

EFFECT OF OPENNESS AND ECONOMIC GROWTH ON POVERTY ALLEVIATION: LESSON LEARNT FROM TAIWAN AND INDONESIA TO ACHIEVE SDGS GOAL

FINAL REPORT

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Effect of Openness and Economic Growth on Poverty Alleviation: Lesson Learnt from Taiwan and Indonesia to Achieve SDGs Goal¹

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Abstract

One of SDGs goal is poverty reduction. This goal is the first objective of the SDGs. Every economy should achieve this goal in 2030. Some previous studies show that economic openness has a significant influence on poverty reduction, some researches explain that the relationship is significant but is indirect, and partly shows there is a different magnitude of the short-run and long-run impact of the economic openness to poverty reduction. This study proposes openness as an important policy option to reduce poverty through economic growth. The research objectives are to describe the condition of poverty and macroeconomic in Taiwan and Indonesia and to analyze how openness and growth in Taiwan and Indonesia have contributed to its poverty reduction. This study applies the Error Correction Method (ECM) for analyzing the short and long run condition. The research result shows that the character and nature of poverty in Taiwan and Indonesia are very different. Based on the regression results, it appears that FDI is not a factor that drives poverty reduction. International trade is a more dominant factor compared to foreign investment. The role of government in both countries is a major factor in reducing poverty. Spending on social welfare, or even the role of government in reducing income disparities, needs special attention.

Keywords: Taiwan, Indonesia, Poverty reduction, economic openness, government role.

1. Introduction

The more open world economy makes trade and capital flows move without obstacles. Theoretically, economic openness will encourage economic growth which in turn would increase public welfare. Along with the openness of the economy, economic indicators are no longer limited to high economic growth and low inflation. Indicators of economic openness and sustainable development are also important in the development process. One of the agreed framework containing goals of sustainable development is the Sustainable Development Goals (SDGs). The SDGs have the 169 targets to be implemented. The SDGs cover areas of human, social and economic development, and also the protection of the planet earth (Heble and Shepherd, 2017, p xv). The SDGs were adopted in September 2015 by the members of the United Nations.

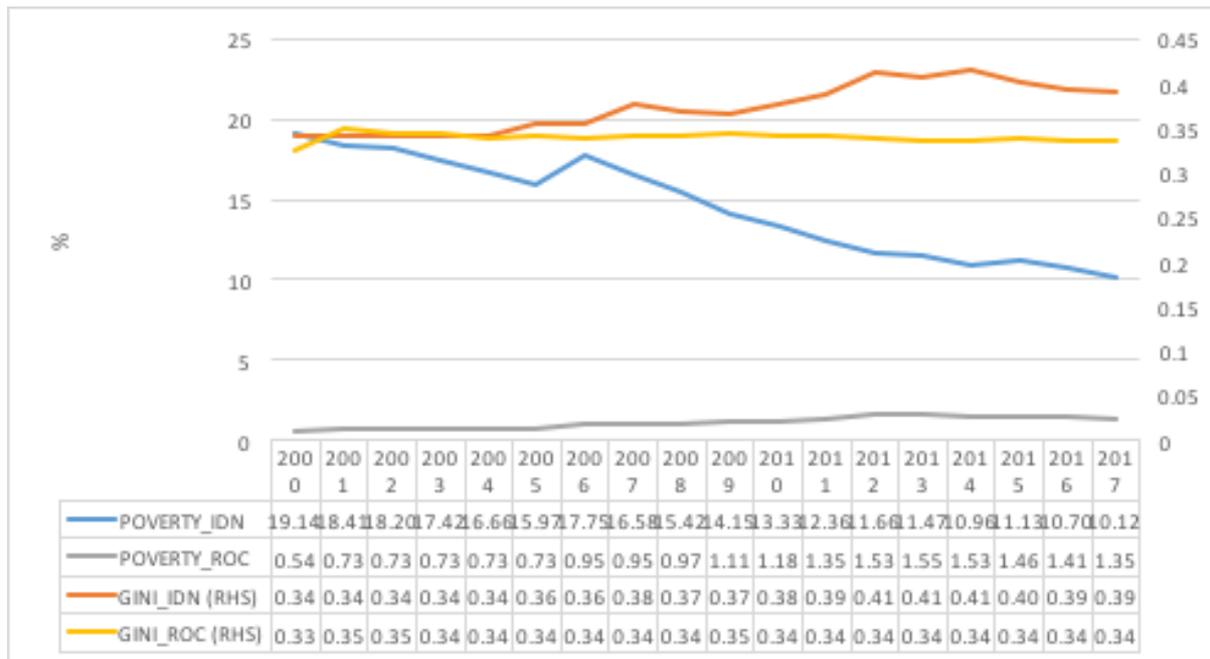
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One of SDGs goal is poverty reduction. This goal is the first objective in the SDGs which proclaims that in 2030 each economy must (i) eradicate extreme poverty, (ii) reduce poverty in all its dimensions; (iii) implement nationally appropriate social protection systems and measures for all, (iv) ensure equal rights to economic resources; (v) build resilience and reduce their exposure and vulnerability to shocks; (vi) ensure that the implementation of programs and policies to end poverty; and (vii) create sound policy frameworks at the national, regional, and international levels of accelerated investment in poverty eradication actions.

Related to poverty reduction, theoretically, economic growth is believed to reduce the level of poverty. Ames et al. (2002) and Ravallion (1997) found a negative correlation between economic growth and poverty. They also found that growth alone is insufficient for poverty reduction. On the other hand, one of the factors driving economic growth is economic openness. Thus, theoretically, the openness of the economy is believed to be able to reduce poverty, although empirically results are ambiguous. Economic openness can be seen from the magnitude of the flow of goods and the flow of capital entering and exiting in a country or indicated through trade and investment. The trade can affect poverty through several channels, notably through macroeconomic and microeconomic mechanisms.

Some previous studies show that economic openness has a significant influence on poverty reduction, some researches explain that the relationship is significant but is indirect, and partly shows there is a different magnitude of the short-run and long-run impact of the economic openness to poverty reduction.

Based on the ambiguity of the results of previous studies, this study used Taiwan and Indonesia as research subjects. These two countries have different characteristics, both in size of the economy, economic openness and poverty level. The differences in characteristics between Taiwan and Indonesia will enrich empirical studies and can be used in making more specific policies.

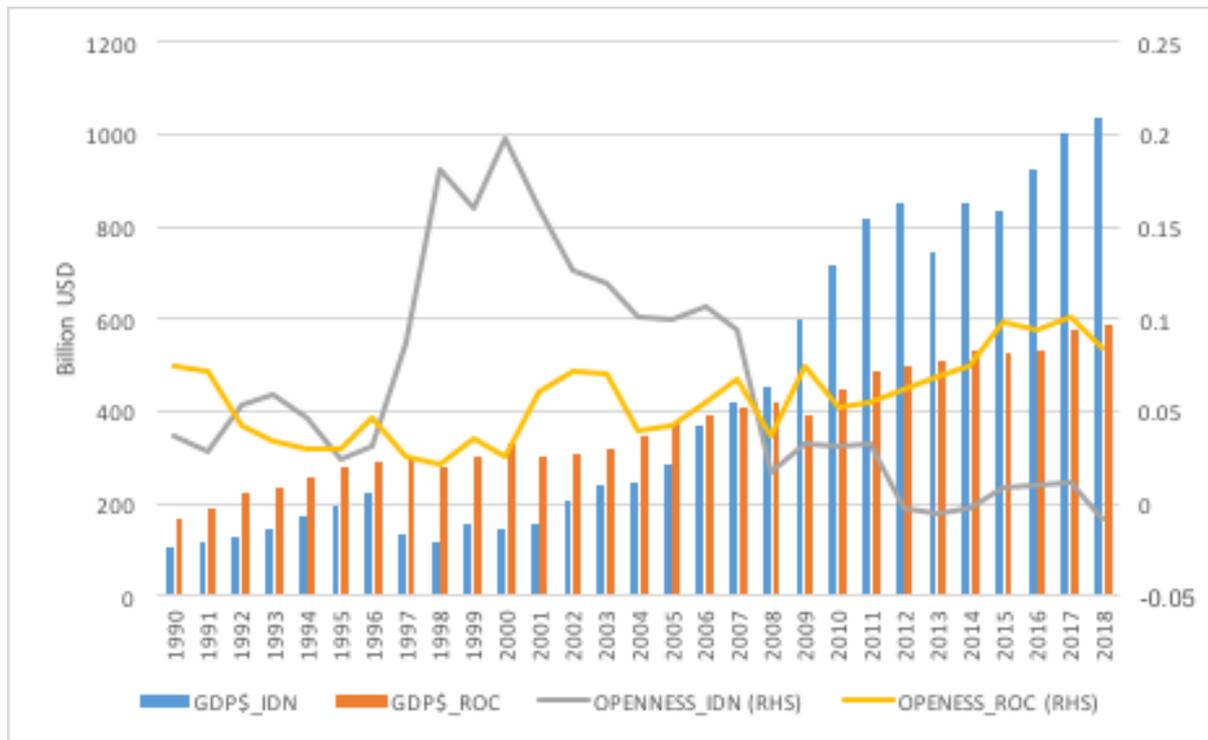


Source: Indonesian Statistics, and National Statistics – Republic of China

Figure 1. Poverty and Gini Index in Taiwan and Indonesia

Based on the data, Taiwan has a very low poverty rate, but Indonesia still has a high poverty rate. Poverty in these countries occurs both in urban and rural areas. On the other hand, the challenges of openness and globalization are also experienced by Taiwan and Indonesia.

As stated in the previous paragraph, economic growth that is driven by economic openness has a large influence on poverty. Based on the data shows that the Gross Domestic Product Indonesia and Taiwan experienced good growth. In terms of value, Indonesia's GDP is greater than Taiwan's. As stated in the previous paragraph, economic growth that is driven by economic openness has a large influence on poverty. Based on the data shows that the Gross Domestic Product Indonesia and Taiwan experienced good growth. In terms of value, Indonesia's GDP is greater than Taiwan's.



Source: Indonesian Statistics, and National Statistics – Republic of China

Figure 2. Gross Domestic Product and Economic Openness in Indonesia and Taiwan

Economic openness can be measured through international economic activities in the form of investment and trade. One indicator of economic openness is the openness index. The openness index measures the trade balance divided by GDP. The higher the openness index indicates that trading activities are more open, or the country's economy is more open. Figure two shows that Taiwan's openness index is relatively smaller than Indonesia but relatively more stable. Indonesia's openness index before 2009 was very high. This condition shows that exports and imports are high. After the mini-crisis, Indonesia's openness index tends to decline. This condition was caused by Indonesia's relatively low competitiveness index problem. While Taiwan's economic openness is relatively stable but low due to various political reasons which causes international trade cannot run freely. Foreign Direct Investment (FDI) condition in Taiwan and Indonesia is relatively similar. Inward FDI is more dominant than outward FDI, so we could use this condition to analyzes the different impact of inward and outward FDI on poverty.

Based on the background, this study proposes openness as an important policy option to reduce poverty through economic growth. The research objectives are

1. to describe the condition of poverty and macroeconomic in Taiwan and Indonesia

2. to analyze how openness and growth in Taiwan and Indonesia have contributed to its poverty reduction.

Because previous researches show that there are differences long-run and short-run effect, then this study applies the Johansen Co-integration approach for the long run and the standard Error Correction Method (ECM) for the short run.

The practical contribution of this study is to show the current condition about the relationship between economic growth, openness, and poverty, based on time-series data. It will fill the gap of empirical studies that depend on cross-section regression analysis. The result has an important policy implication and lesson learned between Taiwan and Indonesia.

2. Literature review

2.1. The importance of poverty and inequality reduction in sustainable development

In September 2015, the United Nations (UN) set new development goals, called the Sustainable Development Goals (SDGs). The SDGs are expected to guide the development efforts to be achieved in 2030. SDGs cover many fields, such as poverty, health, environment, education, innovation, inequality, urbanization, peace, justice and institutions, and partnerships for development. Regarding these goals, poverty and inequality are important goals, not only for developing countries but also for developed countries.

There are various definitions of poverty - from the simplest indicators to more complex and comprehensive indicators. Poverty is a multidimensional phenomenon. In general, poverty is measured by purchasing power per capita or expenditure incurred by households, in the form of expenditure quintiles. Two major theories of poverty are individualistic theories about poverty and inequality, and a structural perspective on poverty (Royce, 2009). The individualistic theory of poverty and inequality views poverty as an individual problem, which is a result of a failure of individual attitudes and values, which come from insufficiency, weakness and inefficiency, economic decisions and lack of ownership of the skills of the poor themselves.

While the structural perspective on poverty views poverty as a structural problem that sees poverty as a social failure, because of the economic, political, cultural and social institutions of the community. Measurements of poverty in many developing countries feel inspired by the utilitarian/welfarist and non-utilitarian / nonwelfarist (Lailosa, 2007). Utilitarian/welfarist defines welfare as the level of individual satisfaction derived from the consumption of goods and services and emphasizes the individual's perception of what generates satisfaction or well-

being. On the other hand, non-utilitarian / non-welfarists define welfare more on a social perspective.

Mostly, this approach to measuring poverty using monetary indicators, namely the amount of household income or consumption. According to this definition, people are categorized as poor if and only if they do not have sufficient income to meet a certain level of welfare. The World Bank measures poverty lines based on one's income. Someone who has an income of less than US \$ 1 per day is categorized as poor. If their income or consumption does not exceed the defined poverty line, then they are said to be poor (Lailosa, 2007). Ames et al. (2002), UNDP (2000), Mikelsen (2003), Maxwell (2007), and BAPPENAS (2002) state that poverty is a situation where a person has no income to meet his daily needs (especially food) and without the ability to support basic human needs for sustainable life. Thus poverty is a multidimensional problem, which is not only an economic problem but also a social, political and cultural problem.

Another approach developed by UNICEF defines poverty as a lack of material ownership which is a minimum human need, including food. This definition is broader than the definition used in monetary concept. The definition of poverty continues to evolve by incorporating the concept of social exclusion as proposed by the International Labor Organization (ILO). In this measurement, elements of personal exclusion (e.g. barriers to social integration from easily impoverished groups such as disabled people, street children and parents) and social exclusion (e.g. racial, sexual and religious discrimination) are included. Noting this development, UNDP developed a more comprehensive definition involving income and economic growth of the poor, fulfilling basic needs, and participating in decision making.

The definitions of poverty that are widely used in empirical studies are (Ravallion, 2004):

1. The headcount index is the proportion of the population that lives below a specific poverty line.
2. Poverty gap index (poverty depth) which measures the mean distance below the specific poverty line as a proportion of the poverty line
3. The squared poverty gap (poverty severity), in which the individual poverty gaps are weighted by the gaps themselves, to reflect inequality amongst the poor.

Measuring poverty levels cannot be separated from income inequality. Theoretically, levels of poverty and income inequality are a different matter, but empirical studies of income inequality can be used as a proxy for poverty. Poverty and inequality are intrinsically linked. Poverty

reduction - especially for the poorest - can be greatly enhanced through distributional policies. All the evidence confirms that distribution is central to fighting poverty. Distribution objectives, particularly for assets, should be an integral part of the poverty reduction agenda.

Small changes in income distribution can have a large effect on poverty. A change in the income distribution of one-quarter of one percent would barely affect the Gini coefficient. The Gini coefficient measures inequality across the whole of society rather than simply comparing different income groups. If all the income went to a single person (maximum inequality) and everyone else got nothing, the Gini coefficient would be equal to 1. If income was shared equally, and everyone got the same, the Gini would equal 0. The lower the Gini value, the more equal a society. Changes in income distribution have even larger effects on measures of the poverty depth (poverty gap), and the severity of poverty (poverty gap squared). This is only because its Gini coefficient is marginally higher. Again, this is due to very marginal changes in the Gini coefficient.

According to McKay (1997) and Hanmer and Naschold (2000), growth is less effective in reducing poverty in countries with high inequality. This is not surprising because what is important for poverty reduction is not the growth rate, but the corrected-distribution growth rate (Ravallion, 2001). In some countries with high inequality and low economic growth rates, changes in income distribution will be more effective in reducing poverty than the rate of economic growth (Hanmer and Naschold, 2000). The recent shift in thinking is that policy is not enough to target poverty reduction without addressing income inequality (McKnight, 2018). Based on this, the World Bank, the United Nations, the World Economic Forum, the OECD set twin objectives and outlined recommendations that policies should simultaneously aim to address poverty and inequality in rich and poor countries

The strength of the relationship between inequality and poverty will depend on the extent to which measures of inequality are sensitive to income dispersions at the bottom of the income distribution (McKnight, 2018). Theoretically, there can be conditions where there is no relative poverty (income <60% median income) but high inequality (high-income concentration among a very small group of very rich households) or relatively high poverty but low inequality (very low-income dispersion above the median). In contrast, inequality is always a relative term: This refers to the difference between the standard of living and income in the income distribution. In practice, poverty and inequality often rise and fall simultaneously. Inequality can be high in communities without high poverty rates due to the large differences between the upper and middle parts of the income spectrum.

Mostly, this approach to measuring poverty using monetary indicators, namely the amount of household income or consumption. According to this definition, people are categorized as poor if and only if they do not have sufficient income to meet a certain level of welfare. The World Bank measures poverty lines based on one's income. Someone who has an income of less than US \$ 1 per day is categorized as poor. If their income or consumption does not exceed the defined poverty line, then they are said to be poor (Lailosa, 2007). Ames et al. (2002), UNDP (2000), Mikelsen (2003), Maxwell (2007), and BAPPENAS (2002) state that poverty is a situation where a person has no income to meet his daily needs (especially food) and without the ability to support basic human needs for sustainable life. Thus, poverty is a multidimensional problem, which is not only an economic problem but also a social, political and cultural problem. Small changes in income distribution can have a large effect on poverty. A change in the income distribution of one-quarter of one percent would barely affect the Gini coefficient.

Finally, reducing poverty and improving conditions of equality is very important for sustainable development. Low poverty rates and low inequality will result in a better quality of development.

2.2. How economic openness help to reduce poverty?

The relationship between poverty, economic openness, and economic growth is an interesting thing to discuss. The strong correlation between economic growth and poverty reduction can be seen from the following two arguments (Rodrik, 2000):

1. Economic growth is very important, so only targeted policies to increase growth can reduce poverty;
2. on the contrary, only policies that succeed in reducing poverty can produce in higher aggregate growth.

The income growth of the poor is strongly correlated with economic growth, although the relationship will vary in each country depending on government policies and social and economic conditions (Hoekman, 2017, pp. 33-34). On the other hand, trade openness has also long been seen as an important element of economic policy. Openness of trade is an important step towards achieving poverty reduction because openness promotes the efficient allocation of resources through comparative advantage, allows the dissemination of knowledge and technological progress, and encourages competition in domestic and international markets

(McCulloch, Winters and Cirera, 2001, Hoekman, 2017, pp. 33-34, Chang, Kaltani, & Loayza, 2009).

There are many terms of trade openness. The proportion of gross domestic product exports and/or imports, average tariffs and foreign direct investment are three widely used definitions (Dollar and Krray, 2001, Harisson, 2007 and Winters, 2002). Trade liberalization can reduce poverty because it will increase the average income, and provide more resources to tackle the problem of poverty (McCulloch, Winters and Cirera, 2001; Hoekman, 2017). Theoretically, trade can influence poverty reduction through two paths, namely the mechanism of macroeconomics and microeconomics (Brambila & Porto, 2017). In macroeconomics, trade affects economic growth and will be beneficial to the poor. While in microeconomics, trade affects poverty through the impact on household behavior. Trade liberalization changes prices. This price change will affect consumption decisions. Higher prices reduce real spending, while lower prices increase it.

The effect of economic openness on poverty reduction can be expressed through the following mechanisms (Brambila & Porto, 2017, Mitra, 2016, McCulloch, Winters and Cirera, 2001, Heble and Shepherd, 2017, Winters, 2002 and Winters et al., 2004):

1. Price transmission. The first effect of trade liberalization is to change the price of liberalized goods. If price changes are experienced by poor households, the direct impact on poverty depends on whether they are consumers or producers. Increasing prices will benefit producers but harm consumers. Price transmission also depends on several factors, especially the structure of the distribution sector; the way government agencies or marketing organizations operate; and whether the goods are traded at the local, regional, national or international. If price changes are not transmitted to the poor, complementary policies are needed to build markets, increase competition and deepen market integration.
2. Taxes and spending. Trade liberalization can also affect poverty through changes in the government's fiscal position, especially if trade taxes are an important source of income. Trade liberalization does not always reduce government revenues if non-tariff barriers and tariff exemptions are also addressed. Social and anti-poverty programs must be protected if there is a decrease in government revenues. Also, in macroeconomically, maintain social expenditure is much more important than trade taxes.

3. Income channel. The openness to the international flow of goods and services can increase national income, which in turn enables moving forward on resource-intensive development issues.
4. The size of the market and the incentives to innovate

Previous studies on the relationship between economic growth, economic openness and poverty reduction showed mixed results and have no general relationship since the impact on poverty. The impact of openness on poverty depends on the structure of poverty (Hertel et al, 2003), the structure of trade (Harrison, 2007), and the poverty policy (Aksoy and Beghin 2005, Anderson and Martin 2005; Bhagwati and Srinivasan 2002; Dollar and Kraay, 2001). Several studies show that trade makes an important contribution to poverty reduction. The integration of developing countries into international markets is also very important to end poverty and not leave anyone behind. Previous research found that trade and economic openness play an important role in reducing poverty due to an increase in the transfer of knowledge and technology which will ultimately create employment opportunities. Fatima et al (2003) found that trade liberalization had a strong influence on productivity. Higher foreign direct investment will have an impact on technology in new business practices and domestic companies to increase productivity, encourage economic growth, and ultimately reduce poverty (Hay, 2001; Ferreira and Rosi, 2001; UNCTAD, 2013)

Tsai and Huang (2007) found the impact of economic growth, openness and government intervention on poverty reduction in Taiwan. Using time-series data, the first concluded that sustainable economic growth is the most important factor for poverty alleviation. Second, openness has brought substantial economic growth, more income, and better income distribution to Taiwan. Third, there is no significant effect of inward direct foreign investment on poverty, but outward foreign direct investment has an impact on poverty reduction in the long-run and short-run.

In contrast to other findings, several studies have not shown a significant positive correlation between economic openness and poverty (UNCTAD, 2013, Rodrik, 2000). Akmal et.al. (2007) found that the process of trade liberalization in Pakistan did not have a significant impact on poverty.

The World Bank indicates that not all poor people are affected by international trade equitably. The effect will depend on where they live (rural versus urban areas), their respective characteristics (skills, gender), types of trade policies (increased import competition or export

opportunities) and where they work (industry, companies, formal/informal sectors). Countries with a weak business environment and support, as well as the high level of corruption also received little benefit from trade liberalization (Freund and Bolaky 2008). Because the effects of economic openness depend on a variety of factors, appropriate poverty policies and good international cooperation are needed. International cooperation is needed to increase beneficial participation for developing countries in the trade of goods and services, to create a greater impact of pro-development of employment and poverty reduction, (UNCTAD, 2013).

Table 1. The relationship between trade and poverty in former studies

Category	Study	Country	Methodology	Time	Impact on poverty reduction
Positive	Nicita (2008)	Mexico	General equilibrium macro model	1989, 1992, 1994, 1996, 1998, 2000	Positive geographically
	Cockburn, Corong, and Cororaton (2008)	Philippine	A computable general equilibrium micro-simulation model	1994	Positive for headcount index and negative for the poverty gap and severity of poverty
	Bussolo and Nimi (2008)	Nicaragua	General equilibrium macro model	2001	Positive
	Tsai and Huang (2007)	Taiwan	Time-series (VECM)	1964-2003	Positive
	Huang and Jun (2007)	China	Partial equilibrium model	2005	Positive geographically
	Akmal et al	Pakistan	Time-series (VECM)	1973-2003	Positive in long-run, unclear in short-run
	Dung and Mitsuo (2007)	Vietnam	Computable general equilibrium mode	2001	Positive
	Hertel et al (2004)	Indonesia	Cross-section	1997	Positive in short-run and long-run
	Bhagwati and Srinivasan (2002)	Developing countries	Qualitative	-	Positive

Category	Study	Country	Methodology	Time	Impact on poverty reduction
	Dollar and Krray (2001)	Several countries	Cross-section	Different periods	Positive
Neutral and unclear	Ravallion (2006)	China	Time series (OLS)	1980-2000	Neutral
	Hertel et al (2003)	14 developing countries	General equilibrium	Different periods	Unclear
Qualitative	Bardhan (2006)	Developing countries	-	-	Qualitative
	Bird (2004)	-	Qualitative	-	Qualitative
	Hertel and Reimer (2004)	-	Survey of literature	-	Qualitative
	Winters (2002)	-	Qualitative	-	Qualitative

Source: Seyed Hamzeh Hosseini Pozveh, 2010

1.3. Poverty and policy

Poverty reduction does not only depend on openness and economic growth but also on government policy. Poverty policies with appropriate instruments need to include the economic and social dimensions. The development of poverty policy is in line with the development of the grand theory of poverty. In individualistic theories of poverty and inequality, markets are considered efficient and fair so that government intervention is not needed. In this view, the best way to combat poverty is to reform and reorganize the poor in entering the labor market. While the structural theory of poverty sees that the market is inefficient and unfair, so government intervention is needed. The best way to fight poverty is to expand the labor market. Romer (2001: 318) emphasized the importance of the role of the government in facing failure and driving conditions to a better level of equilibrium. Government policies can change people's expectations of a higher equilibrium. The most interesting aspect of the new growth model is that this model helps explain international capital flows that exacerbate inequalities between developed and developing countries. Developing countries with a low ratio of capital to labor usually have high spending. High spending will decrease rapidly if there is an investment in education, infrastructure, or research and development.

According to the opinion of Myrdal, Jhingan (2003) said that the national policy in poor countries tends to exacerbate regional imbalances. The free market and liberalization are two

forces that create regional inequalities due to poor distribution of welfare. Underdeveloped country governments must implement equitable policies, strengthen the impact of deployment, bridge regional inequality and strengthen the foundation for a sustainable economy.

The World Bank report (1990) presents two basic strategies for reducing poverty, namely (i) opening opportunities to work for the poor through economic growth, and (ii) building the capacity of the poor to produce through ownership of assets such as education, health, land ownership, and others. The government through fiscal and monetary instruments can stimulate these two strategies as seen in several countries. The strategies and policies chosen by a country are factors that can explain why there are differences in reducing poverty rates between regions or countries even though the growth rate is the same.

Policies to reduce poverty are as follows:

1. The law of minimum wages. The minimum wage law requires that all employers pay the minimum wage to their employees according to government regulations. This is an effective way to increase employee income and will reduce wage inequality. The minimum wage is intended to help poor workers without directly increasing government spending. On the other hand, the minimum wage law is controversial because it can worsen economic conditions. This argument is based on the law of supply and demand. When wages rise, companies may not pay workers causing unemployment and will eventually increase poverty
2. Social security. Social security is the benefits provided by the government, such as income allowances, tax credits, social benefits or unemployment benefits. Most people agree that the government must provide at least a basic social security system (ie "safety net") to prevent people from falling into worse poverty. The social security system aims to reduce poverty by increasing the income of the poor. The problem is that social security can create wrong incentives, and on the other hand social security does not always cause the recipient to be in a better condition.
3. Negative Income Tax. A negative income tax is a subsidy for individuals with low income. Negative income tax would work in a progressive tax system, in which the higher-income individuals also pay a larger percentage of the tax. Many economists regard this policy as a good option for redistributing wealth in a country.
4. In-kind benefits. The in-kind benefit is a non-cash benefit. This policy provides direct access to certain goods and services needed by poor families to improve living standards. In-kind benefits are usually in the form of education and health care benefits.

Free education allows poor families to acquire skills and qualifications that can help get better jobs and higher income in the future.

3. Methodology

This research is a quantitative descriptive study of the effect of economic growth and openness on poverty reduction in Taiwan and Indonesia. The study of the literature on poverty policy in Taiwan and Indonesia is an important source of analysis. Secondary data is used to see the effect of growth and economic openness in reducing poverty. Primary data is obtained through in-depth interviews to sharpen the results of the role of government policy in reducing poverty.

3.1. Data Sources

Annual time-series data from 2000- 2018 are used in the analysis process. Secondary data used is sourced from the Indonesian Statistics Agency and National Statistics, ROC, Ministry of Finance, ROC and World Bank. The variables used in the study are:

1. Poverty. This study uses different poverty indicators for Taiwan and Indonesia. The poverty indicator in Taiwan follows the indicators used by Dollar and Kraay (2002, 2004), and Tsai and Huang (2007), namely the bottom quintile of the population. While the poverty indicator in Indonesia is the Headcount index.
2. Income is proxied by Gross Domestic Product
3. Trade openness is measured by net export divided by GDP (NX/Y)
4. Foreign direct investment. The indicator of FDI is ratio outward FDI to GDP ($FDIo/Y$) and ratio inward FDI to GDP ($FDIi/Y$).
5. Government expenditure. Government spending reflects the government's commitment to poverty alleviation. As noted in the prior research infrastructure of government policies, education and health services have a positive impact on poverty reduction. In this study, the indicator of government expenditure is the ratio of government expenditure to GDP (Gov / Y)
6. Gini Coefficient

3.2. Model and Hypothesis

This research describes two countries with different conditions. Indonesia as an open economy with a high level of poverty and Taiwan as a small open economy with low poverty rates. This

paper is developed from Tsai & Huang paper (2007), Posyeh (2010), and Afandi, Wahyuni and Sriyana (2017). The model is estimated by the Error Correction Model (ECM).

The model is

$$Poverty = f(GDP, \frac{X}{GDP}, \frac{M}{GDP}, \frac{FDI}{GDP}, G, Gini)$$

$$Poverty = \alpha_0 + \alpha_1 GDP + \alpha_2 \frac{X}{GDP} + \alpha_3 \frac{M}{GDP} + \alpha_4 \frac{FDI}{GDP} + \alpha_5 G + \alpha_6 Gini + e_t$$

When the data are cointegrated, there is a long-run relationship between variables. The mechanism of the correction model is to make the behavior of the short run and long run equal. ECM can be formulated as

$$\Delta poverty = \alpha_0 + \alpha_1 \Delta GDP + \alpha_2 \Delta \frac{X}{GDP} + \alpha_3 \Delta \frac{M}{GDP} + \alpha_4 \Delta \frac{FDI}{GDP} + \alpha_5 \Delta G + \alpha_6 \Delta Gini + \alpha_8 EC_{t-1} + e_t$$

$$ECT = (Poverty - \beta_0 - \beta_1 GDP - \beta_2 \frac{X}{GDP} - \beta_3 \frac{M}{GDP} - \beta_4 \frac{FDI}{GDP} - \beta_5 G - \beta_6 Gini$$

In this case, coefficient α_i is a short-run coefficient while is the β_i long-run coefficient.

The hypothesis is the export, FDI, and economic growth is generally conducive to poverty reduction in the short run and long run. Import has a negative impact on poverty in the long run because import can jeopardize job creation, but not in the short run because import can be used to reduce price levels. Inflation and the Gini coefficient has a negative effect on poverty.

Before proceeding, as a preliminary, we investigate the time-series properties of the variables which will be employed later in our regression analysis. We focus on examining whether these variables contain unit roots and whether they share common stochastic trends. The unit root testing and co-integration test are used as a property of a dynamic model.

These are the steps of ECM regression.

1. Unit root test. The unit root test is a stationary test that analyzing whether a certain coefficient of autoregressive models have the same value or not. Augmented Dickey-Fuller (ADF) is used for the unit root test. These are the formulation of the ADF test:
 - a. The model with intercept and trend

$$\Delta Y_t = \alpha_0 + \alpha_1 T + \gamma Y_{t-1} + \sum_{i=2}^p \beta_0 \Delta Y_{t-1+i} + e_t$$

b. Model with intercept but no trend

$$\Delta Y_t = \alpha_0 + \gamma Y_{t-1} + \sum_{i=2}^p \beta_0 \Delta Y_{t-1+i} + e_t$$

c. Model without intercept and trend

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=2}^p \beta_0 \Delta Y_{t-1+i} + e_t$$

where

$$\Delta Y_t = Y_t - Y_{t-1}$$

Y_t = the observed value at time t

P = maximum lag used

Procedures to consider whether the data was stationary or not stationary were to compare the value between the values of statistics ADF and the T critical value developed by MacKinnon. If ADF absolute statistic value is higher than the critical value so that the data is stationary. The length of lag can be decided based on criteria Akaike Info Criterion (AIC) or Schwartz Info Criterion

2. Co-integration test. If the data that used is not stationary, Granger and Newbold (1987) note that the regression results will be spurious. So, to avoid such a problem, a dynamic model by Engle and Granger (1987) recommended a causality test known as ECM which is related to the co-integration test. To use the co-integration test, the researcher can make sure that all the variables have the same degree of integration. This test was applied when stationary data through the unit root test and the degree of integration test has been done. The co-integration test is used to know the probability of equilibrium or the long-run stabilization occurred between the observed variables. After all the requirements of co-integration have been done then the researcher knew the degree of the data which is stationary or not. To use the co-integration test, all the data must be

at the same degree. The Johansen co-integration test is used to decide the co-integration of variables.

3. Error Correction Model (ECM). When the data are cointegrated, there is a long-run relationship between variables. The mechanism of the correction model is to make the behavior of the short run and long run equal. ECM can be formulated as

The hypothesis is the export, FDI, and economic growth is generally conducive to poverty reduction in the short run and long run. Import has a negative impact on poverty in the long run because import can jeopardize job creation, but not in the short run because import can be used to reduce price levels. Inflation and the Gini coefficient has a negative effect on poverty.

4. Research Result

In this section, we describe the openness of the economy, poverty, and poverty policy in Taiwan and Indonesia and the next is the result of regression ECM.

4.1. The openness of the economy in Taiwan and Indonesia

Taiwan's economy has experienced considerable structural change. Roughly speaking, economic development in Taiwan can be divided into three stages:

1. primary import substitution (1950–58)
2. transition and export promotion (1958–80)
3. accelerated liberalization (1980–present)

In 1910-1936, the Taiwan economy was dominated by the agricultural sector and the industry that processed agricultural products. Since 1937 with the entry of Japan in Taiwan, the industry began to develop, especially steel, chemistry, textile, metal, and machinery. In the 1950s, with aids from the USA, economic growth began to increase and the government focused on infrastructure investment. Agricultural products increase by around 14 percent and provide a lot of investment needed in the industrial process.

Tsai and Huang (2007) stated that Taiwan '70s is considered as one of the four "mini dragon" in Southeast Asia; the other three are Singapore, Hong Kong, and South Korea. At that time, agricultural production remained stable, industrial production and exports grew rapidly. Ten large construction projects expand Taiwan's industrial infrastructure. The oil crisis in 1973 and 1979 did not seriously harm the economy. From 1980 until now, in maintaining growth, facing wage increases, labor shortages, oil supply problems, and industrial pollution, the government shifted its emphasis from processing exports to high-tech industries. Entrepreneurship is

encouraged, and research and development are funded. Since 2000 Taiwan has produced 30 percent of high-tech computer equipment in the world. This condition causes per capita income to increase.

Based on research by Tsai and Huang (2007) like many developing countries, in 1950 Taiwan adopted a primary import substitution strategy. Foreign exchange controls policies, protective tariffs, and import restrictions are applied to support this strategy. These policies were chosen to maintain exchange rates and encourage domestic production. In the 1960s, economic policy turned into export promotion.

Two types of policies were implemented in the promotion of export policies. The first was aimed at eliminating or neutralizing the distortions resulting from the protectionist policies imposed during the import substitution phase. Including, among others, liberalization of the foreign exchange allocation system, reimbursement of tariffs for non-tariff protection, and discounted import duties. The second policy involves offering new incentives for exports, namely establishing export processing zones and tax incentives for exports. Since 1980, Taiwan has a dual-track trade regime which is trying to boost exports while protecting the domestic market from foreign competition at the same time. In the early 1990s, many export incentives, such as special export loan programs and customs rebate systems, were revoked or greatly reduced.

Taiwan's export and import data show that Taiwan experienced a trade balance surplus. Both exports and imports tended to experience growth, but in 2015 they experienced a sharp decline. Most of Taiwan's exports are electronic goods.

Table 2. Taiwan Trade Balance 2000-2018

Year	Trade balance (billion USD)	Growth of Export (%)	Growth of import (%)
2000	8.311	21.983	26.490
2001	18.348	-14.835	-22.884
2002	22.075	7.124	4.883
2003	22.587	11.294	13.043
2004	13.613	21.096	31.829
2005	15.814	8.807	8.213
2006	21.318	12.896	10.999
2007	27.425	10.116	8.167
2008	15.180	3.629	9.668

2009	29.303	-20.324	-27.481
2010	23.363	34.824	44.083
2011	26.819	12.257	12.021
2012	30.708	-2.296	-3.896
2013	35.544	1.415	-0.213
2014	39.670	2.703	1.530
2015	51.768	-10.618	-16.570
2016	49.753	-0.024	0.852
2017	57.983	13.173	12.447
2018	49.566	5.889	10.453

Source: National Statistics, ROC

In terms of FDI, Taiwan has opened up to inward FDI since the early 1950s. FDI was invited to enter because it was the first to obtain much-needed foreign exchange, to implement export-oriented industrialization, and finally to transfer advanced technology. At first, there were not many FDI entering Taiwan, but then began to rise. If inward FDI gets special attention, it turns out that outward FDI does not. The deregulation of capital outflows in June 1987 was a turning point. The policy allows businesses or individuals to send annually up to the US \$ 5 million abroad without government approval. As a result, outward FDI surged. In 1987-88, both FDI flows and stock out of Taiwan exceeded FDI inflows, and since then Taiwan has become a net capital exporter. Also, snowballing foreign reserves and liberalizing capital controls, several other factors contributed to pushing Taiwanese companies abroad.

The dynamics of Indonesia's economic openness are also interesting to discuss. Many policies have been made by the government to push towards economic openness. Some of Indonesia's international trade policies are harmonization of policies, making effective procedures and licensing, establishing trade and business competition institutions, illegal trading supervision systems, standardization, safeguard and anti-dumping, and negotiating efforts through various free trade agreements. Whereas to encourage real investment, the government seeks to ensure business certainty, make investment laws, provide incentives, ease of customs and taxation and market security.

In international trade, competitiveness plays an important role in entering the market. Indonesia has four missions to improve competitiveness, namely:

1. increase the smooth distribution, use of domestic products, consumer protection, and trade security;

2. maximize the profitability of the Indonesian nation's competitiveness in global competition;
3. realizing public services and good governance;
4. increasing the role of research and development, and the process of public consultation in decision making in the trade sector.

In addition to these four missions, the Indonesian government has policies, namely:

1. restrictions on the export of raw materials
2. The establishment of processing industries which can contribute to the fulfillment of domestic intermediate goods and boost export performance
3. import restrictions
4. local content requirements.

The openness of the Indonesian economy is marked by the development of Indonesia's trade balance from year to year. As an activity that is prone to world economic shocks, the value of Indonesia's exports and imports also experienced a decline in performance in the years when the global monetary and crisis occurred. Export performance declined significantly in 2009 when the global crisis was more significant than during the 1998/1999 monetary crisis. The decline in export performance during the global crisis was due to a decline in world export demand. The decline in world trade performance also affected the decline in demand for Indonesian export commodities (Safitriani, 2014).

Table 3. Indonesia Trade Balance 2000-2018

Year	Trade balance (billion USD)	Growth of Export (%)	Growth of import (%)
2000	28.609	27.655	39.626
2001	25.359	-9.341	-7.617
2002	25.870	1.488	1.055
2003	28.508	6.822	4.033
2004	25.060	17.240	42.929
2005	27.959	19.663	24.023
2006	39.733	17.673	5.831
2007	39.628	13.197	21.957
2008	7.823	20.087	73.481
2009	19.681	-14.969	-25.053
2010	22.116	35.421	40.106

2011	26.061	28.976	30.791
2012	-1.669	-6.622	8.033
2013	-4.077	-3.930	-2.640
2014	-2.199	-3.600	-4.528
2015	7.672	-14.555	-19.915
2016	9.533	-3.445	-4.935
2017	11.837	16.216	15.658
2018	-8.570	6.715	20.228

Source: Indonesian Statistics

On the other hand, in general, the value of FDI entering Indonesia tends to fluctuate. Similar to Indonesia's trade activities, the value of FDI also suffered from the monetary crisis of 1998/1999 and the global crisis of 2008/2009. Before the crisis, namely the period 1990-1997, the value of FDI in Indonesia reached the highest value in 1996 with a total FDI of USD 6,194 million (Safitriani, 2014). In the period 1995-1997, the value of FDI in Indonesia reached over USD 4 billion. The high FDI was caused by the increasing interest of foreign investors to invest in Indonesia. The increase in interest was allegedly related to the Government Regulation No. 20/1994 imposed by the government on foreign investment in Indonesia during this period.

The regulation regulates FDI share ownership. This policy is able to attract investors, among others, due to the absence of minimum investment requirements, allowing foreign investors to invest both jointly and with 100% share ownership in all regions of Indonesia, and allowing foreign investors to buy domestic companies including foreign investment companies that have the format of a limited liability company under Indonesian law (ASEAN Secretariat, 2004).

4.2. Poverty in Taiwan and Indonesia

In the early postwar years, Taiwan is no exception in that many developing countries have to face the poverty problem. But at present, poverty in Taiwan is very small. Based on Tsai and Huang (2007) research, there are not many references about poverty in Taiwan. Economists seem to forget the word poverty both in research and in all development indices. Moreover, poverty was traditionally treated as an individual rather than a society's problem for which the government or society is responsible (Tsai and Huang, 2007).

The definition of poverty has been revised time and again since then. At present, there are three categories of low-income families:

1. First-type low-income family: a family with no real estate, no one in the family able to work, no sensible revenues, and the family cannot survive without assistance.

2. Second-type low-income family: a family with less than a third of the total family members able to work, and with per capita monthly revenue less than two-thirds of the per capita monthly minimum costs of living (MCL).
3. Third-type low-income family: a family with per capita monthly revenue less than the per capita monthly MCL.

Taiwan has at least three legal frameworks for the population in Poverty since 2000 (Chan, 2016)

1. Public Assistance Act, firstly enacted in 1980 and revised in 2015. This Act is enacted to care for low-income and middle-low-income households, which are measured by the poverty line. Following the Public Assistance Act, the MOHW, with local government agencies, implements a variety of social welfare programs that provide benefits in cash and in-kind to low and middle-low-income households. Some local authorities provide relatively long-term aid, other short-term aid in emergencies.
2. Senior Citizen welfare, firstly enacted in 1980 and revised in 2015. This Act is formulated to assert dignity and health, to maintain the standard of living, to protect the rights and to facilitate the welfares of elders. The elders who fall within the category of medium-low income and do not receive governmental installment shall apply for living subsidies. Benefits in Cash:
 - Living Subsidies (Monthly Cash Allowance)
 - Special Care Subsidies (for the care provider)
 - Rental Subsidy
 Benefits in Kind and Services:
 - Special Family Care Assistance for Elders 65+
 - House Repair
3. Act of Assistance for a family in hardship, firstly enacted in 2000 and revised in 2014. This Act is enacted to assist those families suffering hardship, providing emergency care, helping them to stand on their own feet and improving their living environment Benefits in Cash:
 - Emergency Assistance for Livelihood
 - Children Living Allowance
 - Children Nursery Allowance
 - Medical subsidy
 - Subsidy of Litigation

- Career Development Loan

From year to year, ROC government expenditure has increased. Government spending used for social welfare also continues to increase. On average government spending on social welfare is between 15-20 percent of the total expenditure.

Table 4. Taiwan Government Expenditure on Social Welfare

Year	Government expenditure (billion USD)	G for social welfare (billion USD)	Growth of Gov. Expenditure (%)	Growth of gov of social welfare (%)	Social welfare/exp enditure
2006	68.065	11.383	1.271	-3.081	16.724
2008	74.359	11.681	9.247	2.613	15.708
2009	80.816	11.757	8.683	0.656	14.548
2010	81.120	13.127	0.376	11.649	16.182
2011	88.683	15.168	9.323	15.553	17.104
2012	90.430	18.249	1.970	20.312	20.181
2013	89.528	18.035	-0.997	-1.173	20.145
2014	87.122	17.029	-2.687	-5.579	19.546
2015	82.926	16.681	-4.815	-2.044	20.116
2016	84.947	16.973	2.436	1.750	19.981
2017	91.004	18.510	7.131	9.055	20.340

Source: Ministry of Finance, ROC

Government expenditure on social welfare consists of social insurance, social relief, welfare service, employment service, and public health. The largest proportion of government spending on social welfare is used for social insurance. More than 50 percent of social welfare expenditure is in the form of social insurance. The second largest proportion is welfare service expenditure (above 30 percent). As for social relief and public health, an average of around 6 percent. Employment service has the smallest portion.

Table 5. The proportion of Taiwan Government Expenditure on Social Welfare (%)

Year	Social insurance	Social relief	Welfare service	Employment service	Public health
2001	50.78	9.83	31.96	0.73	6.71
2008	40.11	6.94	42.99	0.61	9.34
2009	48.71	6.21	35.19	0.71	9.19
2010	48.89	7.42	33.37	1.15	9.16
2011	50.41	6.97	33.06	1.19	8.37
2012	56.15	6.78	29.99	0.63	6.45
2013	59.79	6.74	26.25	0.56	6.67
2014	56.87	4.26	31.25	0.52	7.10

2015	58.41	3.96	30.13	0.54	6.96
2016	59.66	3.83	29.20	0.52	6.80
2017	60.50	3.55	28.51	0.51	6.93

Source: Ministry of Finance, ROC

In Indonesia, Statistics Indonesia uses the concept of ability to meet basic needs as a basis for the measurement of poverty. With this approach, poverty is seen as an economic inability to meet the basic needs of food and non-food. The method used in calculating the poverty line which consists of 2 components namely the Food Poverty Line and the Non-Food Poverty Line (Statistics Indonesia, 2009). The Food Poverty Line is the expenditure value for minimum food requirements which is equal to 2,100-kilocalories per capita per day. Non-Food Poverty Lines are the minimum needs for housing, clothing, education, health, and other basic needs. (Statistics Indonesia, 2009).

The National Family Planning Coordinating Board measures poverty based on two criteria, namely:

1. Pre-prosperous Family Criteria is a family that does not have the ability to: (i) carry out religious orders properly, (ii) minimum two meals a day, (iii) buy more than one set of clothes per person per year, (iv) floor houses have more than 80 percent cement, and (v) seek treatment at the health center when sick.
2. Criteria for a Prosperous Family 1 is a family that is unable to carry out religious orders properly, at least once a week eating meat/eggs/ fish, buying clothes one set per year, the average floor area of the house is 8 meters per square foot per family member, no family members aged 10 to 60 years are illiterate, all children aged between 5 to 15 years attend school, one of the family members has a regular or regular income, and no one is sick for three months.

Table 6. Indonesia Poverty Gap (%)

Year	Poverty gap at \$1.90 a day (2011 PPP) (%)	Poverty gap at \$3.20 a day (2011 PPP) (%)	Poverty gap at \$5.50 a day (2011 PPP) (%)	Poverty gap at national poverty lines (%)
2000	9.1	31.1	55.9	
2001	7.7	29.0	54.0	
2002	4.2	21.2	46.0	
2003	4.3	20.7	44.9	3.1
2004	5.2	21.5	45.5	3.0
2005	4.3	19.8	43.8	2.9

2006	6.3	23.4	47.1	3.7
2007	4.7	19.9	42.6	5.1
2008	4.3	18.8	41.7	2.8
2009	3.5	17.4	40.3	2.5
2010	2.9	15.1	36.0	2.2
2011	2.3	13.7	33.8	2.1
2012	1.9	12.7	32.8	1.9
2013	1.4	11.3	30.8	1.8
2014	1.2	10.2	29.0	1.8
2015	1.2	9.0	27.0	
2016	1.0	8.3	24.7	
2017	0.9	7.1	22.7	

Source: World Bank

Based on World Bank indicator, the poverty gap can be divided into four categories:

1. Poverty gap at \$1.90 a day (2011 PPP). Poverty gap at \$1.90 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line \$1.90 a day, expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence. In 2017 this poverty gap is already below 1 percent. This condition shows that the deepest poverty is getting lower.
2. Poverty gap at \$3.20 a day (2011 PPP). Poverty gap at \$3.20 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line \$3.20 a day (counting the non-poor as having zero shortfalls), expressed as a percentage of the poverty line. On this criterion, the poor in Indonesia is still about 7 percent in 2017.
3. Poverty gap at \$5.50 a day (2011 PPP). Poverty gap at \$5.50 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line \$5.50 a day, expressed as a percentage of the poverty line. On this indicator, a significant decrease has been seen since 2000. In 2000 around 50% of Indonesian people were still in this category, but in 2017 there was only 22.7 percent. This shows the efforts of the Indonesian government to reduce poverty successfully.
4. Poverty gap at national poverty lines. Poverty gap at national poverty lines is the mean shortfall from the poverty lines as a percentage of the poverty lines. This measure reflects the depth of poverty as well as its incidence.

Table 7. Indonesia Poverty headcount ratio (%)

Year	Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of the population)	Poverty headcount ratio at \$3.20 a day (2011 PPP) (% of the population)	Poverty headcount ratio at \$5.50 a day (2011 PPP) (% of the population)	Poverty headcount ratio at national poverty lines (% of the population)
2000	39.3	79.9	95.7	18.9
2001	35.5	77.6	94.8	18.4
2002	23.0	65.2	89.7	18.2
2003	22.6	62.7	88.6	17.4
2004	23.9	63.0	88.6	16.7
2005	21.1	61.3	87.5	16.0
2006	27.4	65.7	89.3	17.8
2007	22.5	58.5	84.8	16.6
2008	21.4	56.6	84.6	15.4
2009	18.2	54.7	83.7	14.2
2010	15.7	48.1	77.8	13.3
2011	13.3	45.0	74.4	12.5
2012	11.7	43.5	73.6	12.0
2013	9.4	40.7	71.0	11.4
2014	7.9	37.8	69.0	11.3
2015	7.2	33.1	67.0	11.2
2016	6.5	30.9	62.3	10.9
2017	5.7	27.2	58.6	10.6

Source: World Bank

Another poverty criterion used is the poverty headcount ratio which is a percentage of the population. Poverty headcount ratio can be divided into:

1. Poverty headcount ratio at \$1.90 a day (2011 PPP). Poverty headcount ratio at \$1.90 a day is the percentage of the population living on less than \$1.90 a day at 2011 international prices.
2. Poverty headcount ratio at \$3.20 a day (2011 PPP). Poverty headcount ratio at \$3.20 a day is the percentage of the population living on less than \$3.20 a day at 2011 international prices.
3. Poverty headcount ratio at \$5.50 a day (2011 PPP). Poverty headcount ratio at \$5.50 a day is the percentage of the population living on less than \$5.50 a day at 2011 international prices.
4. Poverty headcount ratio at national poverty lines. The national poverty headcount ratio is the percentage of the population living below the national poverty lines.

National estimates are based on population-weighted subgroup estimates from household surveys.

Indonesia is one of the successful examples of state intervention in the reduction of poverty despite running a relatively slow decline. Formulation of development policies in Indonesia itself is influenced by the thoughts of the world such as growth strategy, growth distribution, Appropriate technology, basic need development, sustainable development or empowerment. This is the masterplan of acceleration and expansion of poverty reduction in Indonesia.

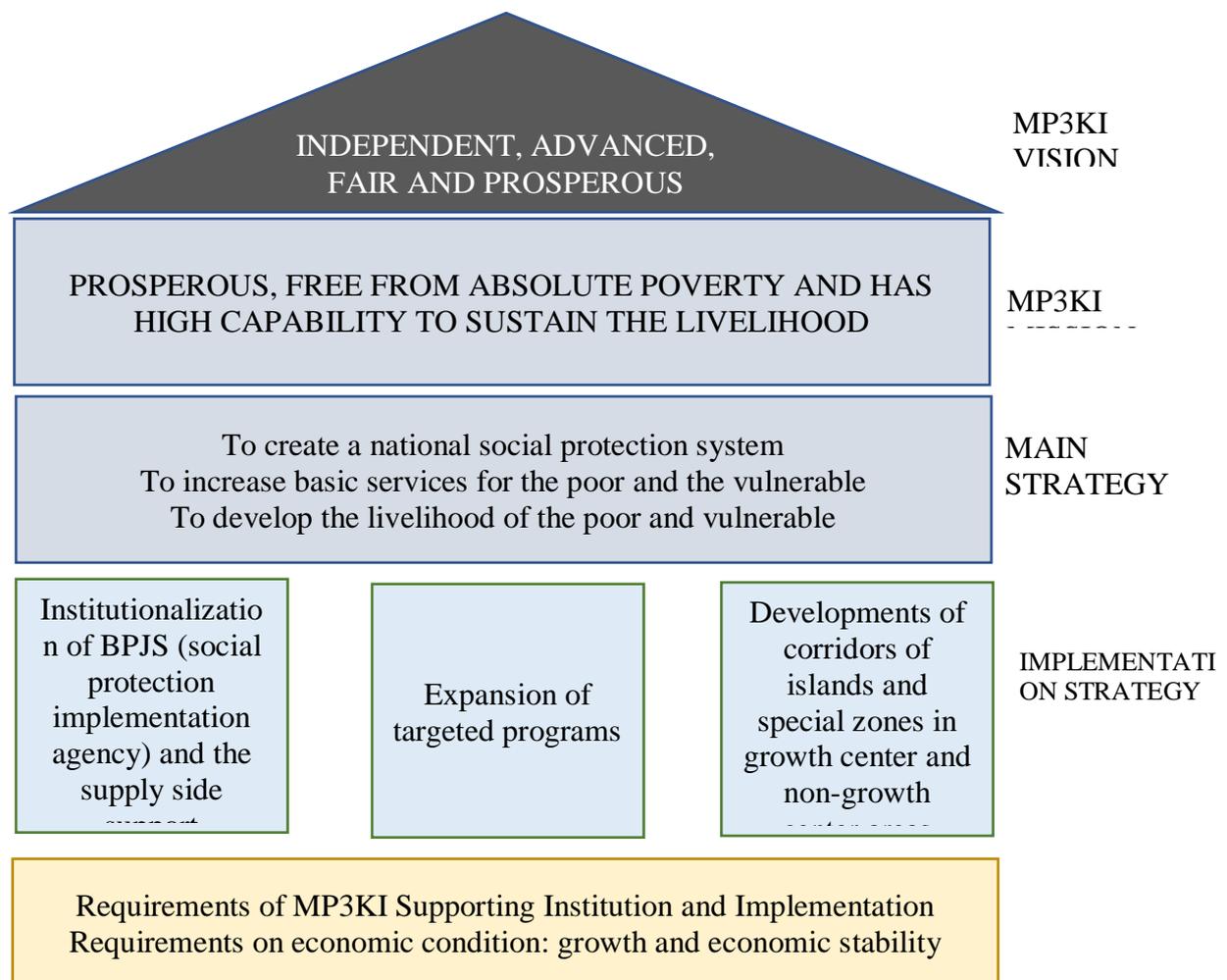


Figure 3. Masterplan of Acceleration and Expansion of Poverty Reduction in Indonesia

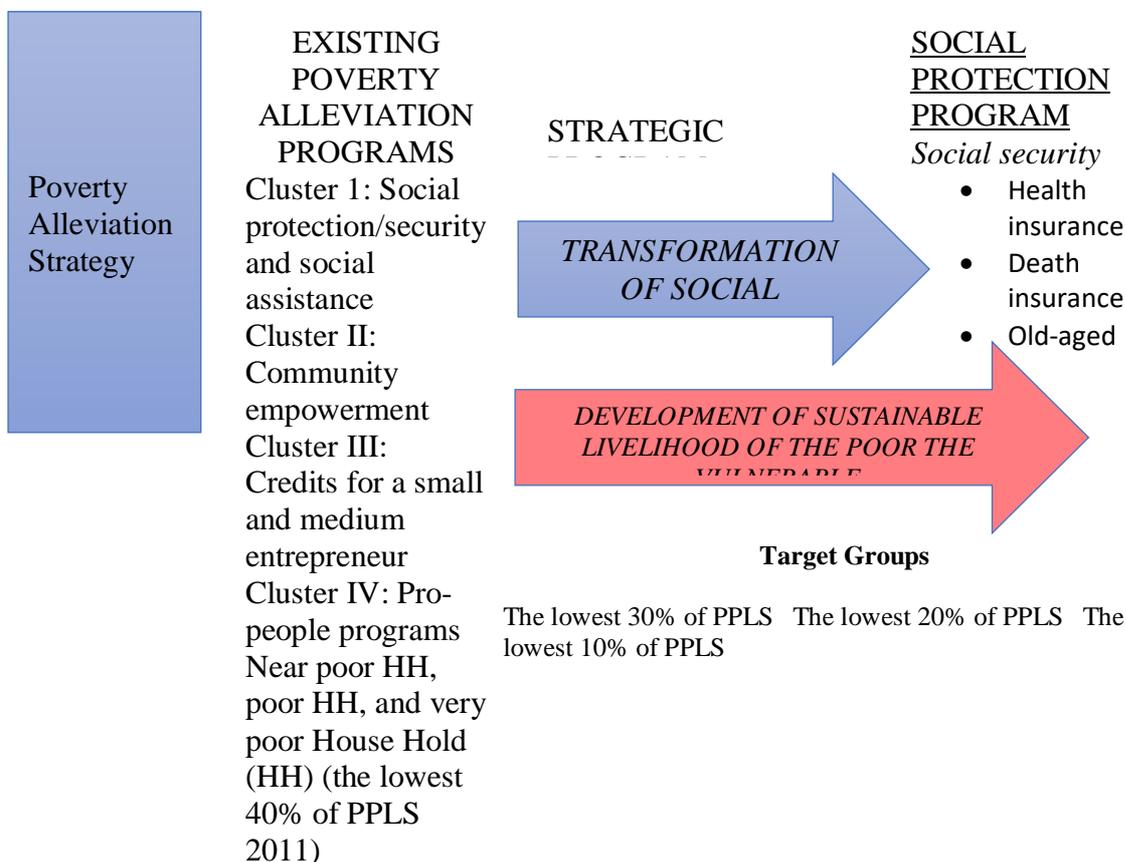
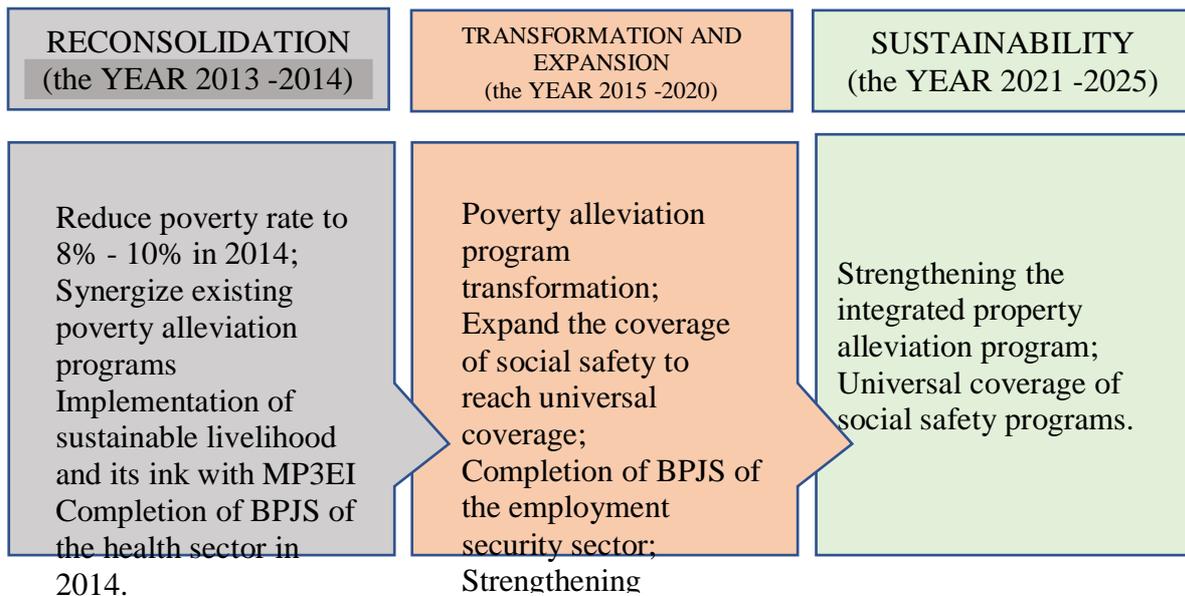


Figure 4. Stages of MP3KI

The Indonesian government has taken major steps, especially through the implementation of Law No. 11/2009 concerning Social Welfare and Law No. 40/2004 concerning the National Social Insurance System (SJSN). Law No. 24 of 2011 concerning the Institutionalization of

Social Security (BPJS) has authorized the government to integrate and expand current social insurance which is fragmented in several institutions.

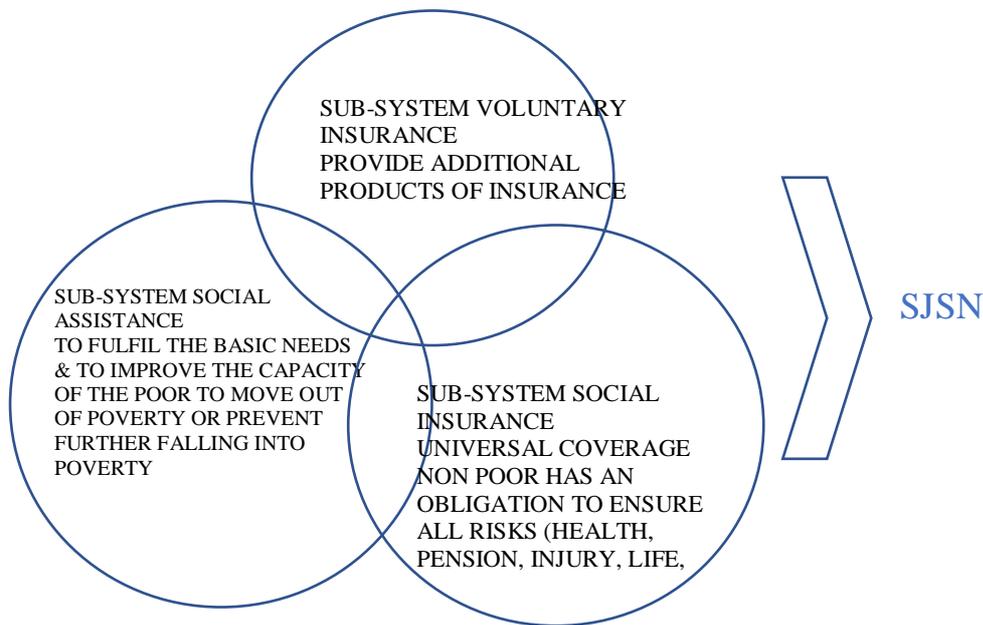


Figure 5. National Social Insurance System

The Government of Indonesia has implemented various programs in efforts to reduce poverty. These programs designed to meet basic needs, to improve socio-economic conditions and the welfare of poor families. Indonesian government programs are grouped into three clusters.

1. Cluster I is an Integrated family-based social assistance program. This program provides social assistance and protection to meet basic human needs. This program guarantees that everyone has access to food, health services, and education.
2. Cluster II is Community development poverty alleviation programs. The aim of this program is empowering communities to use their potential and resources to get out of poverty and take a wider role in their area. This program is group-based community empowerment.
3. Cluster III is a micro-enterprise empowerment poverty alleviation program. The program aims to support micro and small enterprises through financial access, business, and management training and counseling for entrepreneurs.

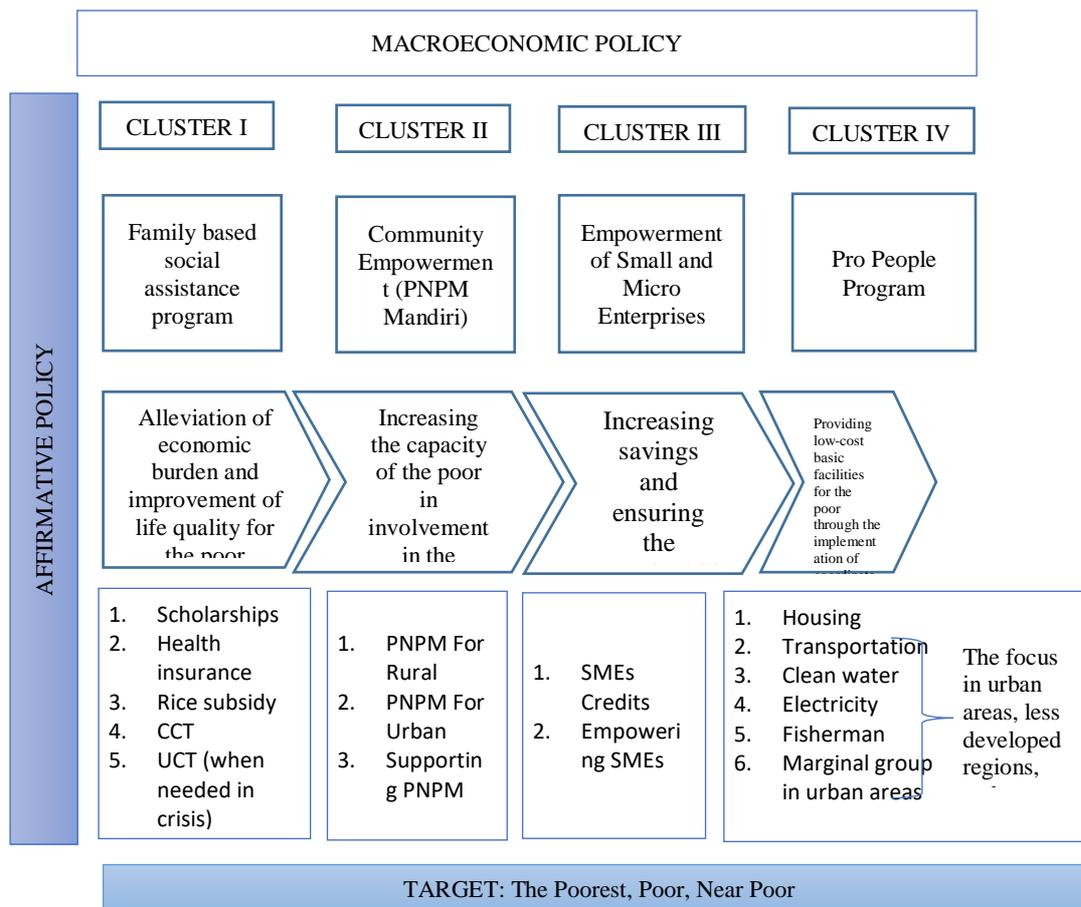


Figure 6. Macroeconomic Policy for the poorest, poor and near-poor

The impact of these programs will be maximized with the support of all stakeholders. For this reason, four main strategies were formulated, namely:

1. Enhancing and developing social protection programs;
2. Increasing access to basic services;
3. Empowering the poor;
4. Prioritize inclusive development.

4.3. Regression result and discussion

Regression using the ECM method requires DF and ADF tests at the level and first difference. The DF and ADF test results in table 8 show that all variables co-integrate at the first difference level so that the ECM model can be used.

Table 8. DF and ADF test result

Variable	level		first difference	
	DF	ADF	DF	ADF
export_idn	-0.9816	-1.5527	-3.5168	-3.4610
export_roc	-0.8377	-2.4728	-4.5434	-4.5434
fdii_idn	-0.5190	-1.4263	-1.4263	-2.8791
fdii_roc	-3.1771	-3.0999	-3.5164	-3.5164
g_idn	-1.3252	-2.0853	-2.0358	-2.0294
g_roc	-2.5758	-3.8716	-5.0727	-5.0192
gdp_idn	-5.0192	-2.1174	-4.0850	-3.9279
gdp_roc	0.3616	-3.6566	-4.0568	-3.8868
gini_idn	-1.1915	-0.9416	-3.4224	-3.4996
gini_roc	-5.3827	-6.2060	-6.9081	-6.4848
import_idn	-0.7712	-1.8368	-3.7492	-3.6220
import_roc	-1.1422	-2.3929	-4.8292	-4.7385
poverty_idn	-0.7621	-2.0160	-4.1529	-4.0255
poverty_roc	-1.7223	-0.3738	-3.0339	-3.0693

Source: data processed

Because the data are cointegrated, it can do short-term and long-term regression. The model used is as follows.

$$Poverty = \alpha_0 + \alpha_1 GDP + \alpha_2 \frac{X}{GDP} + \alpha_3 \frac{M}{GDP} + \alpha_4 \frac{FDI i}{GDP} + \alpha_5 G + \alpha_6 Gini + e_t$$

When the data are cointegrated, there is a long-run relationship between variables. The mechanism of the correction model is to make the behavior of the short run and long run equal. ECM can be formulated as

$$\Delta poverty = \alpha_0 + \alpha_1 \Delta GDP + \alpha_2 \Delta \frac{X}{GDP} + \alpha_3 \Delta \frac{M}{GDP} + \alpha_4 \Delta \frac{FDI i}{GDP} + \alpha_5 \Delta G + \alpha_6 \Delta Gini + \alpha_8 ECT_{t-1} + e_t$$

The coefficient in the OLS model shows the short-run effect, while in the ECM model it shows the long-run effect. ECT shows the adjustment process towards the equilibrium point.

Regression results for Indonesia show that in the short run there are only two significant variables, namely exports/GDP and imports/GDP. If the ratio of exports to GDP rises by 1 percent, poverty will increase by 0.8 percent. The increase in the ratio of exports to GDP can be caused due to the increase in exports (while GDP fixed) or a decrease in GDP (while exports constant). In the case of Indonesia, the proportion of the increase in exports on average is small.

Indonesia's export growth tends to be stagnant. So the increase in this ratio is more due to a decrease in GDP. GDP depicts welfare, so if GDP falls, on average it will drive poverty to increase. Besides, because Indonesia's index competitiveness is relatively low, the increase in exports is usually driven by depreciation. When a currency weakens, poverty on average will also increase.

On the other hand, an increase in the ratio of imports to GDP would reduce poverty by 0.47 percent. This is because the increase in imports indicates an increasing purchasing power. The increase in purchasing power is in line with the reduction in poverty. In the long run, the export/GDP variable no longer has a significant effect. While imports/GDP still have a significant effect. An increase in the import / GDP ratio by 1 percent will reduce poverty by 1.2 percent.

Table 9. Regression Result (Indonesia)

Variable	OLS		ECM	
	Coefficient	t-statistic	Coefficient	t-statistic
C	2.516950	1.109529	0.032649	0.0315
LOG(GDP_IDN)	-0.165485	-0.444442	0.038769	0.2718
LOG(EXPORT_IDN/GDP_IDN)	0.801912*	2.599182	2.127203	0.2191
LOG(IMPORT_IDN/GDP_IDN)	-0.475369*	-2.216585	-1.267572*	0.0802
LOG(FDI_IDN/GDP_IDN)	-0.009128	-0.152771	0.015321	0.8799
LOG(G_IDN)	0.175444	0.576958	-0.303332*	0.0524
LOG(GINI_IDN)	-0.744054	-1.131384	3.356721	0.6276
ECT(-1)			-0.436173*	0.0100

Source: data processed

Another indicator of economic openness, namely FDI, does not have a significant effect on poverty reduction in Indonesia. This is likely because the incoming investment did not provide new employment for workers from poor families. FDI entering Indonesia on average brings new technology that requires skilled labor. Poor families, as we know, are usually trapped in vicious circles. Poor families do not have access to education, so it will be difficult to enter employment that is the result of FDI.

In the long run, the role of government is very important. This is indicated by the significant coefficient of government expenditure. Increase government spending by 1 percent will reduce poverty by 0.3 percent in the long run. This shows that the government has a very big role in reducing poverty. The Indonesian government needs to focus more on spending aimed at reducing poverty.

Table 10. Regression Result (Taiwan)

Variable	OLS		ECM	
	Coefficient	t-statistic	Coefficient	t-statistic
C	-2.658004	-0.452804	0.032649	0.2987
LOG(GDP_ROC)	1.006618*	3.218434	0.038769	0.9592
LOG(EXPORT_ROC/GDP_ROC)	2.697397	1.604788	2.127203*	0.0517
LOG(IMPORT_ROC/GDP_ROC)	-1.549610	-1.283495	-1.267572*	0.0974
LOG(FDII_ROC/GDP_ROC)	-0.108802	-1.149557	0.015321	0.7685
LOG(G_ROC)	-0.451054	-0.916266	-0.303332	0.2490
LOG(GINI_ROC)	4.492575	1.530839	3.356721*	0.0624
ECT(-1)			-0.436173*	0.0829

Source: data processed

Regression for the Taiwan case shows different results. In the short term, none of the variables has a significant effect on poverty in Taiwan. GDP has a significant effect but has the wrong direction of influence. While in the long run, exports/GDP and imports GDP have a significant effect. An increase in exports/GDP of 1 percent will increase poverty by 2.12 percent, while an increase in imports/GDP of 1 percent will reduce poverty by 1.26 percent. This condition is similar to Indonesia. On the other hand, an increase in the Gini index of 1 percent will increase poverty by 3.3 percent. This means that the government must maintain that economic disparities should not be enlarged. Increasing economic inequality will very strongly encourage poverty in Taiwan.

5. Conclusion

The character and nature of poverty in Taiwan and Indonesia are very different. As a country with a relatively small population, Taiwan has almost no poverty problem. This is different from Indonesia. Until now, Indonesia's poverty is still above 5 percent. With a relatively small population, the Taiwanese government successfully manage poverty alleviation programs as well. The remaining poverty in Taiwan is only natural poverty, which indeed will always be there forever. Thus, to achieve SDGs, Taiwan has almost no difficulties. The opposite condition occurs in Indonesia. Indonesia is a large country with a very large population. The data shows that the government has worked hard to reduce poverty. In general, the government's effort to reduce poverty was successful, although it has not been able to suppress it to under 5 percent. From the policy side, it appears that the two countries are pro-poor countries. Various programs were created to reduce poverty and provide social security for poor families.

Based on the regression results, it appears that FDI is not a factor that drives poverty reduction. International trade is a more dominant factor compared to foreign investment. What needs to be considered concerning international trade is the role of export and import factors. The results in both countries show that the GDP element as a numerator in the international trade ratio has a stronger effect. Thus, exports must be pushed towards creating value-added income for poor families so that exports can also be a variable that drives poverty reduction.

The role of government in both countries is a major factor in reducing poverty. Spending on social welfare, or even the role of government in reducing income disparities, needs special attention. Taiwan has a more detailed government spending scheme for social welfare compared to Indonesia. Thus, Indonesia should emulate several government spending schemes for social welfare from Taiwan.

The lesson to be learned from these two conditions is that economic openness does have a role in reducing poverty, but it is not the main thing. The role of government is far more important in the process of reducing poverty in both Taiwan and Indonesia.

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APPENDICES

Dependent Variable: LOG(POVERTY_IDN)				
Method: Least Squares				
Date: 08/22/19 Time: 23:03				
Sample: 2000 2018				
Included observations: 19				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.516950	2.268485	1.109529	0.2889
LOG(GDP_IDN)	-0.165485	0.372344	-0.444442	0.6646
LOG(EXPORT_IDN/GDP_IDN)	0.801912	0.308525	2.599182	0.0233
LOG(IMPORT_IDN/GDP_IDN)	-0.475369	0.214460	-2.216585	0.0467
LOG(FDII_IDN/GDP_IDN)	-0.009128	0.059748	-0.152771	0.8811
LOG(G_IDN)	0.175444	0.304085	0.576958	0.5746
LOG(GINI_IDN)	-0.744054	0.657649	-1.131384	0.2800
R-squared	0.933530	Mean dependent var	2.635212	
Adjusted R-squared	0.900295	S.D. dependent var	0.226758	
S.E. of regression	0.071601	Akaike info criterion	-2.158098	
Sum squared resid	0.061521	Schwarz criterion	-1.810146	
Log-likelihood	27.50193	Hannan-Quinn criter.	-2.099210	
F-statistic	28.08888	Durbin-Watson stat	0.979825	
Prob(F-statistic)	0.000002			

Dependent Variable: LOG(POVERTY_ROC)				
Method: Least Squares				
Date: 08/22/19 Time: 23:05				
Sample: 2000 2018				
Included observations: 19				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.658004	5.870102	-0.452804	0.6588
LOG(GDP_ROC)	1.006618	0.312767	3.218434	0.0074
LOG(EXPORT_ROC/GDP_ROC)	2.697397	1.680843	1.604788	0.1345
LOG(IMPORT_ROC/GDP_ROC)	-1.549610	1.207337	-1.283495	0.2236
LOG(FDII_ROC/GDP_ROC)	-0.108802	0.094647	-1.149557	0.2727
LOG(G_ROC)	-0.451054	0.492274	-0.916266	0.3776
LOG(GINI_ROC)	4.492575	2.934715	1.530839	0.1517
R-squared	0.926507	Mean dependent var	0.043183	
Adjusted R-squared	0.889761	S.D. dependent var	0.328967	
S.E. of regression	0.109224	Akaike info criterion	-1.313515	
Sum squared resid	0.143160	Schwarz criterion	-0.965564	
Log-likelihood	19.47839	Hannan-Quinn criter.	-1.254628	
F-statistic	25.21363	Durbin-Watson stat	1.009018	
Prob(F-statistic)	0.000004			

Dependent Variable: D(LOG(POVERTY_IDN))				
Method: Least Squares				
Date: 08/21/19 Time: 12:03				
Sample (adjusted): 2001 2018				

Included observations: 18 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.041151	0.016469	-2.498640	0.0315
D(LOG(GDP_IDN))	-0.188710	0.162259	-1.163019	0.2718
D(LOG(EXPORT_IDN/GDP_IDN))	0.200552	0.152955	1.311182	0.2191
D(LOG(IMPORT_IDN/GDP_IDN))	-0.183318	0.094167	-1.946742	0.0802
D(LOG(FDII_IDN/GDP_IDN))	-0.004316	0.027856	-0.154955	0.8799
D(LOG(G_IDN))	0.305276	0.138739	2.200356	0.0524
D(LOG(GINI_IDN))	-0.180053	0.359842	-0.500366	0.6276
ECT01_LOGIDN(-1)	-0.558594	0.176341	-3.167687	0.0100
R-squared	0.612224	Mean dependent var		-0.036066
Adjusted R-squared	0.340781	S.D. dependent var		0.043683
S.E. of regression	0.035467	Akaike info criterion		-3.539320
Sum squared resid	0.012579	Schwarz criterion		-3.143599
Log-likelihood	39.85388	Hannan-Quinn criter.		-3.484755
F-statistic	2.255440	Durbin-Watson stat		1.487840
Prob(F-statistic)	0.117741			

Dependent Variable: D(LOG(POVERTY_ROC))				
Method: Least Squares				
Date: 08/21/19 Time: 12:05				
Sample (adjusted): 2001 2018				
Included observations: 18 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.032649	0.029783	1.096226	0.2987
D(LOG(GDP_ROC))	0.038769	0.739943	0.052395	0.9592
D(LOG(EXPORT_ROC/GDP_ROC))	2.127203	0.963181	2.208519	0.0517
D(LOG(IMPORT_ROC/GDP_ROC))	-1.267572	0.693156	-1.828698	0.0974
D(LOG(FDII_ROC/GDP_ROC))	0.015321	0.050661	0.302429	0.7685
D(LOG(G_ROC))	-0.303332	0.247806	-1.224074	0.2490
D(LOG(GINI_ROC))	3.356721	1.601116	2.096489	0.0624
ECT01_LOGROC(-1)	-0.436173	0.226399	-1.926572	0.0829
R-squared	0.691486	Mean dependent var		0.048808
Adjusted R-squared	0.475527	S.D. dependent var		0.103067
S.E. of regression	0.074641	Akaike info criterion		-2.051143
Sum squared resid	0.055713	Schwarz criterion		-1.655422
Log-likelihood	26.46029	Hannan-Quinn criter.		-1.996578
F-statistic	3.201927	Durbin-Watson stat		0.664875
Prob(F-statistic)	0.047092			