การเติบโตทางเศรษฐกิจรายสาขาสามารถลดปัญหาความยากจนได้หรือไม่ กรณีศึกษา ประเทศไทย

DOES THE SECTORAL ECONOMIC GROWTH LOWER THE POVERTY INCIDENCE: ADDITIONAL EVIDENCE FROM THAILAND

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บทคัดย่อ

ประเทศไทยมีพัฒนาการด้านการลดปัญหาความยากจนได้อย่างน่าประทับใจในระยะ สิบปีที่ผ่านมา ถึงอย่างไรก็ตาม ในปี 2560 ยังคงมีคนไทยมากถึง 5.33 ล้านคนที่ยังประสบกับ ความยากจน และมีคนไทยจำนวนมากถึง 620,540 คน ประสบปัญหาความยากจนขั้นรุนแรง องค์กรระหว่างประเทศได้นำเสนอแนวทางการลดปัญหาความยากจนอย่างหลากหลาย รวมถึง ข้อวิธีการทางทฤษฎี   งานวิจัยชิ้นนี้มีวัตถุประสงค์เพื่อวิเคราะห์บทบาทของการเติบโตทาง เศรษฐกิจและการลดความยากจนจากมุมมองทางเศรษฐกิจมหาภาค ตลอดจนพิสูจน์ว่าการ เติบโตทางเศรษฐกิจรายสาขาได้แก่ การเติบโตภาคเกษตร ภาคอุตสาหกรรม และภาคบริการ สามารถลดความยากจนได้จริงหรือไม่ ผลการศึกษาเชิงประจักษ์จากการประมาณค่าสมการ เชิงเส้นตรงชี้ให้เห็นว่าการเติบโตทางเศรษฐกิจโดยรวมและรายสาขาสามารถลดความยากจน ได้อย่างมีนัยสำคัญ ซึ่งสอดคล้องกับทฤษฎีการเติบโตทางเศรษฐกิจ (Economic Growth Theory) ขณะเดียวกันราคาสินค้ากลุ่มอาหารที่เพิ่มสูงขึ้นทำให้ปัญหาความยากจนรุนแรงขึ้น ในกรณี ศึกษาประเทศไทย พบว่าการเติบโตทางเศรษฐกิจรายสาขาทำให้ความยากจนลดลง แต่เฉพาะ การเติบโตภาคบริการเท่านั้น

คำสำคัญ: ปัญหาความยากจน การเติบโตทางเศรษฐกิจ การเติบโตทางเศรษฐกิจรายสาขา

Abstract

Thailand has magnificent progress during the past ten years in terms of poverty eradication. However, there are still 5.33 million Thai people who are struggling in poverty in 2017 and up to 620,540 people are living in extreme poverty. Enormous approaches have been proposed to heal poverty by international organizations, government, and by the theoretical frameworks. This paper thus investigates the role of economic growth on poverty reduction from macro-economic perceptive, and try to find the empirical evidence to support the theoretical framework that aggregate and sectoral economic growth (agriculture, industrial, and service sector) can help lowering poverty incident. Based on a classical linear regression model, we found that the results are analogous to the theoretical framework in which aggregate and sectoral economic growth (only service sector) do play a significant role in poverty reduction. While increasing in food prices worsen the poverty incidence.

1. Introduction

In economics, "Poverty" is a monetary term of income or expenses measurement of people that are below the appropriate standard living of people in society (Word Bank, 2005) or lower than the average income of society known as poverty lines. Those people having income below the standard level of society will be considered as the poor. The word "poor" is a universal language used to call those who lack key capabilities, inadequate income or education, be in poor health, feel powerless, or lack political freedoms. It is believed that the poverty problem is "man-made" (Mandela, 2011), in which the characteristics of poverty faced by the individual, household, society or country. This might be different from their socioeconomic factors, geographical location, and government policies, not a natural selection. Economists have developed the measurement to measure poverty, such as the Headcount Index (HI), the Poverty Gap Index (PGI), and the Severity of Poverty Index. One of the easiest and well-known tool is "Poverty Line". It is an average line of income or expenditure of people in society. When a person has income or living expenses below the poverty line, that person is considered poor. There are four reasons why poverty need to be measured; first, to keep the poor on the agenda, without poverty measured, the poor would be easily left behind. Second, measuring poverty can identify directly who are the poor and allows the government to set the right target group to alleviate poverty. Third, to monitor and assess policy interventions that are geared towards the poor. And finally, to evaluate the effectiveness of institutions whose goal is to help the poor (World Bank, Poverty Manual, All, JH Revision, 2005).

In Economic Development literature, there are two types of poverty problems by its definition. Firstly, ๑absolute poverty× refers to the problems when an individual, household, or society does not have access to the basic requirements of life, for instance, food, shelter, clothing, and medicine. These people are extremely struggling with finding a living. Absolute poverty does not take into account other factors that are wider than the basic needs of individuals. For example, an individual is facing the absolute poverty problem as they have an inadequate income to afford

accommodation. Another dimension of poverty definition is "relative poverty", it is a problematic situation when individuals are excluded from being able to take part in what is considered the normal, acceptable standards of living in a society. It is a measurement of poverty by comparing the quality of life of one person with the average standard of living of the whole society (World Bank, 2005). For instance, an individual might relatively feel poorer to the average majority of people in their village as they have less income comparing to others.

For Thailand, the situation of poverty has improved continuously. The proportion of poor people has decreased continuously for ten years from 21.94 to 4.8 million or declined by 67% within ten years (See Figure 1). It was impressive progress reported in accordance with the World Bank (Word Bank, 2017) indicating that the situation of Thai poverty has been improved outstandingly comparing to neighboring countries. However, the current number of Thai poor people reported by Thailand National Economic and Social Development Board (NESDB) in 2017 has a total of **5.325 million people or 7.87% of the population** (NESDB, 2019), which is something Thailand still cannot be proud of and claim its triumph over poverty combat.
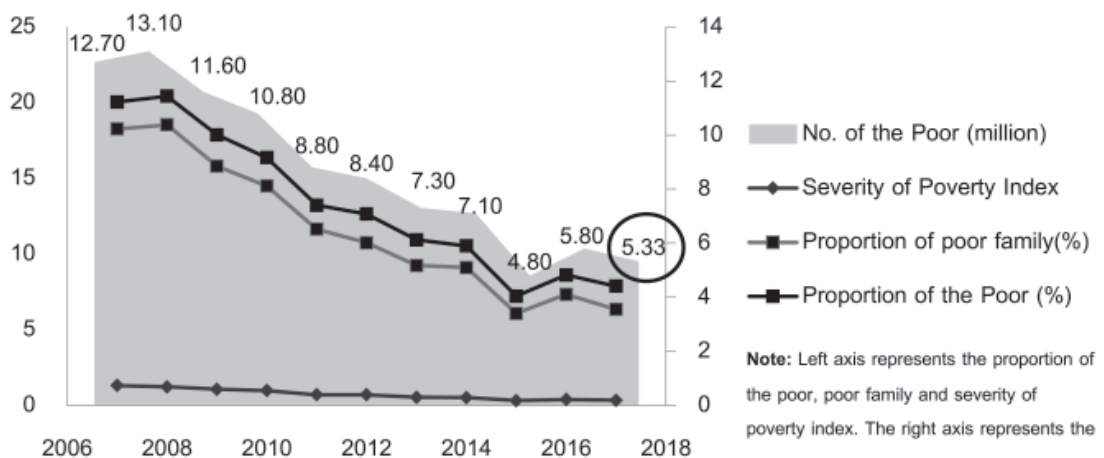

Figure 1 Poverty Situation in Thailand (2007-2017)
Source: (NESDB, 2019)

At the same time, if considering the "**extreme poverty**" situation in Thailand represented by the number of the poor living below $1.90 and $3.10 per day from 1980-2015 (see figure 2), the number of poor who suffer severe poverty is around **26,980** and **620,540 people** respectively (World Bank, 2015). Even this amount accounted only for 1% of the population, but it claimed that the absolute poverty problem still exists. Therefore, no one should be left behind.
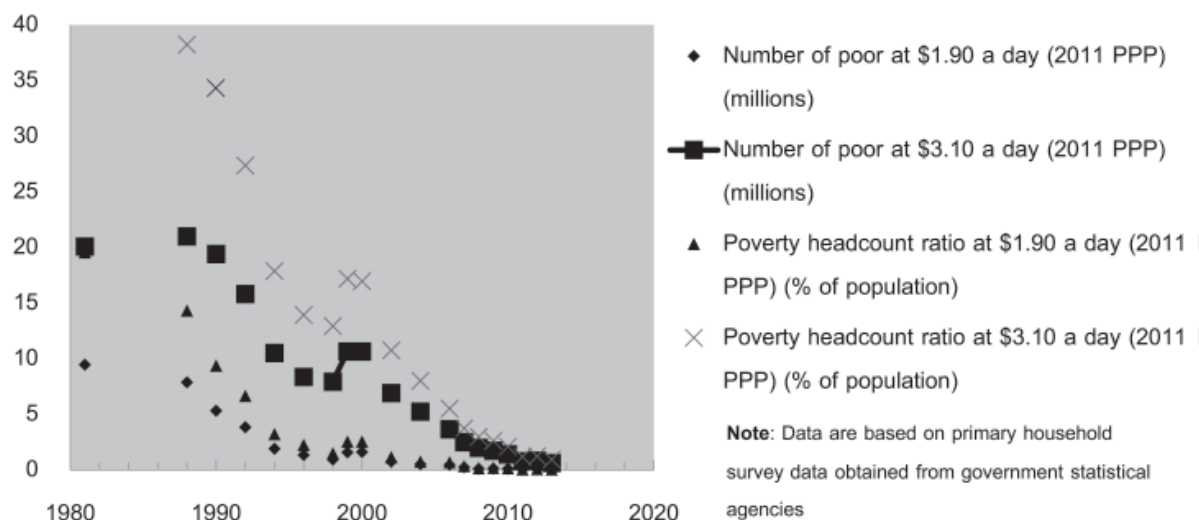

Figure 2 Extreme Poverty Situations in Thailand (1980-2015)
Source: World Bank, Development Research Group, (2015)

All statements mentioned above are only monetary poverty where poverty is measured using the monetary term. Besides, if we consider poverty in a wider and more touching dimension, for example, well-being, health, and education, we can see the poverty problem in the wider dimension. Whether or not these numbers can reflect the actual poverty situation. As a later definition of poverty covered both income and non-income dimensions, it is important not to overlook "non-income poverty". A later study has put further poverty measurement and has developed other indicators, for example, The Human Poverty Index (HPI) and The Regional Human Achievement Index (RHAI).

The United Nation Development Programme (UNDP), therefore, developed the "Multidimensional Poverty Index (MPI)" to destroy the imitation of income-poverty. MPI was co-designed and launched in 2010 by cooperation with The Human

Development Report Office (HDRO) and the Oxford Poverty and Human Development Initiative (OPHI). It provided a new methodology to measure poverty, which takes multidimensional health, education, and standard of living into the calculation. As a result, this becomes the new era of poverty analysis that needs to integrate various dimensions into measurement and consequently requires more dimensional approaches to alleviate the problem.

Many approaches to combat poverty have been studied by economists throughout the world including the Poverty Reduction Strategy Paper (PRSP) process suggested by World Bank in 1999 (World Bank, Poverty Manual, All, JH Revision, 2005), a comparative perspective on poverty reduction (Ravallion, 2009), poverty reduction through long-term growth (Warr, 2009), trade liberalization and poverty (Winters et al., 2004), industrialization, employment and poverty (P. Athukorala and K.Sen, 2015), understanding the economic lives of the poor (Abhijit V. Banerjee and Esther Duflo, 2007) and income, health, and well-being around the world (Deaton, 2008). However, the concept of well-being, poverty profile, and determinants of poverty of each country are differ based on different demographical presentations, economic characteristics, socioeconomic factors, and government policies. Therefore, suitable approaches to end poverty need to be well-designed, target the right spot, and sustainable.

This paper, therefore, aimed to find evidence to support our hypothesis if the long term economic growth and sectoral economic growth (agriculture, industrial, and service sector growth) has significantly relation to poverty reduction in Thailand. The study will benefit multiple stakeholders whose goals to end poverty. Firstly, this study will support the PRSP of the World Bank, and help improve the capacity of analysts, researchers, and statisticians in developing countries especially in the ASEAN region. Secondly, the Thai government and the National Economic and Social Development Board (NESDB) whose main purpose to develop and monitor the economic and social development of the country. Lastly, this study will contribute to those passionate researchers throughout the globe who engaging the field of poverty and inequality.

2. Literature Review

2.1.1 Poverty Definition

According to the World Bank's Poverty Analysis Initiative (PAI) (2005), "**Poverty is pronounced deprivation in well-being**." The conventional view links well-being primarily to command over commodities, so the poor are those who do not have enough income or consumption to put them above some adequate minimum threshold. This view sees poverty largely in monetary terms. Thus, the people who live their life below the average adequate minimum threshold of society will be considered as the poor. In common sense, the poor most likely to lack key capabilities, and may have inadequate income or education, or be in poor health, or feel powerless, or lack political freedoms. On the other hand, it can conclude that poor are those people living below the poverty line. Poverty, however, may also be tied to a specific type of consumption; thus someone might be house poor or food poor, or health poor. These dimensions of poverty can often be measured directly, for instance by measuring malnutrition or literacy. After 2018, World Bank has put further definition beyond monetary poverty and increase the minimum poverty line from $1.9 to $5.5 a day as the cost of basic need (CBN) of people has now changed from the past and related to the location they live.

2.1.2 Poverty Line (PL)

In general, to indicate an individual or household is facing the poverty problem, it is commonly using the poverty line (PL). The PL will be the benchmark classifying the poor and non-poor group. The poverty line is the most convenient indicator that is commonly used among economists. The poverty line is developed to set the standard adequate basic need of an individual to live a day. They capture both food and the non-food dimension of expenditure of an individual. It first estimates the cost of acquiring enough food (CBN) for adequate nutrition, usually 2,100 calories per person per day for maintaining good health (World Bank, Poverty Manual, All, JH Revision, 2005) and then adds on the cost of other essentials such as clothing and shelter. When there is no price information, this allows using the Food Energy Intake (FEI) method, which illustrates graphically expenditure (or income) per capita against food consumption (in Calories per person per day). Or use the Subjective Poverty Lines which are based on asking people what minimum income (or expenditure) level is needed to just make ends meet. For Thailand, the concept of poverty line

calculation consists of two phases: first, the original poverty line by the World Bank in the year 1962-1963, based on necessities in life such as food and non-food. Disadvantage of the original poverty line is that it is regardless of age differences, sex, product prices in urban areas and rural areas. Therefore, to reflect the current consumption pattern and the change in population structure new poverty line is used instead (Kakwani and Medhi, 1998). The new poverty line can measure poverty at the individual, household, regional, and national levels based on the minimum basic needs of individuals. (Report on poverty in Thailand, TDRI, 2015)

2.1.3 Poverty Measurement

It is extremely important to measure poverty because of four main reasons by World Bank; first, to keep the poor on the agenda, without poverty measured, the poor would be easily left behind. Second, measuring poverty can identify directly who are the poor and allows the government to set the right target group to alleviate poverty. Otherwise, the policy might yield deficiencies and leaked to the non-poor group. Third, to monitor and assess policy interventions that are geared towards the poor. And finally, to evaluate the effectiveness of institutions whose goal is to help the poor. However, to construct poverty measures are not easy. The measurements are perhaps inefficient due to the survey issues. For example, the survey designs, sampling, coverage and valuation, and quality control. Therefore, The World Bank has developed the Living Standards Measurement (LSMS) survey to measure poverty more accurately. However, there are more indicators measuring poverty and beyond. This measurement initially relied on the selection of welfare indicators such as the income and consumption per capita, then using a calculation to develop the indicators. To make an efficient measure on the actual poverty situation multiple indicators are developed to do so (see figure 3).
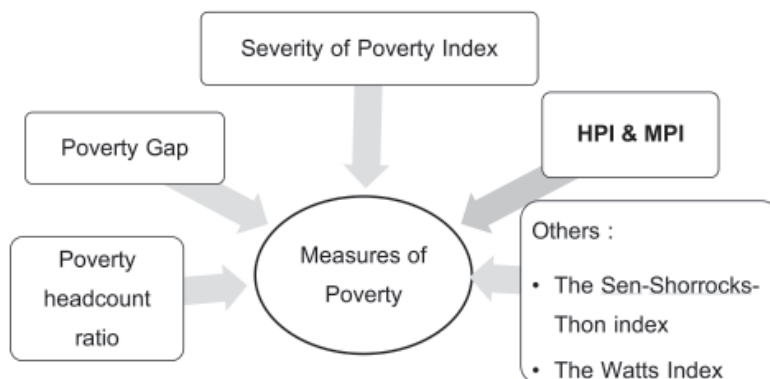
Figure 3 Poverty Measurement

As displayed in the figure above, there are six main indicators namely, the poverty headcount ratio (P_0) measures the proportion of the poor to total population of the country, the poverty gap (P_1) the extended measures of individuals fall below the poverty line and minimum cost of eliminating the poverty, the squared poverty gap or poverty severity (P_2) which are the average squares of the poverty gaps relative to the poverty line.

2.1.4 Poverty headcount ratio (P_0)

The poverty headcount ratio, sometimes called Poverty Incidence, is the percentage of the population below the minimum level of real income. Headcount (the number of people below the poverty line) and headcount index (ratio) the proportion of people below PL from the whole population. World Bank has announced the poverty line at $1.90 a day which is the percentage of the population living on less than $1.90 a day at 2011 international prices. They called those people the poor who are facing the extreme poverty problem. Later, the poverty line has revised to $3.1 and $5.5 a day respectively. Poverty Rate, Headcount Index or Headcount Ratio can be calculated as the following equation

$$P_0 = \frac{1}{N} \sum_{i=1}^{N} I(y_i \leq Z)$$

$$P_0 = \frac{N_p}{N}$$

(2.1)

Where: N_p is the number of population with job (Income or Expenditure) below
the poverty line

N is the number of the population

y_i is monthly current income or consumption per capita

I is 1 if (y$_i$ < Z), 0 if (y$_i$ > Z)

Z is the poverty line

2.2 Poverty Reduction Approach

2.2.1 Poverty Reduction Strategy Process (PRSP)

In 1999, the World Bank and the International Monetary Fund (IMF) implemented a new set of processes to guide lending to some of the worldᰠs poorest countries. Many poor countries were inspired to set the policy to address the concern, study and measure poverty to find the framework to aid those who have left behind the poverty line. This process allows "country-owned" poverty reduction strategies to acquire banks and fund concessional lending. These papers aimed to suggest poorer countries to have their macro and structural policies to support sustainable development, improve governanceᰠincluding public sector financial management, appropriate sectoral policies and programs and realistic costing and appropriate levels of funding for the major programs. Many regions have applied PRSP to alleviate poverty in their countries since 2000. Years of implementation has paid off the improvement and progress in poverty eradication. For instance, Ethiopia has started in 17-Sep-2002, Guinea 25-Jul-2002, Mauritania 6-Feb-2001, Mozambique 25-Sep-2001, Tanzania 30-Nov-2000. In Asia, Cambodia started in 20-Feb-2003 while Vietnam 2-Jul-2002. (World Bank, 2003). According to PRSP, the varietal approach have been applied, such as Fund-supported programs, debt relief program, knowledge, and resources comprehensive development framework, macroeconomic growth matters approach, macroeconomic framework and structural policies, Foreign Direct Investment promotion, International Financial Agenda, aid modalities and donor support, public expenditure, poverty reduction, and NGOs, etc.

2.2.2 Sectoral Economic growth and poverty reduction

In the late 1990s, Local Economic Development (LED) has been widely used to strengthen countries' economic growth. Many regions have put their priority on "strength from within" rather than international economic reliance. Thus role of

sectoral economic growth, particularly the agricultural, industrial and service sector growth, could help lowering the poverty incidence (Warr, 2018; Northrop, 1988; Hainsworth, 1979; Casse, & Jensen, 2009). As the world major financial crisis namely the hamburger crisis (2008), Eurozone crisis (2009), currency war, oil price war, Brexit (2018), and the trade war between China and the U.S. (2019), many countries started to recognize that international trade liberalization might no longer be the best solution for economic growth. Instead, the "**trade protectionism**" and "**localization**" seemed to be the new mindset of growth for many countries including emerging market like ASEAN. De Janvry, A., & Sadoulet, E. (2010) and Somporn Isvilanonda, Ahmad, A., & Hossain, M. (2000) emphasized the role of agricultural growth, expansion in crop yields, and the local economic development correlated with poverty reduction.

According to (Mahlalela, 2014) LED defined as ten principles; 1) Strategically structured process which is based on empathetic the economic and social dynamics of an area, structuring competitive advantages and minimizing an area's weaknesses and threats; 2) Founded on a territorial approach- initial purpose is to have functional economic space at regional or city levels, incorporating urban and rural space and using sectoral methods; 3) Locally owned, designed and distributed- each scheme must be planned and spread locally in order to address local urgencies and exclusive competitive positions; 4) Best realized through partnerships for design and implementation- LED strategies are inclined to be designed by public, private and local government community actors partnerships; 5) Reinforced by integrated government actions at both the vertical and horizontal tiers - All tiers of government need to participate as partners in LED, it is necessary for each tier to equally reinforce and integrate national and local urgencies; 6) Obsessed on enabling a favorable local business environment for all stakeholders- LED facilitates private sector growth through reducing 'red-tape', and reducing transaction costs; 7) Includes integrated interventions across numerous sectors- unlike traditional supply side

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[1] Macroeconomic Instability Hurts the Poor; Distribution of Growth; Macroeconomic Stability and Economic Growth; Macroeconomic Stability Growth-Oriented Macroeconomic Policies and Poverty; Financing Poverty Reduction Strategies; Fiscal Policy; Monetary and Exchange Policies; Policies to Insulate the Poor Against Shocks

sectors approaches which only address certain sectors, LED addresses various sectors thereby maximizing synergies; 8) Embraces standardizing interventions in hard, soft and institutional infrastructure- It is essential to invest in human capital, economic infrastructure, institutional support and inclusion programs as different components of LED; 9) Prioritizes development and withholding of local business and people- Contrary to early LED focusing on attracting investment and being unsustainable, LED presently focuses on growing local economies; and 10) Public, private and non-governmental actors are involved in bringing projects- all sectors being public, private and community have specific competencies in delivering LED projects.

European Unions (EU) defined LED as "the process by which local authorities develop - with their local partners (other public organizations, business and non-governmental sector)-a better business environment; i.e. they create the condition for private sector-led economic growth and employment generation, from which all communities benefit" (ESI, 2011) Also, suggests the local economic development tools an introduction for municipalities and local economic service providers in Bosnia and Herzegovina that Local Economic Development could be implemented focusing on; 1) increase the local availability of Finance; 2) support the development of businesses & SMEs; 3) create the local infrastructure for economic growth, and 4) develop human resources and training activities.

Including (Astia Dendi et.al., 2004) who studied the Alleviating Poverty through Local Economic Development case of Nusa Tenggara, Indonesia. The research tried to emphasize the role of LED and poverty alleviation with objectives to increase people's incomes, the synergy between government and the private sector, and to match policy to local characteristics, conditions, and potentials and responds to local problems. This study found the relationship between growth in the local economy and job market, a reduction in the number of poor and sustainable livelihoods. It suggested that strategies should focus on the attractiveness of local economy, the resilience of local economy, and the competitiveness of the local economy.

2.2.3 Other methods to end the poverty

The World Bank group has launched the Mind, Behaviors, and Development unit (EMBed) which is the World Bank's behavioral science team in the poverty and equity global practice, working with project teams, government, and other partner to diagnose, design, and evaluates behaviorally informed interventions to eliminate poverty and increase equity. This unit has completed several works currently i.e. 1) Peru - the reframing mindsets and changing lives. Working with Ministry of Education to improve the student mindset toward the intelligence, it results in 0.14 standard deviation intervention in math test scores improvement of over 50,000 students. 2) Nicaragua - Creating connections and empowering local women by implementing the productive cash transfer program aimed to showcase how interaction with local female leader role models can be a powerful and cost effective war to affect changes in attitudes towards the future. 3) Tanzania - Partnering for better financial inclusion cooperating with wireless service provider 'Airtel' aimed to encourage low-income individuals to save more using mobile money products. This program was designed behaviorally using informed text messages that highlighted social comparisons, mental accounting, and more. It succeeded to intervene increased saving by up to 11% within two week of implementation. 4) Poland - Tax compliance increasing program aimed to use behavioral science and social norms telling people that others have paid tax. Using hard tones punitive languages increase tax compliance by 20.8% rather than peer comparisons methods. Moreover, (Hayes, 2005) has studied the approach of a poverty-interrupted method by applying Behavioral Science to study poverty deeper into individual and family level. It aimed to apply behavioral science and design to efforts to reduce poverty. The method is mainly regarding how living in poverty shapes the context of peoples' lives and what effect it has on their decisions and actions. This research pointed out the unique context that elicits a predictable set of responses, rather than a result of personal failure or character defects--and charts a path forward based on cutting-edge research in the behavioral sciences, such as, 1) Cut the many different types of costs imposed on families with low incomes- temporally, financially, and cognitively (make community clear and actionable, reduce the barrier to entry, increases accessibility, cut the restriction, create synergies-one stop shopping helping center); 2) Create slack for credit - by providing more

whatever the poor lack i.e. time, job, major medical expense, extra income, or providing that support unconditionally. In addition to these immediate benefits, providing a financial cushion can lead to increased long-term impacts when viewed from a two-generation perspective. Because a child's well-being is closely linked to parental success, investments in an adultәs financial security may continue paying dividends for decades to come. And 3) Reframe and empower - reframe programs in ways that empower clients rather than reinforce stigma (use intentional language, confront bias, create the plausible path, treat families as experts, and leverage positive identity).

3. Research Methodology

This paper aimed to find evidence to support that poverty reduction is driven by aggregate and sectoral economic growth, possibly influenced by its sectoral composition and further by the relative price of food. The data consisted number of the poor by the National Economic and Social Development Board of Thailand from 2007-2018, real and sectoral GDP growth, and the relative price of food by the Ministry of Commerce. According to Peter War (2018), the model classification as expressed as the following expressions;

3.1 Nexus of the Poverty and Aggregate Growth

$$P = \frac{N_p}{N} = \varphi(Y, R^F) \qquad (3.1)$$

Where, P =   poverty headcount ratio

N_p =   Total number people in poverty

N =   Total number of the whole population

Y =   Real income per unit of population

R^F =   The relative price of food

To indicate the marginal effects of real income and relative price effect, we take the total differentiating 3.1 and obtain the following expression,

$$dP = \varphi_Y Y_y + \varphi_R dR^F \qquad (3.2)$$

Where, dP = represents the change in poverty incidence

dR^F = represents the change in the real price of food

$y = dY/Y$ is the growth rate of aggregate real income per person

Finally, we estimate relationships of the change in poverty to the change in two determinants:

$$dP = a + b_y + cd(R^F) \qquad (3.3)$$

And test whether the coefficients b and c are significantly different from zero.

3.2 Poverty and Sectoral Growth

Whether the sectoral composition of economic growth is significant for poverty reduction can be investigated as follows. The level of real GDP per person is given by:

$$Y = Y_a + Y_i + Y_s \qquad (3.4)$$

Where Y_a, Y_i, Y_s and denote value-added (contribution to GDP) per person in the total population, measured at constant prices, in agriculture, industry, and services, respectively. The overall real rate of growth per person can be decomposed into its sectoral components from:

$$y = H_a y_a + H_i y_i + H_s y_s \qquad (3.5)$$

Where $H_k = \frac{Y_k}{Y}, k = (a, i, s),$ denotes the share of sector k in GDP. By estimating $dP = a + b_a H_a y_a + b_i H_i y_i + b_s H_s y_s + cdR^F \qquad (3.6)$

4. Empirical Results

The regression represented in table 4.1 and 4.2 summarized the empirical results which are analogous to support the theoretical framework discussed above. First, we discussed the role of aggregate economic growth and poverty reduction in Thailand using annual data from 2007-2018. Prior to the result interpretation, regression models had satisfied the classical linear regression assumptions in which there is no multicollinearity, heteroscedasticity, and autocorrelation. For the detection of multicollinearity, pairwise correlation and Variance Inflation Factors (VIF) had been adopted to ensure that correlation among the independent variable does not exists (VIF of around 1.6025 which is less than 5, thus we concluded that there is no multicollinearity problem). The results also passed the white's heteroscedasticity test in which the null hypothesis of homoscedasticity was accepted (F-statistic 2.453, Prob. F (5,5) 0.1735). Durbin-Watson stat is 1.8743 which is located close to 2, it is concluded no positive and negative autocorrelation.

Table 1 Regression results: aggregate growth and poverty reduction of Thailand

Independent Variable	Change in poverty (1)		Change in poverty (2)	
	Coefficient	t-statistic	Coefficient	t-statistic
Aggregate GDP growth	-4.510***	-7.591	-3.715***	-5.712
	(5.945)		(6.498)	
Real price of food			0.249*	2.026
			(0.122)	
Constant	25.382***	11.412	21.305***	7.663
	(2.224)		(2.780)	
R-squared	0.865		0.911	
Adjusted R-squared	0.850		0.888	
F-statistic	57.629		40.780	

Note: Standard errors in parentheses; * Denotes confidence level at 90%;

** Denotes confidence level at 95%; *** Denotes confidence level at 99%

The (1) model in table 1, we firstly discuss the effect of aggregate GDP growth and change in poverty. Results from Thailand suggested that when aggregate economic growth increases, the poverty (or number of the poor) is reduced by 4.510 percentage points significantly. By the rule of thumb, we knew that this is due to the spillover of the economic expansion into the employment and labor income. Then, in the second model (2) we estimated equation 3.2 to observe if the real food price and change in aggregate economic growth simultaneously affect to the poverty. Results are unsurprising, the two components affected poverty significantly. On one hand, the aggregate economic growth lowers the poverty. On the other hand, when consider the price effect to the poverty, the real price of food (taken as a cost of living of people) does worsen the purchasing power of the poor and caused poverty incidence to increase. We then can conclude that the aggregate economic growth can lower poverty, whereas the higher food price worsens the poverty incident in Thailand.

Table 2 Regression results: sectoral growth and poverty reduction of Thailand

Variable	Change in poverty (3)		
	Coefficient	**Standard Error**	**t-statistics**
Agricultural growth (y_a)	**0.124****	(0.031)	4.020
Industrial growth (y_i)	**0.215****	(0.038)	5.689
Service growth (y_s)	**-0.357****	(0.060)	-5.961
Constant	**-0.684****	(0.153)	-4.476
R-squared	0.857		
Adjusted R-squared	0.786		
F-statistic	11.975		

Note: Standard errors in parentheses; * Denotes confidence level at 90%;

** Denotes confidence level at 95%; *** Denotes confidence level at 99%

As per equation (3.6), we estimated poverty and sectoral economic growth. The results showed in Table 2, the estimated coefficients of agricultural sector and industrial sector do not lower the poverty incidence in Thailand. Only the services sector can lower the poverty significantly. Based on the estimation, results found insignificant growth of GDP in the **agriculture and industry** sector to poverty reduction, which is in line with the current problems of Thai farmers who encountered severe debt problems, weather condition, and yield price fluctuation (Fabrizio Bresciani, et al., 2002; Soontaranurak, & Dawson, 2015; Laosutsan, Shivakoti, & Soni, 2019; Sukanlaya Choenkwan, Jefferson Metz Fox, & Terry Rambo., 2014; Sukanlaya Choenkwan, et al., 2016). Although there is an increase in production, the debt of the farmers remains the same or even increase, which comes from the existing debt, rising interest rates for loans which caused a debt repayment ability. Also, this creates additional debt for production in the next. Then the problem of poverty does not decrease. While **industrial growth** yielded a similar result as agricultural growth that industrial growth does not play a role in poverty reduction. This is because; (i) The structure of Thailand industrial sector that more than half come from the foreign investment- which benefited Thailand only unskilled labor employment and also the local content used is not that high comparing to more developed countries. (ii) The shrinking in Thai labors in manufacturing which arise from various factor, i.e., aging labor, insufficient number of unskilled labor, migrant workers from neighboring countries (Mizuno, 2020), etc. Currently, most of the labors in Thai manufacturing come from the neighboring countries such as Myanmar Lao and Cambodia (Mizuno, 2020). (iii) Due to the wage imbalance between Thailand and its neighbors, many foreign direct investments were encouraged to reallocate their production base to neighboring countries instead. Therefore, even the growth in the industrial sector increases, it does not spill benefit significantly to reduce poverty. **Service sector growth**, the only sector that results found the negative relation (at the 95% level). The growth of services was associated with reductions in poverty because the service sector involves several economic activities (Booth, 2019), employs high skilled labor with higher return and the service sector is considered as a high value-added economic activity which provides higher economic return and other positive externality spillover compared to the industrial sector.

5. Conclusion and Discussion

This paper was developed to find empirical evidence to support the theoretical framework introduced by War, Peter G. (2018). The theoretical framework follows that aggregate and sectoral economic growth can lower the poverty incident. We tested this framework by constructing a classical linear regression model incorporating basic violation assumption diagnosis to ensure that the results are "Best Linear Unbiased Estimator (BLUE)" and independent of multicollinearity, heteroscedasticity, and autocorrelation. We found similar results to Warr Peter (2018); Northrop, (1988); Hainsworth, (1979); that the aggregate growth does reduce the poverty in Thailand. Comparing to Peter Warr (2018), we found additional evidences. First, we supported finding of Peter Warr (2018) that the real price of food has impacts the poverty incidence and the poor's purchasing power. Second, we agreed that the sectoral growth affected the poverty incidence in Thailand, excepted the fact that the agriculture and industry sector growth. The main reason agriculture growth does not lower the poverty is because of the severe debt-cycle and repayment ability of Thai agriculturists and the price fluctuation in the agriculture sector (both product price and inputs price) that worsen debt-cycle situation of farmers. Our result in line with De Janvry, & Sadoulet, (2010) that argricultural growth might somehow not able to lower poverty due to the differernce regional contexts, rural conditions, and limitations. For the futher studies, we suggested to take the greater look into more regional data. As well as, using other method to discuuss how the service sector growth can lower the poverty incidence in Thailand.

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