

Regional multipliers of social accounting matrix and the effective eradication of poverty

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ABSTRACT

Halving poverty became a global responsibility. As decreased poverty was typically related with an increased income, policies relevant to economic growth had been widely implemented throughout all regions. The purpose of this study was to simulate the effects of exogenously macroeconomic shocks on regional poverty through SAM multiplier in various groups of developing country around the world. The study revealed that to eradicate poverty in each region required exogenous shock or income injection through an increase in foreign's demand or in-cash subsidy from government or international agents. Moreover, the response of poverty to given shock was relatively high in Asia due to a strong inter-industry linkage throughout the economy while relatively low in Emerging Europe due to high income level and initially low poverty rate. Additionally, light manufacturing sector should be supported in Asia in order to capably reduce the destitution. Also, a policy aimed at encouraging processed food sector was an effective tool to raise citizen's living standard in Emerging Europe; Latin America; and Sub-Saharan Africa, Middle East, and North America. Thus, importance of integrated policy will be recognized as a motivator of economic development.

Keywords: Social Account Matrix Multiplier, Poverty, Economic Development

JEL Classification: I32, O21, O57

1. Introduction. According to Smith (1776), "No society can surely be flourishing and happy, of which by far the greater part of the numbers are poor and miserable" (p. 88). Poverty reduction became a global goal of the Millennium Declaration from the United Nations. The question is how poverty matter. Sen (1985) argued that the poor was not only being poor relative to other but also lacking opportunities in accessing standard materials. The poor, typically measured by level of income or consumption, was one who spent money less than \$1.25 and \$2 a day. According to the World Bank, poverty rate in Rwanda was 26.64 percent under \$1.25 poverty line in 2011 which means that one fourth of population was the poor. It might be difficult to imagine about the poor as you would not be the poor. Malnutrition and illiteracy always prevailed. Due to relatively low income, investment in health and education was rare which made the poor more difficult in getting out of poverty. When the majority of citizen in country was unable to read and write, law and regulation aimed at controlling them could not be fully implemented. Society as a whole was derailed from a standard pace of economic development.

Poverty is multidimensional, not merely absolute and relative. Ingham (1995) argued that just income and expenditure could not answer all questions about the poor. Remenyi (1991) classified the poor into five groups and stated that most severe type of the poor had many characteristics including having large household size with many children, female headed family, the old without relatives. Also, Todaro & Smith (2009) explained that the indigenous and rural people were always the poor. A lack of assessing infrastructure and technology, clean water, sanitation, and well-training teacher was the main culprit of the indigent. An eradication of absolute poverty at least guaranteed that we all did not leave someone behind our prosperity and development. Additionally, the concept of the poor across country was important when monetary deprivation was defined by using relative income or even absolute income. Being poor in England may be different from in Sudan. With highly industrialized country, there were many social welfare programs as social safety net. But in landlocked agricultural-based country, universal health care system might take time to happen. Thus, a situation of poverty around the world was distinct and it was relatively severe in developing country, especially a third world.

For estimating of poverty, in 1965, Orshanky proposed a tool to measure poverty in the U.S. called poverty threshold. Afterwards, the idea of this tool was normally used and widespread around the world by, especially, a group of economists in World Bank, for example, Squire (1993), Ravallion & Chen (1996), Kalwij & Verschoor (2004). Situation of poverty around the world is diverse while, within region, there is a big gap. According to World Bank data using \$1.25 U.S. global poverty line, in Asia, poverty rate of Bangladesh in 2010 was 43.25 percent while it was 4.11 percent in Sri Lanka. In Europe, poverty rate was relatively low compared to other region, for example, poverty rate of Poland and Romania was 0.07 percent and 0.4 percent, respectively. Poverty situation in Latin America was moderately high and various. In 2010, poverty rate of Colombia and Peru was 8.16 percent and 4.91 percent, respectively. In Sub-Saharan Africa, poverty was most dominant. Madagascar's poverty rate was 81.29 while poverty rate of Zambia was 74.45 percent in 2010. With a trend of poverty, Chandy & Gertz (2011) projected poverty in 2015. They stated that poverty rate in Sub-Saharan Africa, South Asia, Latin America, East Asia, Middle East and North America, and Europe and Middle Asia will remain 39.3, 8.7, 4.5, 2.7, 1.9, and 0.9 percent, respectively.

Bestley & Burgess (2003) mentioned that halving poverty is a domestic government's responsibility. Especially, in developing countries, poverty is still dominant despite their impressive economic growth. The response of poverty reduction to monetary achievement is normally stated as economic growth elasticity of poverty (GEP) which refers to how much poverty falls when there is an increase in economic growth, typically measured by Gross Domestic Product (GDP). GDP firstly proposed by Kuznet since 1934 that represented nationally economic performance was no longer considered a good indicator of economy as a whole by many economists, for example, Meier & Rauch (2005) and Stiglitz (2009). As mentioned by Besley & Burgess (2003), achievement of economic growth became traditional benchmark of development influenced mainly from neoclassical paradigm. There is however a new tool aimed at measuring population's well-being in economic and social dimension developed in 1990 by the United Nations Development Programme (UNDP) called Human Development Index (HDI) which concerned not only income but also health and education level. It gives us more broad picture about how economy performs.

It was likely to conclude that every region around the world has got an impressive increase in GDP, especially in developing countries. UNDP (2013) revealed that it was the first time in 150 years that the combined output from three leading developing countries including China, Brazil, and India (called The South) is equal to the output from industrialized countries including Canada, Germany, France, Italy, United Kingdom, and the United States (called The North) mainly due to the progress on technical innovation and creative entrepreneurship which create production's manufacturing capacities. According to World Bank data, growth rate of per capita GDP between 2003 and 2012 is highest in Europe (93.40 percent) and followed by Asia (90.23 percent); Latin America (LA) (75.07 percent); and Sub-Saharan Africa, Middle East and North America (SSAMENA) (55.62 percent). The World Bank (2012) has predicted economic growth around the world which revealed that, by 2016, East Asia and Pacific, Middle East and North America, South Asia, Europe and Middle Asia, Latin America and Caribbean, and Sub-saharan Africa will grow at 7.1, 6.7, 6.7, 3.8, 3.7, and 5.5 percent, respectively. For economic development measured by HDI, it was reported by UNDP (2013) that this indicator is converging to higher level in all countries. According to UNDP (2012), between 1980 and 2012, all regions seemed to enjoy an improvement in human development. There is a highest improvement of HDI in Asia by 43.17 percent, and followed by LA (28.77 percent); and SSAMENA (27.25 percent), and Europe (27.25 percent). For the trend of HDI, Asher & Daponte (2011) projected HDI value in 2030. They revealed that HDI will be 0.956, 0.948, 0.936, 0.881, and 0.876 in Croatia, Chile, Latvia, Thai, and China, respectively which signalize that, in the next few years, human-centered policy will be important to raise citizen's well-being up.

Besides econometric methods which referred to the concept of GEP, Social Account Matrix (SAM) multiplier is another techniques in dealing with poverty. Round (2003) elaborately concluded three main features of SAM including square matrix displaying the transactions among agents, system of all economic activities, and flexibility of SAM's pattern allowed for disaggregation. Breisinger, Thomas & Thurlow (2009) explained that SAM was a tool to depict economy by capturing the relationship between all sectors and institutions. It was a framework displaying transfers through balanced row and column. Additionally, Burfisher (2011) clearly stated that SAM was a square matrix which column gives the information on spending while row gives the

information on income. Total expenditure (column sum) must be equal to income (row sum). SAM contained many accounts described the monetary transfer among agents including production activity, commodity, factors, taxes, final demand, government, saving - investment, and rest of the world. In deriving SAM, researchers or economists normally collected and arranged the data from national statistics office or economic institutions. However, SAM can be derived from GTAP database as well. GTAP stands for Global Trade Analysis Project which was a project conducted by many scholars in many institutions around the world, for example, Purdue University and Monash University. Harslett (2013) explained that GTAP database was collected the data from a variety of international source including region input-output (I-O) tables, tariff data, energy data, trade data. Also, Dimaranan & McDougall (2012) stated that GTAP data base comprised four files including sets, parameters, main data, and energy data. However, with a flexibility of SAM as mentioned, SAM format from GTAP was different from standard SAM. McDonald & Thierfelder (2004) clearly explained the important features of SAM from GTAP. For example, data was highly concentrated on trade account and regional information was mainly about inter-industry and final demand interactions. GTAP software was well-known for Computable General Equilibrium (CGE) analysis, for example, the study of Adams (2005), Fugazza & Maur (2008), Kitwiwattanachai, Nelson, & Reed (2009), Hertel, Verma, Ivanic & Rios (2011), and Durongkaveroj (2013). Besides GTAP, CGE model is beneficial and widely implemented for policy analysis and it can be performed through other computational platform, for example, GAMS which was precisely exercised by many scholars, for example, the paper of Siksamat (1998), Lofgren, Thurlow & Robinson (2004), Thaiprasert (2006) and Buffie & Atolia (2008). However, in this paper, derivation and implication of SAM multiplier is main objective.

In analyzing poverty, Thorbecke & Jung (1996) proposed the model using SAM multiplier and the model was developed by Miguel-Velez & Perez-Mayo (2010). With a precise and delicate technique in dealing with poverty, the objective of this paper was to analyze the impact of exogenous shocks and the response of poverty to economic growth through econometric regression model and SAM-based multiplier model.

2. Literature review. Ravallion (2001) stated that the poor normally gained in rising of national prosperity and suffered from economic crisis. Also, Perkins, Radelet, & Lindauer (2006) argued that the poor was typically benefit from an increase in GDP per capita.

The next question is how much people better off as they faced with increased income. The research on GEP was normally focused on how income results in poverty reduction through simple regression analysis. To the extent, it was developed by Kakwani (1993), Ravallion (2001), Jamal (2006) and Techanan and Suriya (2012) to include income inequality in the model. Moreover, political system was taken in account by Perrotta (2007). Also, Takeda (2009) compared the response to growth before and after economic crisis in Russia. Normally, poverty reduction was stated using poverty rate conducted by World Bank. However, Ferreira, Leite & Ravallion (2007) used poverty gap represented poverty. With limitation of data, some researchers developed the existing strand of knowledge by using a direct estimation so as to calculate GEP, for example, Adigun, Awoyemi & Omonona (2011) and Ram (2012).

Multiplier from SAM was widely accepted and applied to various fields after proposing by Pyatt & Round (1979). It measured the overall impacts of income injection from exogenous account displaying the linkages within economy. SAM multiplier was further developed for dealing with poverty by Thorbecke and Jung (1996), case of Indonesia, which stated that poverty reduction requires exogenous shocks. Afterwards, Klan (1999) revealed that an increase in output of agriculture, services, and manufacturing sector can reduce poverty in South Africa. Additionally, Humphreys (2000) studied poverty and economic activities in South Africa which found that economy needed to shift its base from resources to primary industries. Moreover, the effect of macroeconomic policy on poverty reduction was clearly studied through SAM multipliers by Round (2003). Round explained that multiplier describes the possible resultant effects of exogenous shocks and also stated the strong assumptions of SAM multiplier including excess capacity in all sector and unemployed factors of production, fixed price, distinction between exogenous and endogenous account.

Shantong, Ying, & Jianwu (2004) estimated SAM multiplier in China and raised some limitation of SAM multipliers, for example, assumption of linear structure did not reflect the reality and needs high-quality data which may take a long time in collecting them. After that, Essama-Nssah (2005) studied the poverty impact of macroeconomic policies in developing countries. Civardi & Lenti (2006) confirmed that poverty was related to growth in all sectors through the poverty income elasticity. In 2008, Saari, Dietzenbacher & Los revealed that , in Malaysia, poverty can be reduced through an equal increase in final demand in all sectors, especially, transportation, communication, and service sector which yielded a positive impact on Malay lived in rural area. Also, D'Haese, Lecomte, Alary, D'Haese & Schipper (2008) simulated the effects of income injection through many scenarios, for example, an increased demand or decreased subsidy using SAM multiplier in the dairy chain in reunion island. And in 2010, Miguel-Velez & Peres-Mayo developed a new technique in considering poverty with SAM multiplier. They found that poverty measured by Head Count Index (HCI) decreased by 11.98 percent from income injection. Also, in cash subsidy can be better reducing the poverty measured by Foster-Greer-Thorbecke (FGT) and Poverty Gap more than HCI.

3. Methodology

Main tool in analyzing poverty and economic growth was log-linear model and SAM multiplier. First, the relationship between poverty and income was shown by the coefficient of regressor in log-linear model which basically represented the elasticity. In this case, economic growth elasticity of poverty was derived. The dependent variable was poverty rate while the independent variable was per capita GDP. All data were collected from the World Bank from 1990 to 2012.

TABLE 1. Country in each region

Region	Country
Asia	Bangladesh, Cambodia, China, India, Indonesia, Kyrgyz Republic, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam
Emerging Europe	Albania, Armenia, Belarus, Croatia, Hungary, Kazakhstan, Latvia, Lithuania, Poland, Romania, Russia, Slovakia, Turkey, Ukraine
LA	Bolivia, Brazil, Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Panama, Paraguay, Peru, Uruguay, Venezuela
SSAMENA	Egypt, Ethiopia, Madagascar, Mauritania, Mexico, Rwanda, Senegal, South Africa, Tanzania, Togo, Tunisia, Uganda, Zambia

Source: Author

However, it was unbalanced panel data due to unavailability of poverty rate in many countries in different year. In this study, countries in consideration were developing countries. There are four regions including Asia; Emerging Europe; Latin America (LA) ; and Sub-saharan Africa, Middle East, and North America (SSAMENA). The member in each regions in this study was shown by table1.

For model specification,

$$\log\text{POV}_i = B_0 + B_1\log\text{Growth}_i + U_i \quad (1)$$

where $\log\text{POV}_i$ denotes the log of poverty rate, $\log\text{Growth}_i$ denotes the log of per capita GDP, and U_i denotes the error term. All variable was treated in natural log so as to controls its variance and make the coefficient (B_1) standing for growth elasticity of poverty. However, the way to derive GEP was different followed stationary test. If the data was stationary, there would be a selection method for most proper model including Fixed Effect (FE), Random Effect (RE), and pooled OLS through Hausman Test and Breusch-Pagan Lagragian Multiplier Test. If the data was not stationary, pooled OLS would be implemented which was normally used to derive GEP by many authors, for example, Ravallion (2001), Kalwig & Verschoor (2004), and Takeda (2009).

After deriving elasticity, poverty analysis through SAM multiplier was simulated through main five steps. Firstly, it was an aggregation of regions, commodities, and factors of production using GTAP software version 8. For this version, data was up to date to 2013. However, I-O table collected from national institution in each country may be formed in different year because not all national statistic office presented I-O table every year. For example, the last I-O table for Thailand was a version of 2005. Regions were aggregated followed the regression model. Additionally, there are seven sectors of commodity including agriculture, mining and construction, processed foods, heavy manufacture, light manufacture, services, and other. Moreover, there are four categories of factor including skilled labor, unskilled labor, land, and capital.

Secondly, SAM was derived from GTAP database using GTAP software. Thirdly, SAM multiplier was simulated according to Leontief's method. Fourthly, the effects of exogenous shocks, income, and growth elasticity of poverty on poverty reduction was derived through the model written as following,

According to Henderson (1980) and Synder & Nicholson (2010), the price elasticity of demand was derived as:

$$\frac{dq}{dp} \frac{p}{q} = \delta$$

where q is quantity demanded of i commodity, p is price level, and δ is the response of demand to a change in price level.

According to this formula, it can be applied to find growth elasticity of poverty to investigate the effectiveness of economic growth in reducing poverty. Squire (1993) used the value of coefficients in log linear model standing for growth elasticity of poverty which can be written as:

$$\frac{dp}{dy} \frac{y}{p} = \varphi$$

where p is poverty rate, y is income level, and φ is economic growth elasticity of poverty (GEP). From this formula, it can be arranged as:

$$\frac{dp}{p} \frac{y}{dy} = \varphi$$

and

$$\frac{dp}{p} \frac{y}{dy} = \varphi$$

Relating GEP with SAM multiplier proposed by Miguel-Velez & Perez-Mayo (2010) can be written as:

$$dy = m_i dx$$

where m_i is SAM multiplier, and dx is exogenous shock (income injection). And then, this formula is replaced to the GEP model and it can be arranged as written:

$$\frac{dp}{p} = \varphi \frac{m_i dx}{y}$$

From this model, it can be implied that a change in poverty depends on SAM multiplier, exogenous shock, income level, and GEP.

For the last step, fifthly, GEP was estimated by using pooled OLS regression model. The coefficient of regressor in log - linear model is growth elasticity of poverty where dependent variable is poverty rate and independent variable is per capita GDP.

Data was collected from the World Bank database. For model specification, the main difference between this study and Miguel-Velez & Perez-Mayo (2010) is that, in this study, GEP was estimated by using econometric method (log-linear regression model) as widely accepted while Miguel-Velez & Perez-Mayo directly calculated from their elasticity expression. Another difference is that Miguel-Velez & Pares-Mayo separated people into five groups within region while this study considered comparatively regional elasticity. For model implication, within region, GEP, income level, and shock are similar among all sectors. So, poverty reduction in each sector is effectively dependent on its multiplier represented economic linkage. This model can tell us the most effective sector experienced poverty reduction and the most difficult sector in eradicating poverty due to exogenous shocks (income injection or in cash subsidy). For comparative view, the model can estimate the impacts of trade policy on regional population's well-being.

4. Results. In this section, the effects on poverty due to four factors including SAM multiplier, income level, GEP and exogenous shocks was deliberately concerned. However, growth elasticity of poverty is another important factor derived from simple regression. Table 2 presents calculated GEP.

According to table 2, this result suggested that a 1percentage point increase in per capita GDP results in a decrease of poverty rate by 1.61, 1.56, 1.54, 1.24 percent in Asia, Europe, LA, and SSAMENA, respectively. It is implied that an equal amount of growth occurred yields a different result in poverty reduction in each region which means that a set of successful policies implemented aimed at raising people's living standard in one region cannot be a benchmark for other region. The response of poverty on monetary prosperity seems to be relatively high in Europe which is normally more developed not

only in monetary sense but also human capital, infrastructure, political system. The response is seemingly indifferent between Asia and LA whose economy is kindly emerged in the past twenty years. Financial sector and investment has more shifted to these region due to relatively cheap factor cost and improved economic zone (Perkins, Radelet & Lindauer, 2006).

TABLE 2. Economic Growth Elasticity of Poverty

<i>Region</i>	<i>GEP</i>
Europe	-1.61***
LA	-1.56***
Asia	-1.54***
SSAMENA	-1.24***

Source: Author's Calculation

Notes: The dependent variable is the log of poverty rate. The independent variable is the log of per capita GDP. *** $p < 0.01$ (statistically significant).

For SSAMENA, poverty in these region is relatively high. More than 50 percent of population live under \$1.25 a day. Destitute situation completes the vicious cycle and this problem is seemed to be much difficult to solve. Only an increase in general income cannot bring people out of penury. Foreign aid in education and health system should be more funded through international agencies to soothe the problem.

After deriving GEP, individual income level is collected from World Bank shown in Table 3.

TABLE 3. 2012 Per Capita GDP (U.S. dollar)

<i>Region</i>	<i>Per capita GDP</i>
Europe	17,821.70
Latin America	10,594.15
Asia	4,647.37
SSAMENA	4,441.00

Source: World Bank

Notes: Even though GDP is not a perfectly monetary indicator representing economic performance but it, in developing countries, can be a good representative of a change in economic linkages due to foreign investment and labor market.

Table 3 presented per capita GDP in the selected region. Europe has the highest value in this indicator and it is followed by LA, Asia, and SSAMENA.

TABLE 4. SAM multiplier

<i>Region</i>	<i>Agri</i>	<i>Min</i>	<i>Pro.fd</i>	<i>H.mfg</i>	<i>L.mfg</i>	<i>Serv</i>	<i>Other</i>
Asia	3.54	4.37	4.67	4.79	4.97	3.65	3.28
Europe	3.33	3.46	3.97	3.84	3.49	3.26	2.96
LA	3.46	3.24	4.46	4.07	3.89	3.25	2.85
SSAMENA	3.02	3.10	3.73	3.71	3.52	2.92	2.69

Source: Author's Calculation

Notes: Agri stands for agricultural sector. Min stands for mining and construction sector. Pro.fd stands for processed food sector. H.mfg stands for heavy manufacturing sector. L.mfg stands for light manufacturing sector. Serv stands for service sector. Other stands for other sector.

Then, exogenous shock or income injection is set. This study assumed income injection from any exogenous (demand from foreign consumer or government subsidy) to be \$1 for minimizing the scale in analysis. Additionally, with GTAP data base, SAM multiplier is derived through SAM-multiplier decomposition technique (Thorbecke & Jung, 1996) and it is shown in table 4.

According to table 4, this result suggests that light manufacturing has the highest output multiplier in Asia which means that exogenous shocks in this sector can yields vastly impressive impacts on economy including light manufacturing sector itself and its linkages. For light manufacturing sector, it comprises textiles, leather, paper, transport equipments and etc. For Europe; LA; and SSAMENA, the highest output multiplier is in processed foods sector which guarantees the big positive impacts to economy from income injection or subsidy to this sector. Processed food comprises fishing, meat, vegetables, and dairy product. sugar, and beverages. Round (2003) stated that SAM multiplier captured the direct effect, indirect effect, and induced effect. However, this study used output multiplier represented inter-industry effects because export sector (industry-based activity), especially in developing country, is always the main source of national prosperity.

For the effects on poverty followed the model proposed by Miguel-Velez & Perez-Mayo (2010), the result of study is shown in table 5 below.

TABLE 5. Effects on poverty

<i>Region</i>	<i>Agri</i>	<i>Min</i>	<i>Pro.f</i>	<i>H.mfg</i>	<i>L.mfg</i>	<i>Serv</i>	<i>Other</i>
Asia	-0.117	-0.145	-0.155	-0.159	-0.165	-0.121	-0.109
Europe	-0.030	-0.031	-0.036	-0.035	-0.032	-0.029	-0.027
Latin America	-0.051	-0.048	-0.066	-0.060	-0.057	-0.048	-0.042
SSAMENA	-0.084	-0.087	-0.104	-0.104	-0.098	-0.082	-0.075

Source: Author's calculation

Notes: Agri stands for agricultural sector. Min stands for mining and construction sector. Pro.f stands for processed food sector. H.mfg stands for heavy manufacturing sector. L.mfg stands for light manufacturing sector. Serv stands for service sector. Other stands for other sector.

According to the table 5, it presents the sectoral effects on poverty in the selected region. In each region, income, exogenous shock, and GEP are hold constant which means that only M varies the effects in each sector. In each sector, only shock are hold constant which means that regional SAM multiplier, GEP, and income level together vary the effect in comparative view. The result precisely suggests that \$1 dollar injected to household from government (exogenous shock) in Asia can reduce poverty by 0.16 percent in people linked to light manufacturing sector due mainly to high output multiplier. For Europe, LA, and SSAMENA, the same amount of injection can result in a decrease of poverty in people worked in processed food sector by 0.036, 0.066, 0.104 percent, respectively.

Also, it revealed that different sector yields a different response to given macroeconomic shock aimed at reducing poverty. Asia is the most effectively responsible in eradicating poverty due to highest output multiplier. Eradication of poverty in Europe is likely to relative difficult due to medium value of multiplier and high income level. LA has the higher GEP and per capita GDP than Asia and SSAMENA but the effects on poverty is not impressive. Income inequality in this

region, for example, Brazil, may be the culprit in retarded pace of development. As I mentioned, poverty problem in SSAMENA is together the most severe among all competitors. However, there is still some lights in solving this problem due to this results. Thus, exogenous shock is necessary to help people out of poverty.

5. Conclusions. The importance of understanding the effects of exogenous shock and income on poverty is recognized for almost 15 years. This study developed SAM multipliers model by bridging with econometric model. For research problem, poverty is still dominant around the world. According to the United Nation's Millennium Development Goals, by 2015, extreme poverty should be halving for all regions from 41 percent to 20.6 percent. From World Bank research, the pace of achieving this goal was achieved in some regions, especially Latin America. However, poverty in South Asia and Sub-saharan Africa is still higher than 20.6 percent which refers to an indigence faced by rural women, child, and unemployed people. For the main points emerge from this study, exogenous shock becomes another factor in helping eradicate poverty. In order to effectively reduce poverty, light manufacturing sector should be much supported in Asia. Additionally, with the similar goal in raising citizen's living standard in Europe, LA, and SSAMENA, processed food sector should be encouraged through exogenous shock, for example, income injection from government (responsibility of government) or an increase in foreign demand through openness of trade.

6. Implications and Discussions. For model implication, international agencies can help developing countries raise their well-being and sooth destitute problem through foreign aid, in-kind subsidy, or transfer of technology in the sector giving high return on poverty reduction. Also, from the result, Europe, high income country, is more struggled in reducing poverty due to high value of denominator in calculation. However, it may be because the poverty is relatively lower than other region. Additional reduction of destitution may require other factors, for example, structural shift in main economic activity. The results from this study were likely to be familiar with the existing strand of knowledge. For GEP, it was nearby to the paper of Ravallion (2001), Besley & Burgess (2003), Kalwij & Verschoor (2004), Perrotta (2007) and Ram (2012). In comparison, Techanan and Suriya (2012) found that better income distribution did not statistically affected with growth elasticity of poverty but effectively reduced poverty in the Southeast Asia. However, economic growth was differently defined dependent on author's own decision. For example, Adams (2003) found the different results between using GDP and per capita income. Additionally, GEP was different dependent on methodology. Even though most of researchers implemented log-linear model but direct calculation of elasticity was recently attracted to estimate GEP, for example, Adigun, Awoyemi, & Omonoma (2011) and Ram (2012). For the impacts on poverty through SAM-multiplier model, the results from this study were familiar with the paper of Miguel-Velez & Perez-Mayo (2010), merely in the direction of results. In this study, exogenous macroeconomic shock was assumed to be only one dollar but in the previous study, it was 30 percent of minimum wage which unfortunately, the amount of minimum wage was not obviously declared. For further research, to improve this kind of economy-wide analysis, household sectors should be disaggregated into 5 or 10 group in order to elaborately consider the distributional impact on poverty. Unfortunately, GTAP was not allowed to disaggregate household sector. However, it is able to do through GAMS platform which make the picture of economic analysis more clear, correct, and effective in issuing policy.

Also, as the result suggested, SSAMENA should be encouraged in exporting processed food aimed at reducing poverty. However, there are some concerns with this result because this region normally lacked of natural resource. Also, landlocked countries have less competitive to international trade. Thus, there will be two solutions for this region. First, own government and international agents should together help improve agricultural sector which normally has the strong linkage to processed food sector or food industry sector through the provision of specialist and labor training course in this region. Second, besides processed food sector, heavy and light manufacturing could be another player in the role of poverty eradication due to a strong economic linkage throughout the whole region.

Moreover, the meaning of income injection may create the concern of populism, especially in Asia which politics and economics share the strong linkage. Income injection or in-cash subsidy refers to a standard welfare program which was normally distributed to the poor provided by government. For example, the policy may include the payment of THB600 per month to the disabled, elder, and HIV infected persons in Thailand. This policy typically raised the poor's income to make necessary goods more affordable. The priority of income injection was the poor. Unfortunately, household sector from GTAP database was not be classified to income level. To develop this study, GAMS should be implemented.

6. Policy Suggestions. When economic growth is still the fast formula in eradicating poverty (Adams, 2003), Williamson (2000) concluded four main strategies in supporting growth including fiscal and monetary policy, trade liberalization, property right, and privatization. However, Dreze & Sen (1990) argued that an improvement in health and education does not always happen from economic growth. It is clearly presented by Squire (1993) from reviewing of experience in Brazil and Pakistan which found that impressive performance of GDP is unable to give us the definite picture of other non-monetary indicators. Thus, integrated or holistic policy named for the policy that simultaneously engaging income level with education and health is more appropriate. Besley & Burgess (2003) stated that an expansion in human capital is now thought as development. Todaro & Smith (2009) explained that health and education are core of development. Educated people can absorb modern technology while being healthy is an important condition for increasing productivity. Education and health link each other. Moreover, Basu & Foster (1998) found that education and health yielded spillover benefit to people around him or her. With positive externality, Hyman (2012) argued that it is one kind of market failure due to its inadequate amount. So, it is government's responsibility to bring market back to optimal level.

Moreover, as the world became international economic interdependence, global trade policy arranged by international agencies should take place so as to manage and coordinate inter-trade among regions. As mentioned by Yarbrough and Yarbrough (2006), country should shift economic base from inward-looking import-substitution to outward-oriented growth (opened economy). To support exploiting comparative advantage and scale economies is likely to begin through reducing trade barriers including tariffs and non-tariff, as mentioned by Carbaugh (2008), the latter yielded much negative effects to economy than tariffs. Additionally, from GTAP data base, the majority of export and import in all regions was heavy manufacturing sector. Thus, in this case, the policy aimed at reducing poverty and raising citizen's well-being, trade partner should be set correspondent to the result from this study. Asia should export

more in light manufacturing product. The rest should export more in processed food, heavy and light manufacturing product.

Besides exportation, investment is another interesting policy. Developing countries, revealed by the World Bank (2012), have much experienced Foreign Direct Investment (FDI) which, in some countries, its value is counted more than 10 percent of its GDP. The value of FDI in Liberia, Mongolia, and Mozambique was 78.1, 43.3, 36.8 percent of its GDP. However, Perkins, Radelet & Lindauer (2006) stated that not all types of FDI are beneficial to home country. Only FDI aimed at manufacturing sector for export to other countries is often likely to yield a positive impacts due to the spillover in technology and labor market. They suggested many policies for attracting FDI including an improvement in infrastructure for reducing business cost, reduction of red tape, increase in labor productivity, reduction of import protection or tax holidays, and also establishment of economic zone (export-processing zones, EPZs). These factors will create business environment and make country more interesting.

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