

Does Economic Growth Help Reducing Poverty? A Case of Thailand in Recent Data

Wannaphong Durongkaveroj

Abstract Thailand's performance on poverty reduction is obviously impressive because it has already achieved the first goal about halving poverty rate of the Millennium Development Goals promoted by the United Nations Development Programme. The main reason for this success is an outstanding economic growth which is widely accepted to be an efficient tool in eliminating of poverty in many developing countries. This paper attempts to quantitatively estimate the relationship between per capita income and poverty rate in Thailand at national and provincial level using the panel data between 2006 and 2013, and then to suggest the proper policies to accelerate the progress on poverty.

The result reveals that poverty in Thailand is highly elastic to the level of per capita income. For the whole country, a 1% increase in per capita income will lead to 1.0595% decrease in poverty. For provincial analysis, it is found that there is a huge difference in the responsiveness of growth on poverty among all provinces. Additionally, it is stated that there are 39 provinces of 75 provinces which have high growth elasticity of poverty while there are 9 provinces having the reversed correlation between per capita income and poverty rate. Lastly, this study also suggests that the government or related organizations should concern more about the different policies in each province in getting the poor out of destitute and low living standard.

1 Introduction

From the first and most important goal of the Millennium Development Goals (MDGs) issued by the United Nations Development Programme (UNDP) to Thailand's National Economic and Social Development Plans issued by the National Economic and Social Development Board (NESDB) of Thailand, poverty reduction is the priority, in term of policy, among all development targets. Since the 5th NESDB's plan (1982–1986), poverty has dramatically declined; meanwhile, Thailand has also

W. Durongkaveroj (✉)

Department of Development Economics, Faculty of Economics,
Ramkhamhaeng University, 10240 Bangkok, Thailand
e-mail: Wannaphongd@gmail.com

Table 1 Thailand's poverty by regions (Percent of total population in each region)

Regions	2008	2009	2010	2011	2012	2013	Change 2008–2013
Central	12.83	11.18	10.77	10.36	6.94	5.40	−57.90
Southern	16.77	17.03	14.24	10.12	13.32	10.96	−34.63
Northern	29.05	23.38	22.33	16.09	17.40	16.76	−42.30
Northeastern	31.19	27.71	25.26	18.11	19.79	17.37	−44.30
Whole Kingdom	20.43	17.88	16.37	13.22	12.64	10.94	−46.46

Source NESDB (2015)

achieved spectacular economic growth and expanding investment in many sectors which are considered to be the great engine of development. As a result of all positive factors, Thailand is now high human development country [34].

For measuring poverty, the main tool is poverty rate (ratio) which is the percentage of population living below the poverty line. There are two types of the poverty line including the international poverty line issued by the World Bank and the national poverty line normally issued by the national statistic office in each country. According to the World Bank [35], the latest poverty rate at \$1.25 a day purchasing-power parity (PPP), as an international poverty line, in Thailand in 2010 is very low where only 0.31 % of its total population is the poor. It is relatively low to other countries in the same region, for example, Indonesia, Vietnam, and China. However, the picture of poverty is different when it is measured by another criteria. Using the national poverty line issued by NESDB [24], poverty rate in Thailand in 2010 is 16.37%. The reason for higher poverty rate measured by the national poverty line is that the national poverty line is normally derived from an average income of population which is certainly higher than \$1.25 PPP per day. Thus, it is clear that the result of poverty depends on the threshold.

Thailand has an impressive outcome in poverty reduction because poverty ratio for the whole country measured by the national poverty line has declined from 32.44 % in 2002 to only 10.94 % in 2013. Nevertheless, the more important issue is the performance in each province. As revealed, there is a huge difference across all regions in an elimination of poverty ([6], Jitsuchon and Richter 2006). It is stated that progress of poverty reduction has been slowest in the Northeast, followed by the North and the South. Interestingly, there is no significant change in the rank of performance over time. The recent data of poverty rate in Thailand measured by the national poverty line in each region are shown in Table 1.

According to Table 1, poverty rate for the whole country declines from 20.43 % in 2008 to 10.94 % in 2013 which means that Thailand is able to halve its poverty rate within five years. In regional performance, the Northeastern part has highest poverty rate, followed by the North and the South. However, the interesting issue is a change of poverty rate between 2008–2013. The central part is the most successful region because its poverty rate is declined by 57.90 %, followed by the Northeastern and the Northern part.

Table 2 Thailand's Per capita income by regions (Thousand Thai Baht)

Regions	2008	2009	2010	2011	2012	2013	Change 2008–2013
Bangkok and Vicinities	321	307	326	332	362	376	17.42
Central	212	204	222	211	229	239	12.51
Eastern	366	339	380	386	424	431	17.59
Western	102	106	111	120	126	127	25.07
Northern	64	65	74	80	93	98	52.44
Northeastern	43	49	56	61	69	75	74.67
Southern	104	100	121	133	126	123	18.44
Whole Kingdom	149	147	164	171	186	193	29.84

Source NESDB (2015)

Notes Central region is separated into four parts including Bangkok and vicinities, Central, Eastern, and Western part

As poverty rate is directly related to the level of income [23, 32], a change in the level of income, thus, will certainly lead to a change in the standard of livings among citizens. The recent data of per capita income of Thailand in each region are shown in Table 2.

According to Table 2, per capita income of Thailand in 2013 is 193 thousand Thai Baht which is increased by 29.84 % from 2008. However, this table displays a situation of income inequality in Thailand as well because there is a difference of per capita income across regions. Per capita income is highest in the East, followed by Bangkok and vicinities, and the central part. However, every region enjoys growth in this indicator, especially the Northeastern part—the poorest region in Thailand—which has the highest growth of per capita income. As a result, it is a good sign throughout the country for an improved living standard.

For the solution of poverty, many literatures highlight the role of economic growth which is referred to an increase in Gross Domestic Product (GDP) or per capita income. The relationship between economic growth and poverty reduction is realized as Growth Elasticity of Poverty (GEP) which can be derived through log-linear regression model and direct calculation. It presents the responsiveness of a change in income to poverty reduction [1, 3, 4, 7, 9, 10, 13, 18, 25, 27, 29, 30]. From the study of GEP in Thailand, poverty is highly elastic to economic growth [8, 15, 17, 20, 26]. Those papers have suggest a single value of GEP which is calculated at national level. However, each province has the different condition in economic development. Thus, it is necessary to consider the value of GEP in regional or provincial level as well. There are few papers considering the regional GEP [2, 22, 28] but there is still no study about regional/provincial GEP for Thailand whose poverty reduction is outstanding as revealed in Table 2.

2 Objectives

The purposes of this study are to quantitatively estimate the economic growth elasticity of poverty at both national and provincial level, and to suggest the proper policies targeting poverty reduction.

3 Methods

Per capita income and poverty rate measured by the national poverty line are collected from the NESDB. The balanced panel dataset covers 1,200 (2006 to 2013) yearly observations for each of the 75 provinces of Thailand (Except Phuket and Bueng Kan due to the missing data). Many empirical tools are employed in the study. As the panel data includes time-series data for each different entity, many stationary tests are conducted in order to avoid the problem of spurious results including the LLC [21], the HT [12], the Breitung [5], as well as the IPS [14] test.

After implementing a series of panel unit root tests, the relationship between per capita income and poverty rate is tested through two techniques including (1) an econometric method through fixed-effects model (FEM), random-effects model (REM), and an ordinary least square (OLS) method for estimating GEP of the whole country, and (2) the direct and simple calculation which is applied the concept of price elasticity of demand for estimating GEP in each province.

For model specification, the basic concept of GEP is obtained from the following expression

$$POV = f(PCI) \quad (1)$$

where POV is the poverty rate and PCI is the per capita income.

This relationship is the stylized idea of development economics which can be further applied to many models, for example, income inequality, education, and health.

Then, the distributions of poverty rate and per capita income are assumed to be lognormal which the growth elasticity of poverty is defined as the percentage change in the poverty rate for one percent increase in per capita income [4]. The equation for FEM can be written as

$$\ln(POV)_{it} = a_i + b_1 \ln(PCI)_{it} + U_{it} \quad (2)$$

where POV_{it} is the poverty rate in province i during the period t , a_i ($i=1,2,3,\dots,n$) is an unknown intercept for each province, PCI_{it} is the per capita income, b_1 is the growth elasticity of poverty, and U_{it} is the error term.

For FEM, an important assumption is that the unobserved/omitted variables do not vary (invariant) over time; in other words, their effects are imposed to be fixed within the entity but their characteristics can be different across the entities

(provinces). Also, every change to the dependent variable is stemmed from only specified/known variables. The slope of an independent variable (PCI) is the same for all provinces while the specific intercept varies across provinces but not varies over time [11, 19, 31].

The GEP in random-effects model (REM) is given by the following formula

$$\ln(POV)_{it} = a_i + b_1 \ln(PCI)_{it} + U_{it} + e_{it} \quad (3)$$

where U_{it} is the error term between provinces and e_{it} is the error term within province. The main assumption of this model is that the error term for each province is not correlated with the predictors [33]. For the process of selecting model between FEM and REM, Hausman test is implemented with the null hypothesis of no correlation between errors and the independent variables. Additionally, Breusch-Pagan Lagrange Multiplier is tested the significant difference across provinces aimed to select the proper model between REM and OLS.

For the sign of the coefficient, poverty rate is expected to be negatively related to per capita income indicating that an increase in per capita income will lead to a reduction in poverty and a decrease in per capita income can cause poverty increase. However, the positive coefficient for per capita income is also possible. There are many studies attempting to explain this result. Positive GEP can occur when country has high income inequality which the benefit of economic growth is not properly trickled down to citizen, especially the poor. It can also take place in the period of recession as an average output of economy decreases but the poor are hurt less than the non-poor [17]. Also, the positive GEP can be referred to the declining benefit of growth as a result of high inflation and financial crisis [22]. In addition, the coefficient can be positive in the case that an increased mean income is still lower than poverty line. Although people have higher income but they can be still the poor if their income is lower than the threshold [10]. Thus, it should be careful for interpretation of this perverse result.

Besides the estimation of GEP through log-linear model, the direct calculation of price elasticity of demand is applied to estimate the provincial GEP. It can be written as

$$GEP_i = \frac{\%(POV)_i}{\%(PCI)_i} \quad (4)$$

where GEP_i is the growth elasticity of poverty (GEP) in province i , $\%(POV)_i$ is the annual change rate in poverty rate in province i during the period 2006–2013, and $\%(PCI)_i$ is the annual change rate in per capita income in province i during the period 2006–2013. An annual change rate is calculated by using Compound Annual Growth Rate (CAGR) method. Thus, this elasticity is expected to be negative because poverty rate normally declines over time.

However, the main disadvantage of this direct calculation is its assumption because it is assumed that a change in income is the only factor affecting poverty. Also, GEP from this method can be positive in two cases. Firstly, poverty rate increases while per

capita income increases. This can happen when people spend an additional income to pay debt, instead of consuming to fulfill the basic needs of life. This requires the deeper study towards the characteristics of household income and expenditure. Second, per capita income decreases while poverty rate decreases. This can happen when people are able to live in a better condition without having an increase in income, especially the poor lived in the rural area. The quality of life can be promoted through deriving more public services or in-kind subsidies from government. This requires the deeper study towards specific government policies in each province. Thus, a positive GEP needs a case-by-case explanation because the assumption is strict in explaining poverty with an income level only.

4 Results

The results of the various panel unit root tests are presented in Table 3.

According to Table 3, both variables in this study are stationary with trend under all tests at the 5% level of significance. Then, FEM, REM, and OLS are employed to derive the relationship between economic growth (Per capita income) and poverty (Poverty ratio). The results are shown in Table 4.

According to Table 4, economic growth helps reducing poverty in Thailand at national level. The result statistically confirms the relationship between per capita income and poverty rate at the 0.05 level of significance. For FEM, poverty rate

Table 3 Panel unit root tests on poverty rate and per capita income of 75 provinces

Variable	LLC	HT	Breitung	IPS
ln(POV)	-14.1809*** (0.0000)	-0.0636*** (0.0000)	-2.0250** (0.0214)	-4.3047*** (0.0000)
ln(PIC)	-31.0398*** (0.0000)	0.0775*** (0.0002)	-2.3057** (0.0106)	-4.2578*** (0.0000)

Source Author’s calculation

Notes (1) Probability is in parenthesis (2) *** and ** indicate the rejection of the null hypothesis of having unit root at least on the 0.01 and 0.05 level of significance, respectively

Table 4 Economic growth elasticity of poverty for the whole country

Statistic Value	FEM	REM	OLS
GEP	-1.1714***	-1.0595***	-0.9645
Constant	16.0064***	14.7294***	13.6459***

Source Author’s calculation

Notes (1) FEM is the fixed-effects model, REM is the random-effects model, and OLS is the ordinary least square model (2) *** indicates the statistical significance at the 0.05 level

decreases (increases) by 1.1714% when there is a 1% growth (decrease) in per capita income of the society. The equation for FEM can be obtained as

$$\ln(POV)_{it} = 16.0064 - 1.1714\ln(PCI)_{it} \quad (5)$$

For REM, every 1% increase (decrease) in per capita income leads to a reduction (growth) of poverty by 1.0595%. REM can be written as

$$\ln(POV)_{it} = 14.7294 - 1.0595\ln(PCI)_{it} \quad (6)$$

For OLS model, a 1% increase (decrease) in per capita income is associated with the 0.9645% decrease (increase) in poverty head count index. The results from OLS model can be written as

$$\ln(POV)_{it} = 13.6459 - 0.9645\ln(PCI)_{it} \quad (7)$$

Additionally, the probability of test (F) for all models is less than 0.05 which means that all coefficients in the models are different from zero. Then, to select the most proper model requires additional tests including Hausman test and Breusch-Pagan Lagrange Multiplier test. For the first test, the Prob>Chi2 is greater than 0.05. It fails to reject the null hypothesis which means that errors and regressor are not correlated. In this case, REM is more proper than FEM. Then, the latter test is employed to decide between REM and simple OLS model. The result shows that Prob>Chi2 is less than 0.05. It is able to reject the null hypothesis of zero value of variance across provinces indicating that variance is significantly different across provinces. In this case, REM is more proper than simple OLS mode. Therefore, GEP for this study is -1.0595. It is concluded that poverty in Thailand at national level is highly sensitive to per capita income changes.

For provincial GEP, it is directly calculated from the Eq. 4. The selected results, highest and lowest GEP, are displayed in Table 5.

According to Table 5, there is a huge difference in the responsiveness of poverty to a change in income level. On average, the national GEP measured by this method is -1.633 which is correspondent to the value of GEP measured by the log-linear model. For provincial GEP, poverty is highly elastic to economic growth in many provinces. A 1% increase in its per capita income in Chon Buri—the highest GEP province—leads to 14.7344% decrease in poverty. The second highest GEP province is Satun whose value of GEP is -8.7037, followed by Saumut Prakan and Songkhla, respectively. However, GEP is found to be positive in nine provinces including Pathum Thani, Samut Sakhon, Ranong, Phangnga, Trang, Chanthaburi, Mukdahan, Chiang Mai, and Phattalung. For Pathum Thani and Samut Sakhon, poverty rates decline over time but both per capita income are in a downturn over the period 2006–2013. The reason to this perverse result requires an additional information on the distribution of income and expenditure in both provinces. However, it is a special case because Pathum Thani and Samut Sakhon are the only two provinces experiencing

Table 5 Economic growth elasticity of poverty for selected provinces

Provinces	Highest GEP	Provinces	Lowest GEP
Chon Buri	-14.7344	Pathum Thani	140.3150
Satun	-8.7037	Samut Sakhon	123.1867
Samut Prakan	-7.8919	Ranong	10.8290
Songkhla	-7.8434	Phangnga	0.9133
Surat Thani	-7.3268	Trang	0.6412
Samut Songkhram	-6.5594	Chanthaburi	0.4678
Nonthaburi	-5.4163	Mukdahan	0.4669
Nakhon Pathom	-4.7163	Chiang Mai	0.3929
Chumphon	-4.2470	Phattalung	0.1226
Narathiwat	-4.0409	Uttaradit	-0.1194

Source Author's calculation

the negative change of per capita income. For other seven provinces having a positive GEP, both poverty rate and per capita income increase in the selected period.

In conclusion, there are 42 provinces of 75 provinces which their poverty is highly elastic to economic growth because the value of GEP is greater than 1 (39 provinces for negative GEP and 3 provinces for positive GEP). Additionally, there are 33 provinces which their poverty is low elastic to economic growth (27 provinces for negative GEP and 6 provinces for positive GEP). As a result, the poverty responsiveness to economic growth is entirely different in each of the 75 provinces throughout Thailand.

5 Conclusion

To reduce poverty requires not only domestic policies but also international policies. Thailand is one of the developing countries which has made a great progress in fighting poverty as there is only 0.31 % of Thai lived below about \$1.25 a day (PPP) in 2010. Additionally, the recent data indicates that Thailand has already achieved the first goal of the MDGs.

This study focuses the role of economic growth in reducing poverty in Thailand by estimating how poverty rate—measured by the national poverty line—responds to a change in per capita income over the period 2006–2013 at national and provincial level. The result reveals that poverty is highly elastic to economic growth. The poverty elasticity is calculated at -1.0595 , meaning that for every one percent increase in average per capita income, poverty will decline by 1.0595 %. The value of GEP derived from this study is correspondent to Deolalikar [6], Jitsuchon [15], and Durongkaveroj [8] who estimates GEP equal to -2.2 , -1.206 , and -1.4445 , respectively. However, Ram [26] finds that GEP of Thailand is -7.92 using direct calculation method. Therefore, at national prospect, Thai government should con-

cern more about the quality and distribution of economic growth. The real challenge is how much is growth good for the poor. Moreover, it should be stressed that an economic recession is likely to hit the citizen's well-being because the destitute is highly sensitive to the income level.

For provincial analysis, there is a huge difference in the performance of economic growth in reducing poverty. There are 39 provinces which economic growth is a great tool in tackling poverty. However, this method holds the strong assumption about the relationship between economic growth and poverty which can result in an overestimated GDP. For policy implementation, the great efforts have to be made in some provinces experiencing a negative growth of per capita income and a positive growth of poverty. Also, besides only an acceleration of economic growth, public services and in-cash/in-kind subsidies should be provided to the poor aimed at raising their living standards. Education and health services have to be fully served in the rural areas. Thus, each province around Thailand requires the different magnitude, speed, and direction of efforts to lessen its own poverty.

For further study, more specific policies towards poverty reduction in each province should be examined because they will help us understand deeper about causes and consequences of poverty. Moreover, non-economic variables, e.g. culture and institutions, should be explored in order to elaborately figure out other influential factors affecting the standard of living among citizens.

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