala-i-Martin, 1995, and Barro, 1997 which are based on large sample of countries around the world during the time period of 1960s to 1990. The study found negative correlations between country initial income per capita and its growth rate when controlling for other factors. In addition, their growth regression shows positive correlations between growth and education attainment, life expectancy, saving rate, investment to GDP ratio and, negative correlation with inflation rate, government consumption etc. See Bleaney (2002) for a variety of models and variable choices. Quah (1993), however, criticized Barro's method for reason of instable growth path overtime. He proposed a transitional matrix as an alternative approach to investigate changes in income across economies.

Regarding the convergence of growth across regions, Barro and Sala-i-Martin detected the

Figure 1 Growth rate and level of GPP



Note: Estimation for this graph is $Y_g = -19.466 + 2.92 \ln Y$
 t-ratio $(-1.918)^* (2.812)^{**}$

convergence of the 48 US states in 1880–1990, 47 prefectures of Japan during 1930–1990 and 90 regions in 8 European countries in 1950–1990, with estimated convergence rate ranging from 0.010 to 0.030. An abundance of literature survey has been done on this subject (See De la Fuente (2002), and Togo (2001) for survey of convergence in East Asian economies). The Nantamanasikarn (2002) study on the convergence of growth rates across provinces in Thailand for the period of 1983–1999 based on Solow model, reports divergence of income when applying single cross-section data and convergence when pooled data is used and fixed effect is accounted for. Although those province-specific effects are not identified separately, he remarked that they are very important in explaining differences in provincial growth rates.

The figure plots between per capita gross provincial product (GPP) and growth rate of 73 provinces in Thailand exhibits positive sign indicates that convergence in an absolute sense does not exist. Instead, there is a divergence of growth rates across provinces. Absolute convergence implies a common steady state of income level so that the initial poorer provinces will grow faster in per capita terms and will catch up with the richer provinces. A slight positive relationship between average growth and initial level of real per capita GPP observed from figure 1 tells us that the reverse is true. Poor provinces seem to grow at a slower rate than the rich provinces and absolute convergence does not apply to cross-provincial data of Thailand.

3.1 Growth Regression

In the event that the assumption of common steady state level of income does not hold, by allowing for provincial specific effect, it would be interesting to find out if there is a conditional convergence. This is done by differencing the regression equations to eliminate the unobserved time-invariant fixed effects. Here, the data used in the equation is pooled data of two major periods; 1986 to 1996, and 1996 to 2001.⁷ The result is as followed.

$$\begin{aligned} \Delta Y_g &= 1.57 - 18.833 \Delta \ln Y \\ \text{t-ratio} & (2.239)^{**} \quad (-17.626)^{**} \quad R \text{ squared} = 0.814 \end{aligned}$$

ΔY_g = difference between growth of per capita GPP of the two periods (1986–1996, and 1996–2001)

$\Delta \ln Y$ = difference between ln per capita GPP year 1986 and 1996

A negative coefficient sign from the equation denotes that conditional convergence is validated when time-constant unobserved effects are controlled for, suggesting that there are some provincial specific factors determining different steady states of income. These might be distinct characteristics of province; for example, education level, natural resource endowment, other institutional factors, etc. In order to identify these provincial specific characteristics, many variables are introduced in the determination of growth. (See Barro 1997: 8) Framework for the analysis is:

$$D_y = f(y, y^*)$$

where D_y = growth rate of per capita GPP, y = initial level of per capita GPP, y^* = long run or steady-state level of per capita GPP. The value of y^* depends on a vast array of variables that affect transitional change of growth from social and economic characteristics to policy variables; for instance, saving rates, labour supply, fertility rates, terms of trade, ethnic factors etc.

Table 2 Regression for per capita growth rate Dependent Variable: y_g 1986–1996, 1996–2001

	OLS (1)		OLS (2)		2SLS	
	coeff.	t-ratio	coeff.	t-ratio	coeff.	t-ratio
(Constant)	68.597	6.43**	87.023	5.57**	68.072	6.09**
POOLNY2	-6.08	-5.92**	-6.151	-4.53**	-6.359	-5.73**
PLRSTU2			-0.335	-1.16		
PLRBED2			4.580	2.55**		
PLWATER2			-1.366	-2.52**		
PLRKIF2			0.246	2.27**	0.251	2.36**
PLRKID2			0.193	2.16**	0.168	1.77*
DUMMYBKK	4.589	1.76*	6.757	2.52**	6.485	2.46**
DUMMYE	3.112	1.34	1.683	0.70	2.279	0.98
DUMMYN	-5.798	-2.89**	-4.160	-2.09**	-3.076	-1.55
DUMMYNE	-8.258	-3.85**	-7.977	-3.09**	-5.364	-2.56**
DUMMYS	-2.85	-1.42	-2.317	-0.97	-0.103	-0.05
DUMMYW	-2.906	-1.22	-0.665	-0.29	-0.659	-0.28
observations	146		146		146	
R-squared	0.237		0.420		0.250	
F	6.128		8.042		5.050	

Note: 1. Pooled data of two periods 1986 to 1996 and 1996 to 2001 is used in the regression.

2. Independent Variable is growth rate of per capita GPP of 73 provinces.

3. Dependent Variables:

POOLNY2 = natural log of initial per capita GPP year 1986 and 1996

PLRKIF2 = ratio of FDI to GPP year 1988 to 1996, and 1996 to 2001

PLRKID2 = ratio of domestic investment to GPP over the same period

PLRBED2 = ratio of number of hospital beds to population (thousand) year 1986

PLWATER2 = irrigated area in 1985 and 1995

PLRSTU2 = ratio of number of students per teacher year 1985 and 1996

Dummies of six regions in Thailand

4. * and ** mean significant at the 10 and 5 percent levels, respectively.

Source: refer to “data source and scope of study”

Table 2 displays growth regression results based on pooled data of two periods; 1986 to 1996 and 1996 to 2001. First, the simple OLS method is employed in regressions. Regression 1 shows the result when regional dummies are included with initial income variable. It implies that not only the initial income but also the region the province belongs to is important to growth. Treating Central Region as reference, BMR dummy gives a positive coefficient at 10 percent significant level. On the contrary, Northeast and North area give negative and significant coefficients. By Taking regional

dummies into account, the sign of initial income becomes negative which means that conditional convergence exists.

Other provincial characteristics are included in regression 2. Ratio of students to teacher is introduced in the regression to represent the education effect (on the quality side) on growth. The sign is negative and insignificant. It is more desirable to have school enrollment ratio, average years of schooling or literacy rate which are widely used in cross-country regression analysis for the proxy of education effect, but the choice of data available at provincial level is rather limited. Health variable represented by ratio of hospital beds to population shows positive and significant sign to growth rate. Irrigated area as a proxy of primary sector is negatively related to growth as provinces with big irrigated areas tend to have low growth since those regions would concentrate in agriculture.⁸

The result shows that the impact of both FDI and domestic investment on growth is positive and significant. According to the AK approach to endogenous growth, savings will raise the growth rate through investment channel and diminishing return will not occur. (Aghion and Howitt, 1998: 24 – 31) As illustrated in the table, FDI seems to generate greater positive impact on economic growth compared to domestic investment.

After adopting Hausman approach for testing endogeneity, regression 3 is estimated by 2SLS method. Coefficients of domestic investment and FDI variables are positive and significant. The result reasserts the importance of investment and regional dummies variables on growth of provincial output in Thailand.

4. Analysis from Socio-economic survey (SES) 2000

In this section, I will describe the characteristics of the rich and the poor, and households in each region. The first part presents a descriptive analysis. The regression in the second part attempts to find the determinants of household income.

4.1 Characteristics of the rich and the poor

Table 3 shows percentage of people belonging to rich and poor households in various aspects. Based on socioeconomic survey data, it points out why some people are rich while others are poor. Underlying causes vary from demographic structure, household head characteristics to composition of income earned by each group as described below.

From the table, percentage of people belonging to male-headed families is bigger than those belong to female-headed family both in top and bottom quintiles. Those in female-headed family tend to fall in the middle group. Age of household head of the rich group is about 5 years younger than their poor counterpart on average. As expected, size of the family and average number of dependents (children less than 15 years old and the old age over 60 years old) are much smaller for rich

Table 3 Description of poor and rich households, SES 2000

	Income per capita quintile			
	Q1	Mid (2,3,4)	Q5	
Gender of household head (%)				
Male	26.0	58.8	15.2	100
Female	21.0	63.0	16.0	100
Education (%)				
Less than/equal primary	32.1	61.5	6.4	100
lower secondary	10.7	68.1	21.2	100
upper secondary	6.0	68.3	25.7	100
vocational/teacher training	2.3	69.5	28.2	100
university or higher	0.9	6.6	92.5	100
Average:				
age of household head	50.7		45.7	
no. of earners	2.1		1.7	
Household size	4.4		2.7	
Number of children	1.4		0.4	
Number of the old	0.5		0.3	
Socio-economic class of households (%)				
farm operator, mainly owning land	32.6		3.5	
Mainly renting land	7.1		0.7	
fishing, forestry	1.0		0.3	
entrepreneurs, trade and industry	11.5		25.0	
professional, technical&managerial	1.0		39.7	
Labourers	16.8		0.2	
other employees	15.8		21.0	
economically inactive	14.0		9.6	
	100		100	
mean income per capita (baht)	862		12297	
consumption per capita (baht)	1114		6285	
Total money income (%)	59.4		88.5	
wage&salaries	41.8		54.8	
farm income	27.4		5.7	
Income-in-kind	40.6		11.5	
total current income	100.0		100.0	
public health insurance	42.7		7.9	

Source: Author's calculation

households than those of the poor. This is because household income is distributed among its member so that the bigger the household size the lower per capita income is. The rich group also has fewer wage earners most likely because of smaller family size and their higher income.

One out of three people whose household head has less than or equal to primary education is poor, but if the head has had university education or higher, it is almost guaranteed that all of them will be well off. Thus, the more educated the household head is, the less likely their family will be poor.

With respect to the socioeconomic class of households, more than 30 percent of poor people are from agricultural-related families, in contrast to very slight proportion for the rich group. A considerable number of the poor belongs to families with household heads working as labourers or are economically inactive. Owing to the fact that the rich are better educated, most of them are in professional, technical & managerial categories, and entrepreneurial, trade and industry categories.

Mean Income of the rich is 14 times larger than the poor. Worth noting is that the poor consume more than they earn while the rich have enough to save. Composition of income of the rich is also different from the poor. Wage, salary and entrepreneurial income are the main source of income for the rich people. While the share of farm income is negligible for the rich, it contributes more than one-fourth of total current income for the poor. For the poor, income-in-kind is as important as wage & salary, accounting for 40 percent of total current income. The percentage of households receiving benefits from the government, for example, health insurance cards, is much higher for the poor than the rich since the latter group receives health insurance through employment in the formal sector.

4.2 Regional Perspective

It is evident that there are distinct patterns of regional socioeconomic structure in Thailand. As a result, households in each region also have their unique characteristics. In order to understand the gap between regions, table 4 shows geographic breakdown of households across 7 regions and their features.

The disparities between regions can be observed easily when considering the mean income of each region. Households in BMR have the highest mean income followed by those in the Eastern, Central, Southern, Western, Northern, and Northeastern respectively. Around one-third of people live in urban area, except in BMR where the opposite is true. On average, households living in urban area earn twice as much as those in rural area. The urban rural gap, roughly measured by income ratio is more pronounced in poor regions i.e. the Northeast and the North, than in more developed area such as BMR, Central, and the East. From decile data, Gini coefficient for each region can be computed.⁹ It is shown that Northeast region has the highest level of inequality while BMR has the lowest within-region inequality. The value of Gini coefficient computed by NESDB is higher but the ranking is consistent. In terms of mean per capita income, Northeast is the poorest region and most unequal region followed by the North and the West respectively. This might be explained by the low earning and low productivity in agricultural sector that has led to a smaller share of income for the poor in Northeast region as compared to BMR.¹⁰

Regarding to socioeconomic class, similar patterns of distribution of households in Central and

Table 4 Geographical breakdown

	BMR	C	E	NE	N	S	W	All
Average income of the 1 st quintile	956	936	946	823	886	868	958	862
Average income of the 5 th quintile	12573	12664	11722	12425	11800	12301	12433	12293
Income ratio (Q5/Q1)	8.0	11.1	10.4	15.7	12.7	13.5	10.0	14.3
Gini coefficient	0.339	0.367	0.348	0.456	0.421	0.396	0.359	0.418
mean income (baht)	6643	4040	4117	3081	3411	3815	3764	3888
Urban	7722	5124	5691	5129	5341	5819	5463	5902
Rural	4715	3476	3245	2180	2542	2870	3193	2796
urban/rural gap	1.6	1.5	1.8	2.4	2.1	2.0	1.7	2.1
consumption per capita (baht)	4539	2815	2957	2109	2388	2606	2461	2677
age of household head	43.1	50.9	47.7	49.3	50.5	47.7	50.8	48.6
no. of earners (average)	1.9	1.7	1.8	2.0	1.8	1.9	1.9	1.9
Education of household head (% of hh)								
primary education	58.1	75.0	74.1	75.3	76.8	69.7	79.9	72.8
lower secondary	12.2	7.8	9.1	7.5	7.7	10.3	7.2	8.7
upper secondary	7.5	4.7	3.3	4.1	3.4	5.2	3.6	4.5
vocational, teacher training	13.0	6.2	7.7	8.2	6.9	7.9	4.2	8.0
University or higher	8.7	6.1	5.8	4.8	5.1	6.7	5.1	5.8
others or unreported	0.5	0.1	0.1	0.0	0.1	0.1	0.0	0.1
	100	100	100	100	100	100	100	100
Socio-economic class (% of hh)								
farm operator, mainly owning land	1.4	8.4	7.3	20.8	11.7	17.0	12.4	13.3
farm operator, mainly renting land	1.1	5.4	2.4	2.2	5.0	0.8	3.7	2.8
fishing, forestry etc.	0.1	0.2	0.9	0.3	0.2	1.9	0.6	0.6
entrepreneurs, trade and industry	23.3	20.7	25.0	20.0	21.4	25.6	22.8	22.3
professional, technical & managerial	15.3	9.9	11.4	11.8	10.7	12.4	7.1	11.6
Labourers	3.1	4.8	8.5	5.6	9.4	9.1	10.2	7.2
other employees	47.6	32.2	31.7	20.2	22.3	22.3	30.3	26.8
economically inactive	8.0	18.4	12.9	19.0	19.4	10.9	12.9	15.4
	100	100	100	100	100	100	100	100
structure of employment								
type of industry (% of workers)								
Agriculture	6.7	28.0	30.1	52.4	41.4	36.7	37.7	37.6
Manufacturing	31.1	19.2	16.7	6.0	9.3	9.3	13.6	12.5
Service	52.3	42.5	43.3	33.0	38.7	45.4	38.0	40.4
Others	10.0	10.3	9.8	8.6	10.6	8.7	10.6	9.5
	100	100	100	100	100	100	100	100
total money Y per capita (average)								
Agriculture	3998	4270	3000	1677	2010	3302	3543	2389
Manufacturing	8378	6883	7103	5556	3825	5320	4772	6332
Service	11617	7817	8122	8464	7641	8597	7481	8692

Source: Author's calculation

Eastern regions are observed. Region with distinct character is BMR where a small proportion of household have their household heads engaged in agricultural activities. As for the share of workers (defined as 15 to 60 years old employed household members), national average of around 40 percent are in the service industry. The share is particularly high in BMR. Regions with higher average percentages of workers working in manufacturing industry relative to others are BMR, Central, and Eastern regions. This is in accordance with distribution of industries and its activities with respect to location. Most of industrial firms are clustered within and around these areas because they have better facility, better transportation and communication systems (airport and harbour) as well as educated labour supply. Per capita income of workers by industry tells us that people working in services and manufacturing are better off than those in agriculture sector. The same can be said for BMR, Central, Eastern areas and between urban and rural areas.

Table 5 Share of public expenditure and private investment

		BMR	C	E	NE	N	S	W	Total
population (%)		18.2	4.7	6.2	33.7	18.0	13.4	5.6	100
public expenditure (%)		40.5	4.4	6.2	19.7	14.1	10.3	4.7	100
BOI	year								
no. of projects	1988	67.4	4.9	8.9	4.0	3.1	8.9	2.7	
	2000	26.4	13.6	31.8	7.5	11.2	5.4	3.4	
Investment	1988	60.5	13.7	10.5	3.4	1.5	8.1	2.3	100
	2000	26.6	6.5	53.2	2.6	4.2	2.2	4.6	100

Source: National Statistical Office and Board of Investment

The next table summarizes the data of the distribution of public expenditure and private investment by regions. All seven regions received government expenditure and investment from abroad but to very different extents. More than 40 percent of budget is allocated to the capital city and surrounding areas. As for private investment between 1988 to 2000, around 70 to 80 percent of BOI project (or around 85 percent of invested money) is clustered within 3 regions BMR, Central, the East, even though the rankings of these regions has changed over time. Investment has shifted to Eastern region where big industrial estates are located.

4.3 Modeling the determinants of household income

This section presents regression results using socioeconomic data from survey year 2000. By treating level of household income per capita as a dependent variable, regressions in table 6 aim to identify the determinants of per capita household income and confirm the fact from the previous descriptive analysis.

The first column sets central region as a reference, and it confirms the disparity of income between regions we found previously in the descriptive analysis. Almost all geographic variables are

Table 6 Regression Model of logarithm of household income per capita
Dependent variable: Natural log of household income per capita

	Coeff.	t-ratio	coeff.	t-ratio	coeff.	t-ratio	coeff.	t-ratio
(Constant)	8.071	369.08**	8.853	404.48**	8.059	191.48**	8.205	183.38**
MUNICIP			0.395	32.03**	0.264	22.46**	0.233	19.97**
VILLAGE			-0.234	-19.41**	-0.124	-10.69**	-0.144	-12.64**
Household size			-0.143	-51.4**	-0.049	-13.89**	-0.054	-15.53**
AGE			0.004	12.93**	0.008	23.42**	0.008	25.96**
GENDER			0.009	0.84	0.024	2.24**	0.026	2.54**
LOWSECON			-0.829	-65.85**	-0.779	-65.69**	-0.786	-67.36**
DEPENDENT					-0.187	-35.78**	-0.179	-34.87**
single parent					-0.067	-3.80**	-0.057	-3.28**
ELECTRIC					0.464	12.86**	0.469	13.23**
AGRI					-0.416	-36.50**	-0.362	-31.86**
MANU					-0.061	-2.74**	-0.041	-1.87**
ln FDI					0.012	23.41**	0.004	6.44**
BMR	0.537	19.84**					0.258	12.30**
EAST	0.061	2.06**					0.046	2.03**
NORTHEAST	-0.389	-15.97**					-0.209	-10.76**
NORTH	-0.229	-9.21**					-0.162	-8.52**
SOUTH	-0.081	-3.15**					-0.020	-1.01
WEST	-0.046	-1.48					0.081	3.46**
R-squared		0.09		0.38		0.463		0.482
F		420.20		2546.06		1776.68		1280.18
number of observations		24747						

Note: 1. Dependent variable is log of household income per capita.

2. Independent variables:

Household size = number of people in a household

AGE = age of household head

DEPENDENT = number of dependents (children less than 15 years old and adult over 60 years old)

ln FDI = provincial FDI expressed as natural log of average FDI of past five years

Dummies variables consist of

Community types: municipal (MUNICIP), sanitary district¹¹ = 0, village (VILLAGE)

Education level: lower than/equal to lower secondary (LOWSECON) = 1, else = 0

Gender of household head (GENDER): male = 1, female = 0

Status of household head: single parent = 1, else = 0

Have electricity (ELECTRIC): yes = 1, no = 0

Types of enterprise: agriculture (AGRI), manufacturing (MANU), service = 0

Seven regions: central = 0, else = 1

3. * and ** mean significant at the 10 and 5 percent levels, respectively.

Source: Author's calculation based on data from SES 2000 and BOI data

significant, with the highest positive level in BMR and lowest negative level in Northeast. The next regression shows basic determinants of per capita household income. Households living in urban (municipal) have more per capita income while those living in rural (village) have less, ceteris paribus. One interpretation could be that there is more opportunity for employment with higher pay available

in the city than elsewhere. Households whose household heads having education levels lower than or equal to lower secondary school, which is the compulsory level, are likely to earn lower income than their counterparts. According to findings from regression coefficients and t statistics, among other variables, education has the strongest and most significant effect on the level of income.¹²

Household size matters (negatively) as household income is distributed among household members. The number of dependent members, those not belonging to the labour force, is also negatively related to per capita income. The status of household heads, whether he/she is a single parent, is also important. Families with single parents tend to have lower per capita income. The types of enterprise household heads engage in influence income, since agriculture-related work results in lower earnings. Manufacturing industry has smaller effect comparatively and is just statistically significant (at 10% level) when regional dummies are introduced.

A small positive, but also very significant effect of average foreign direct investment (FDI) was observed when the variable was added into the regression. The result is not surprising since compared to household variables which are considered to have direct influence on household income, FDI is expected to have minor effect. Lastly, as expected the regional dummies have a smaller effect on household income once many household characteristics and FDI are accounted for.

5. Concluding Remarks

According to many inequality indices based on gross provincial product, Thailand has gone through a period of high inequality and high growth in the late 1980s to the mid-1990s. Incidence of inequality seemed to have reached its peak in 1993/1994 and declining afterwards. A year after economic crisis there was a reduction in inequality but the index has risen again making Kuznets hypothesis seems inconclusive to Thai experience. The second wave of Kuznets inverted-U curve might occur after the crisis but that is still open to question. Apart from this, inter-region inequality contributes to about 70 to 80 percent of total inequality. Although intra-region inequality is much lower, its share in total inequality has been rising gradually.

Despite the nonexistence of absolute convergence in that low income provinces tend to grow more slowly and are unable to catch up, the empirical findings for a panel data of Thailand support the conditional convergence idea that controlling for structural differences between provinces, growth is negatively related to the initial level of income. Findings from growth regressions indicate that investment is important and is positively related to growth rate. In addition, FDI seems to outperform domestic investment in terms of explaining growth.

The key result from micro data analysis reveals that there are many crucial household characteristics that determine its level of income. These characteristics are not the same for rich and poor households. Poor households tend to be engaged more in agriculture sector, obtain less education

and have larger families than do the rich. Most of the poor live in rural areas and the income gap between the poor and the rich is substantial. In terms of region, it is apparent that structure of employment and type of industry in which households belong to is different; with more households engaged in non-agricultural sector in BMR, Central and Eastern regions where the mean income is higher than elsewhere. Government expenditures and private investment are said to be responsible for this disparity due to their concentration in these leading regions.

The analysis leads to policy recommendations for the government to improve the state of health and education in Thailand. Education is a very important determining factor for household income. Providing more subsidies and loans for education to increase the opportunities for the poor, and ensuring that compulsory level of education is achieved universally, would help to raise people living standards. A considerable number of the poor works in agricultural sector where there is lower pay compared to manufacturing and service sectors. Improving agricultural productivity and shifting the surplus labour (seasonal unemployed, underemployed) to other sectors would help alleviate poverty.

The results of the analysis suggest that policy planners pay serious attention to regional disparity. The industrialization process in the past has left imbalances in structure of production and employment as well as urban/rural and regional gap. There is a need for government to put a greater emphasis on poor region and rural development and less bias on rich region and urban area by allocating substantial share of budget towards rural areas to create sustainable job and permanent income. Additionally, government should invest more in infrastructure, and support investment zones in remote areas to attract private investment, both domestic and from abroad. Incentives, good infrastructure, transportation system, access to market, and good pool of labour are among determining factors for foreign investment to be allocated in an area. To reduce spatial disparity, government, BOI and private sector can collaborate and decide on practical measures to encourage investment from abroad be distributed to less developed area.

Notes

- 1 Cross-section study is when one looks at the change in different countries at a single point of time whereas time-series trend study looks at course of change of country overtime. Two methods of study are distinguished because what is going on across countries might be different from what is going on within countries. See Fields (2001) for details.
- 2 Poverty incidence has declined from 22.9 percent in 1980/1 to 6.15 percent in 1996. It was 8.58 percent in 1999 after the crisis. Based on provincial data from household surveys, Deolalikar (2002) explored the relationship between poverty, inequality and growth in Thailand by regressing poverty incidence on mean income, Gini coefficient and other variables, and found that poverty and income inequality are positively related.
- 3 The government attempts to promote export industries and to encourage industry to relocate in area other than Bangkok began in the 3rd National Economic and Social Development Plan (1972–1976). However, it is in the 4th plan (1977–1981) that improving income distribution was set as a policy target. In 1972, BOI has provided incentives for firms locating in peripheral area outside Bangkok. Despite that, lack of infrastructure and the

difficulty of coordinating the necessary activities of the various government agencies are main obstacles for industry to develop in provincial areas.

- 4 Bangkok Metropolitan Region (BMR) consists of Bangkok and five adjacent provinces of Nonthaburi, Pathum Thani, Samut Prakan, Samut Sakhon and Nakhon Pathom. It is included as one of seven regions for planning and statistical purposes according to NESDB.
- 5 The author also calculated inequality indices by using new series of GPP data available from 1996 to 2004. Most indices show an increase trend of inequality after the crisis. Ikemoto and Uehara (2000) utilising household income data, asserts that after the mid 1990s, there is no clear downward trend of inequality in Thailand despite their opinion that Thailand has reached the turning point of Kuznets curve in the early 1990s. They explain that there emerged a new wave of Kuznets curve caused by the shift of leading industry from export oriented labour-intensive manufacturing to the financial sector. Motonishi (2003) analysis based on Thai household data (1975–1998) concludes that Kuznets hypothesis is invalid.
- 6 Each index is different and up to present, there is no best inequality index. Some inequality indices treat population share as weight while others use income share, for example. Therefore, based on the better the more information merit, it might be useful to review many indices to catch overall trend of inequality. For the formula of inequality indices, refer to Fields (1980).
- 7 The choice of 1996 as a dividing line is based on growth rate which dropped substantially to half of that of the previous year, and is also consistent with Nantamanasikarn (2000) study.
- 8 The population variable was added in regression nonetheless, it gave the positive sign which indicates probably labour force or employment allowing for migration.
- 9 Compared to Gini coefficient in table 4, the disparity of GPP (0.479) in table 1 exaggerates the disparity measured by household income (0.418).
- 10 The lower 40 percent of people in BMR receives 20.5 percent share of income while those in Northeast receives 13.8 percent of income.
- 11 To put it differently, municipal is inner urban, sanitary is outer urban and, village is rural area.
- 12 Other levels of education, namely primary and higher education, was put into the model but it was secondary level of education that gave the biggest and most significant sign among all. This might be because as a compulsory level of education, it is the basic requirement for a job even the least unskilled one.

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