Essays on the Contributions, Challenges and Opportunities of Fiscal Policies in Supporting Poverty Alleviation in Indonesia

by

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Abstract

Poverty is an age-old issue but one that remains an unsolved problem for every ruling government in Indonesia due to the dynamism of poverty. This dissertation addresses the four main challenges and opportunities of fiscal policies for supporting poverty alleviation in Indonesia: 1) the role of import tariff policies on protecting the poor from the volatility of world commodity prices; 2) reallocation fuel subsidies and its implication on fiscal balance and poverty; 3) the poverty impact of the 2008 corporate income tax reform; 4) poverty dynamics and the role of government assistance in changing poverty status. Fiscal policies theoretically can influence poverty (the expenditure based poverty measurement) depending on: 1) change in expenditure as a result of a change in price; 2) change in expenditure as a response to utility change due to a change in price; 3) change in expenditure as a response to utility change due to a change in income; 4) change in poverty line as a response to a price change; 5) change in income distribution as a response to a change in endowment. This study applies the CGE-MS approach and the endogenous poverty line to measure the poverty impact of fiscal policy reforms. Further, the GGE model is based on the extension of the 2005 Social Accounting Matrix while the microsimulation is based on the 2005 National Socio-Economic Survey (SUSENAS) covering 64,407 households.

The study found several findings: first, the volatility of world rice and soybean prices during 2007 to 2010 had a great effect on the poverty incidence in Indonesia. A 60 per cent increase in world rice price raises the headcount index by 0.81 per cent while the zero import tariffs on rice reduced the headcount index by 0.19 per cent. In the case of soybean, a 40 per cent increase in the world price raises the headcount index by 0.204 per cent while the zero import tariffs could only decrease the poverty by 0.059. Government, therefore, should complement the zero import tariffs with other policies to provide maximum protection to the poor. Second, between 2000 and 2011, Indonesia burnt 61 per cent of oil and gas revenues to fuel and electricity subsidies. If government is able to cut fuel subsidies by 86 per cent, there is no budget deficit in 2011. The 100 per cent removal of fuel subsidies and the reallocation of 50 per cent of them to government spending, transfers and other subsidies could decrease the incidence of poverty by 0.277 per cent. However, these reallocation policies might not be effective to compensate the adverse impacts of the 100 per cent removal of fuel subsidies if there is a mark-up pricing over the increase of production costs.

Third, the 2008 CIT reform supported by administrative reforms and the tax amnesty has increased new corporate tax payers by 422,407 and tax revenue by 53.95 per cent during 2009 to 2011. Further, a cutting the CIT rate from 30 per cent to 25 per cent will attract IDR 41.77 trillion of new investments, create 441,910 new job opportunities and lift 1.88 million people (0.898 per cent) out of poverty. Fourth, observing the SUSENAS panel data set of 2005 and 2007, around 28 per cent of poor households are classified as chronic poor. This study using the ordered logit model found that the important factors of poverty dynamics in Indonesia are the size of household member, physical assets (land and house ownership), economic shocks, employment status, access to electricity, changes in the size of household member and in the microcredit program. Unfortunately, there is no consistent statistical evidence of government assistance in protecting the poor due to an unequal distribution. Fifth, corruption reduces the effectiveness of fiscal policy on reducing poverty due to rent seeking behavior. Great efforts to eradicate corruption would likely have an immediate effect of increasing public investment that would benefit to the poor.

Keywords: *Indonesia, fiscal policy, poverty, CGE, microsimulation, an endogenous poverty line, import tariffs, rice, soybeans, food policy, fuel subsidies, energy policy, corporate income tax reform, poverty dynamics, government assistance, inter-temporal CGE, corruption.*

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Acknowledgements

Regardless of the different angles and standpoints when analyzing the problem, poverty is still a major point of interest for policy makers, international donors, and academia. Despite the facts that there have been extensive studies aimed at identifying the sources of the poverty and proposing a poverty alleviation program, the problem is still a common phenomenon in developing countries. Therefore, among several undisclosed areas concerning poverty issues, this dissertation is motivated to scrutinize the research on the relationship between fiscal policy and poverty that is investigated in a more comprehensive analysis.

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Chapter 1
Poverty in Indonesia:
An Old Issue with New Challenges and Opportunities in Fiscal Policies

1.1 Background

The United Nation has declared the Millennium Development Goals (MDG) in 2000. Under these goals United Nation members are encourage to drastically reduce the poverty incidence by up to 50 per cent in 2015. One of the MDG goals is to eradicate extreme poverty, that is, those living below 1 USD/day, by up to 21 per cent in 2015. However, the global financial crisis, rising food prices and climate change have significantly impacted on achieving the MDGs.

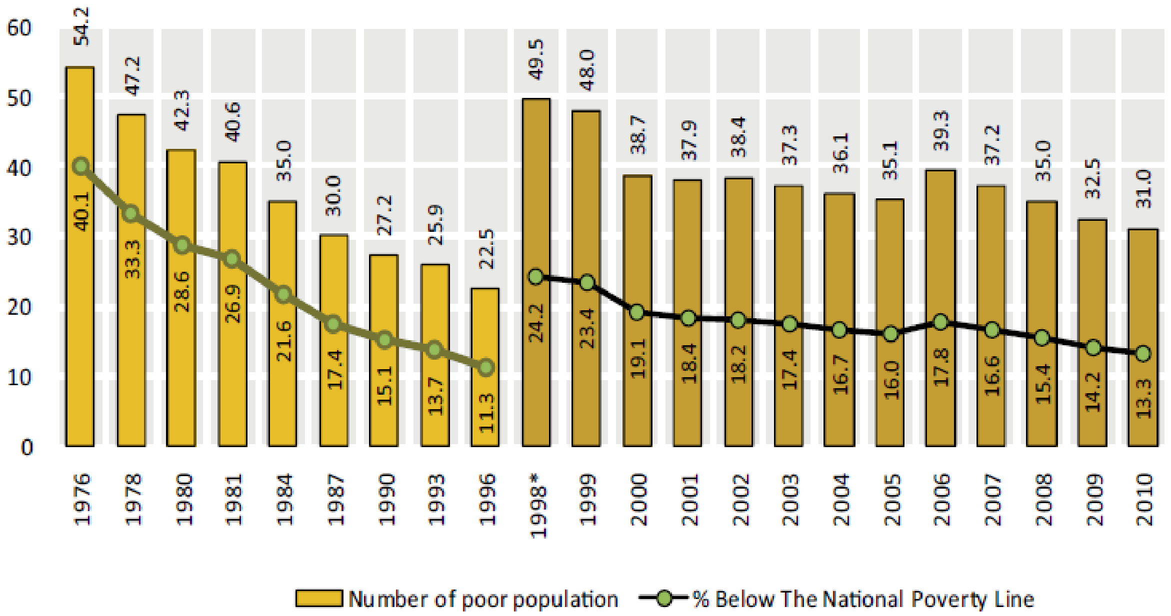
According to the MDG goals, Indonesia should reduce extreme poverty from 20.60 per cent (1990) to 10.30 per cent (2015). The government has successfully accomplished the MDGs target. By 2008, the proportion of people whose income (expenditure) was less than 1 USD/day was 5.9 per cent (BAPPENAS, 2010). If the national poverty line, approximately 1.5 USD/day, is applied, Indonesia has to reduce the poverty incidence from 15.1 per cent (1990) to 7.6 per cent (2015). By 2010, the poverty incidence was 13.3 per cent; the MDGs target, however, is very difficult to be achieved by the end of 2015 (Figure 1.1). There is a 6.6 percentage gap between the MDGs target and the current poverty rate that must be eradicated during five years. The government has to reduce the poverty incidence by 1.12 per cent per year in order to accomplish the target. Further, if the poverty line is 2 USD/day, Indonesia has to reduce the poverty incidence from 71.1 per cent (1990) to 35.5 per cent (2015) (BAPPENAS, 2004). By 2008, the proportion of whose expenditures less than 2 USD/day was 49 per cent (BAPPENAS, 2008). There is a 13.5 percentage gap that has to be eradicated during seven years.

According to these facts, poverty is an old issue but one that remains an unsolved problem for every ruling government in Indonesia. The poverty continues to exist in Indonesia, although the government has tried to alleviate it. This is because poverty has a dynamic behavior as a life entity that is growing and changing overtime. The poverty measurement also always changes as it responds to changes in the socio-economic conditions and society needs. Figure 1.1 clearly shows the dynamism of poverty. The poverty incidence had significantly decreased from 40.1 per cent (1976) to 11.3 per cent (1996). The poverty incidence, however, jumped up to 24.2 per cent in 1998. The massive increase in the poverty incidence in 1998 was not only caused by external shocks of the Asian economic crisis but also caused by the change in the method of calculating poverty. The change of poverty line measurement had increased the headcount index from 11.3 per cent to 17.5 per cent while the Asian economic crisis had increased the headcount index from 17.5 per cent to 24.4 per cent.

Regarding the dynamism of poverty responding to changes in the socio-economic conditions and the poverty measurement, the fiscal policy as one tool of the poverty alleviation policies will face many challenges and opportunities in supporting the poverty reduction in Indonesia. A fiscal policy might successfully eradicate poverty in the past but the same policy might not be appropriately implemented in the current condition due to changes in the socio-economic environment. The fiscal policy, therefore, should be continuously adjusted and modified to fit with changes in external and internal conditions in order to support the conditions of pro-poor, pro-growth, pro-job and pro-environmental.

Many researchers, both locals and foreigners, have made the poverty in Indonesia as a subject of academic work and a policy research paper but the poverty is still in existence. This has motivated researchers and policy makers to do a better research and to propose an efficacious policy. This academic work then aims to contribute a comprehensive study analyzing the role of the fiscal policy in supporting the poverty alleviation in Indonesia. This study provides not only an empirical analysis, but also a theoretical analysis dealing with the current issues of fiscal policy and poverty.

Figure 1.1 The Poverty Trend in Indonesia



Source: Central Statistical Agency (BPS), 2010
*Note: *Since 1998, a change in the method of calculating the poverty line was adopted by improving the quality of non-food items, including: the cost of education (originally based on the cost of elementary education, the increased to cover costs of junior high school education), the cost of health care (initially based on standard costs at a primary Health Center, then increased to include costs of services of a general practitioner); as well as transport costs (initially only costs of transport within a city were estimated, then transport costs were increased to also provide for inter-city transportation costs in accordance with the increased mobility of the population). As a result the poverty line increased and the population below the poverty line increased.*

1.2 The Indonesian Poverty Profile

This part will explain the poverty map in Indonesia as a way to understand the overall situation. Indonesia recorded a good experience in combating poverty during 1976-1996. Continuous economic growth in Indonesia over that period has been the primary factor supporting the reduction in poverty. The poverty incidence (the headcount index) had decreased from 40.1 per cent in 1976 to 11.3 per cent in 1996. Table 1.1 shows that poverty in

Indonesia is a rural and agriculture phenomenon. By 2010, the poverty incidence in urban areas had fallen below 10 per cent while the poverty incidence in a rural area still remained high at 16.56 per cent. The depth of poverty shown by the poverty gap index is decreasing rapidly in urban areas, almost 1 per cent comparing the figure in 2002. In contrast, the depth of poverty in a rural has declined only slowly; for example, it dropped by only 0.5 per cent during 2002-2010.

Table 1.1 The Trend of Poverty Indicator in Indonesia

Year	Head Cound Index (HCI)			Poverty Gap Index (PGI)			Squared Poverty Gap Index (SGI)			Population (000)
	Urban	Rural	National	Urban	Rural	National	Urban	Rural	National	
1996	13.39	19.78	17.47	2.40	3.57	3.15	0.65	0.97	0.86	194,677
1998	21.92	25.72	24.23	-	-	4.35	-	-	1.27	204,292
1999	18.60	27.66	24.09	3.58	5.52	4.76	1.03	1.65	1.41	204,712
2000	14.60	22.38	19.14	-	-	-	-	-	-	205,132
2002	14.90	20.84	18.20	2.59	3.35	3.01	0.71	0.85	0.79	210,736
2003	15.01	17.72	16.58	2.78	3.10	3.13	0.80	0.86	0.83	213,551
2004	12.13	20.11	16.66	2.18	3.43	2.89	0.58	0.90	0.78	216,382
2005	13.02	19.41	16.59	2.62	3.84	3.30	0.86	1.25	1.07	219,205
2006	13.47	21.81	17.75	2.61	4.22	3.43	0.77	1.22	1.00	221,408
2007	12.52	20.37	16.58	2.15	3.78	2.99	0.57	1.09	0.84	224,176
2008	11.65	18.93	15.42	2.07	3.42	2.77	0.56	0.95	0.76	226,740
2009	10.72	17.35	14.15	1.91	3.05	2.50	0.52	0.82	0.68	229,894
2010	9.87	16.56	13.33	1.57	2.80	2.21	0.40	0.75	0.58	232,734

Sources: LPEM Staff Estimate 2011 Based on several SUSENAS Data set 1996, 1999, 2002, 2003, 2005 and other sources[1]

Figure 1.1 and Table 1.1 shows that the poverty incidence as well as the number of poor fluctuated over time. When the economic crisis hit and the economic growth decreased drastically, poverty figures increased sharply from 17.47 per cent (34.01 millions) in 1996 to 23.43 per cent (47.97 millions) in 1999. This figure indicates that the most household resided

[1] These data are accessed from several sources:
http://www.bps.go.id/aboutus.php?tabel=1&id_subyek=23
http://arsip.tkpkri.org/data-kemiskinan.html
http://www.jica.go.jp/activities/issues/poverty/profile/pdf/indonesia_fr.pdf
http://www.datastatistik-indonesia.com/proyeksi/
http://www.nscb.gov.ph/poverty/conference/papers/2_Indonesia.pdf
http://www.nscb.gov.ph/poverty/conference/papers/2_Indonesia.pdf

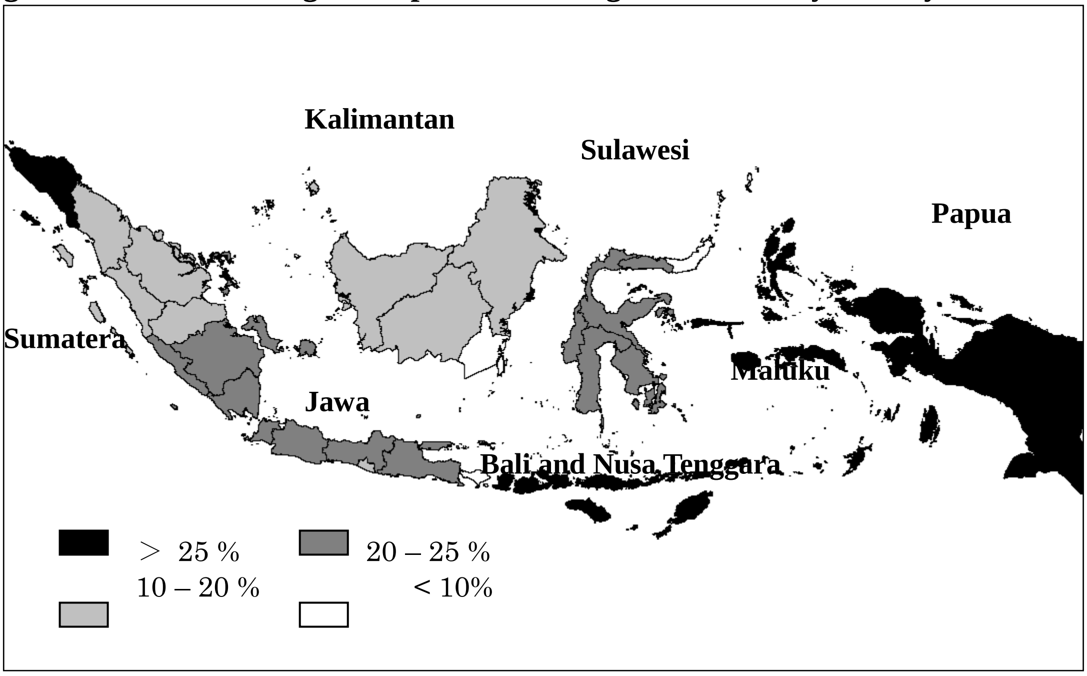
around the poverty line so that the economic fluctuation will easily cause many people to fall below the poverty line. The economic crisis followed by massive contraction in the industrial sector and service sector hit urban households. The poverty rate in urban area, where the most activities are located, jumped significantly around 8.6 per cent compared to the pre-crisis level.

The economic recovery and macroeconomic stability during 2000 to 2005 have led a significant decreasing on the poverty incidence in this period. By 2003, the poverty incidence was not much different to that found before the economic crisis. Conversely, in 2006, the poverty incidence had increased as the consequent of the adjustment on fuel subsidies in 2005. The poverty rate increased from 15.97 per cent in 2005 to 17.75 per cent in 2006. However, poverty was not much affected by adjustment fuel prices in 2008, because households and firms have had experience with a very high increase in 2005, so they can anticipate better. And it might also be caused by the role of the compensation policies, and the stabilization price policies of commodities price in protecting the poor.

At disaggregate level, in 2009, two third of poor (20.16 millions) lived in rural area depending on agriculture as their main source of income and majority of them are self-employed. In addition, about 57 per cent of poor in Indonesia live in Java, the most populous Island. One-fourth of population in Java, with most being concentrated in East Java, West Java, and Central Java, can be categorized by the poor. The poverty in Java is relatively intense in landless household; particularly those whose income depends solely on agriculture sector. Some of the landless were able to escape from poverty if they are able to find other jobs from non-farm activities.

The poverty in Sumatera is mostly concentrated in Lampung, Aceh, Bengkulu and South Sumatera. The highest poverty rate in Kalimantan and Sulawesi is in East Kalimantan, the richest natural resource's province, and in Gorontalo. The phenomenon of East Kalimantan indicates that natural resources are not related to the social welfare. In addition, the provinces that experienced social riots such as Maluku, Central Sulawesi and Southeast Sulawesi have a high poverty rate. The social riot damaged both physical infrastructures and economic activities. Moreover, the high poverty rate in Papua and West Papua are mostly influenced by isolation and infrastructure problems. Reducing infrastructure barriers will reduce the poverty incidence in Papua. Figure 1.2 shows the inter-regional disparity in the poverty index among provinces in Indonesia. Appendix 1.1, Appendix 1.2 and Appendix 1.3 shows the poverty measurements at the provincial level in Indonesia.

Figure 1.2 The Percentage of Population Living Below Poverty Line by Island, 2005



Source: Juswanto (2010)

1.3 The Poverty Reduction Strategy Paper (PRSP) and Medium-Term Development Plan (RPJMN)

Poverty reduction has become the mainstream of the country's development agenda. Poverty reduction was never explicitly discussed as a policy issue in any official documents until the early 1990s. Since then, it has been articulated in all key policy and planning documents as Indonesia's highest priority objective. In 2001, the government formed the inter-ministerial Poverty Reduction Committee in order to implement a set of comprehensive and harmonized actions in poverty reduction. Under the coordination of this committee, and through various forums and meetings, stakeholders at the national level prepared an Interim-Poverty Reduction Strategy Paper (I-PRSP), a road map for the development of *Strategi Nasional Penanggulangan Kemiskinan (SNPK henceforth)* or the National Strategy for Poverty Reduction (SNPK henceforth).

The current government has made poverty reduction a priority in its medium term and annual plans. The 2004-2009 Medium-Term Development Plan (RPJM) provides broad strategic direction for the government to manage economy. The RPJM incorporates the SNPK and addresses the growth-related aspects of poverty reduction. In these documents, the government has set poverty reduction targets linked to the Millennium Development Goals. The government stands firm that the MDGs should not just be treated as a declaration of good intentions, but be backed up with definite actions on poverty reduction. Indonesia has faced some recent challenges in poverty reduction, including the tsunami disaster and the reduction of fuel subsidies. There have also been opportunities, however, to refocus policy and budget allocation to achieve better the Government's poverty reduction targets. These could be done through using savings from the fuel subsidy reduction to finance more progressive social protection programs and improve the poor's access to health and education.

IPRSP stated that the paradigm of poverty alleviation strategy was changed from an economic approach to right based approach. IPRSP provided preliminary strategy methods to guide policies in alleviating poverty in Indonesia. The poverty reduction strategy is focusing on two aspects: first, to increase income for the poor through economic growth and improvement of inequalities; second, to reduce the cost of living for the poor through improving efficiency and access to public facilities and establishing good and specific subsidy program targets.

To achieve these strategies, poverty alleviation programs will be based on these four pillars: (1) creating opportunities for the poor, (2) increasing the capacity of the poor through human resources development, (3) empowering the poor through equipping them with access to public decision-making processes and access to economic resources, (4) protecting the poor against economic and other shocks through the provision of social safety nets. Therefore, the poverty alleviation policies both macro and micro policies must be in line with these strategies and pillars.

In the RPJMN 2004-2009 and RPJMN 2010-2014, the fiscal policy is directed to maintain fiscal sustainability, stimulate economic growth and protect domestic economy responding the global recession. Fiscal Policy should be directed to support the fourth pillars of poverty reduction. On the revenue side, the government has tried to increase tax revenue through, for example, tax reforms to create more business friendly environment. In the expenditure side, the government has tried to reallocate budget from product subsidies (i.e. fuel subsidies) to direct subsidies and productive activities (education, health and infrastructure). Moreover, the government tries to stabilize the domestic price through flexible in tariff policies for food commodities.

In the RPJMN year 2010 - 2014, three development plan agendas were set as mid-term development policy references, which are as follows: (1) welfare development target, (2) democratic development target, and (3) law enforcement target. The three agendas that had been set in RPJMN 2010 - 2014 phase into development themes in yearly RKP. In RKP 2011, there are three main objectives: 1) creating employment and reducing poverty, (2) building a better governance to increase effectiveness and efficiency in Government's expenditure, and 3) increasing synergy between the central and regional governments.

1.4 Challenges and Opportunities of Fiscal Policy in Supporting Poverty Alleviation

The Government of Indonesia[2] (GOI henceforth) has continuously implemented several policies, including macro and micro policies, to alleviate poverty. In macroeconomic policy - especially in fiscal policy - there has been some improvement both in quality and quantity compared to previous years. However, there are still challenges and opportunities for the role of fiscal policy as the stabilization policy, the revenue distribution policy and the expenditure reallocation policy in supporting poverty alleviation in Indonesia. Other challenges are the role of micro fiscal policies on changing a poverty status (poverty dynamics) and protecting the poor from shocks.

The Role of Fiscal Policy as the Stabilization Policy

GOI consistently controls foods price responding to temporarily domestic or external shocks by implementing several instruments such as tariffs, VAT, income tax and subsidy policies. This is because such large increases (decreases) in prices may have tremendous impacts on the expenditure and real incomes of poor households and the future consequences. The increases in prices of foods raise the real incomes of those selling foods, many of whom are relatively poor, while hurting net food consumers, many of whom are also relatively poor.

In 2008, GOI has implemented the policy package to stabilize domestic commodity

[2] The Republic of Indonesia is a country in Southeast Asia comprising 17,508 islands which it is the world's largest archipelagic state. Indonesia is the world's fourth most populous country and the most populous Muslim-majority nation. Around 130 million people live on the island of Java, the world's most populous island. Administratively, Indonesia consists of 33 provinces, five of which have special status. Each province has its own political legislature and governor. The provinces are subdivided into regencies *(kabupaten)* and cities *(kota)*, which are further subdivided into subdistricts *(kecamatan)*, and again into village groupings (either *desa* or *kelurahan*). Following the implementation of regional autonomy measures in 2001, the regencies and cities have become the key administrative units, responsible for providing most government services.

price aiming to protect and help low income group from a dramatic surge in the international price of food commodities. The price of rice jumped from 288 USD/Metric Ton (Jan. 2005) to 1,015 USD/Ton (April 2008) then dropped to 593/Metric Ton USD (Sept. 2009); while the price of soybeans sharply rose from USD 255.87/metric ton (January 2007) to USD 552.47/metric ton (June 2008) and then significantly decreased to USD 379/metric ton (Dec. 2009), (IMF Primary Commodity Statistics, 2009). GOI through Ministry of Finance issues various regulations including: Ministry of Finance (further MOF) regulation No.180/PMK.011/2007 cuts the import tariff of rice from IDR 550/Kg to IDR 450/Kg and the regulation No. 241/PMK.0011/2010 imposed zero import tariffs on rice; MOF regulation No.01/PMK.011/2008 cuts the import tariff of soybean from 5 per cent to 0 per cent. The cutting of import tariffs on rice and soybean reduced the government revenue by IDR 200 billion and IDR 1 trillion respectively. The effectiveness of the stabilization policy through zero import tariffs, however, on protecting the poor from the volatility world commodity prices should be evaluated.

The Role of Fiscal Policy as the Expenditure Reallocation Policy

There are significant changes in budget allocation starting from 2001 due to changing from the centralized system to more the decentralized system. The share of transfer to local governments is gradually increasing up to 30.9 per cent but the share of development expenditure is sharply decreasing to 7 per cent in 2009 due to budget reallocation. Provinces and local governments now manage 36 percent of total public expenditures and carry out more than 50 percent of public investment (The World Bank, 2007).

In addition, GOI pay much attention to education and health sectors represented by an increase in budget allocation to both sectors. Education and health consumed 9.78 per cent of budget in 2005 and by 2009 those consumed almost 15 per cent of budget. Education spending reached 3.9 percent of GDP in 2006 and total public health spending was still below 1 percent of GDP (The World Bank, 2007). In general, the expenditure on health, education, social safety net, and product subsidies (fertilizer, fuel, electricity, etc.) are still maintained at a minimum level as same as the pre-crisis level.

However, the main drawback of budget allocation is a huge allocation on subsidies. Subsidies consume 27.63 per cent of budget and fuel subsidies itself took 72.62 per cent of subsidies in 2010. Son (2008) observed that Indonesia spent 5 per cent of gross domestic product on energy subsidies. The massive fuel subsidies reduce fiscal space which means the government has fewer sources to promote economic growth through investment in infrastructure or human capital (Agustina et al., 2008). This would also cause a worsening in the income distribution because, in 2008, the richest income group received fuel subsidies approximately IDR 111,533/month/capita while the lowest income group received fuel subsidies approximately IDR 10,787/month/capita.

Indonesia has not been an oil-exporting country since 2003. Thus, oil is no longer a “Black Gold” but oil is a “Black Hole” for Indonesian Budget. Since Indonesian oil reserves would only last a further 15-20 years, a reduction in fuel subsidies is needed to prepare households for the condition when international fuel prices have 100 per cent pass-through into the domestic market. GOI will continuously attempt to change the subsidy systems from product subsidies such as fuel and electricity subsidy to direct subsidies such cash transfer and productive activities such as education, health, infrastructure and entrepreneurship. This change aims to reduce the budget deficit and improve the allocation of appropriate budgetary targets for the poor.

Removing fuel subsidies, of course, worsen the low-income group due to decreasing in purchasing power while an increase in infrastructure's spending can remove infrastructure bottleneck and create job opportunities and an increase in both education and health can equip the poor in be more competitive and creative (Jung and Thorbecke, 2003; Roberts, 2003; Davis et al., 2001, and Fan et al., 2000;). The strategy of reallocation policies is: first, reduce fuel subsidies and compensate the low-income groups through direct transfers; second, the saved money is used to finance development expenditures, and the rest of the saved money is used to finance the budget deficit. However, the effectiveness of reducing subsidies and reallocation policies in protecting the poor is still debatable in Indonesia and needs to be observed carefully.

The Role of Fiscal Policy as the Revenue Redistribution Policy

Generally speaking, the taxation system is moving in the right direction. The Indonesian value added tax (VAT henceforth) conforms in its design to the best practice in very many respects (Marks, 2003). For example, VAT on capital goods expenditures is creditable against VAT obligations. Indonesia also exempts a wider range of goods and services which are especially consumed by the low income group. The role of indirect taxes, which previously were dominant, has decreased and direct taxes now dominate so that the distortion in economy can be minimized. During 1996-2009, the average proportion of income tax to total revenue (33.38 per cent) exceeded the proportion of VAT (20.73 per cent).

One of the current issues on the revenue redistribution policy is an income tax reform which was enacted by the new income tax law No.36/2008 junc. to Law, No.7/1983. In many respects, the Indonesian income tax, known as *Pajak Penghasilan (PPh),* is progressive and applied to both individual and enterprises. The law No.38/2008, however, maintains the progressiveness of personal income taxes but introduces a flat rate of corporate income tax rate. This law cut maximum tax rates from 30 per cent (2008) to 25 per cent (2010) and offers more incentives to listed companies. Moreover, this current reform appears in favor of the development of small medium enterprises (SMEs). A 50 per cent discount of the normal rate is granted to SMEs with the turnover up to IDR 50 billion that is imposed on taxable income of a gross income of IDR 4.8 billion.

These incentives may encourage large companies to expand their business and SMEs to register their business as a legal entity. The legal entity will benefit SMEs to access capital from financial institutions and to make a contract with other parties, so they will easily expand their business. The corporate income tax reforms might encourage investment and business expansion for both large scale business and SMEs that will be beneficial to the poor (Djankov et al., 2010; Zariyawati et al., 2010; Chang and Doina, 2005; De Mooij and Ederveen, 2005). On the contrary, in the case of OECD, lower corporate tax rates may raise a budget deficit (Gomes and Pouget, 2008; Shin, 1994). The corporate income tax reforms, however, improved tax revenues in Ghana and India (Rao, 2000; Kusi, 1998). Regarding these facts, it is important to evaluate the impacts of the 2008 corporate tax reforms on the government budget and the poverty in Indonesia.

The Role of Micro-Fiscal Policies on Changing Poverty Status and Protecting the Poor from the Shocks

The government has innovated and implemented several policies to alleviate chronic poverty such as educational subsidy *(Bantuan Operasional Sekolah)*, scholarships, conditional cash transfers, community empowerment programs *(Program Nasional Pemberdayaan Masyarakat)*, credits for small-medium enterprises (micro finance) and infrastructure development projects *(Program Pengembangan Kecamatan)*. In addition, the government also provides social safety nets to protect the poor from some external shocks through distributing subsidized rice (RASKIN), cash transfers *(Bantuan Langsung Tunai)* and poor targeted health insurance (ASKESKIN). Those policies are deliberated to cope with transient poverty. However, the effectiveness of these policies in alleviating poverty is still questionable. Evaluating the impact of poverty alleviation policies in the static term or short period can be difficult since for some policies there is a lag between policy implementation and the results of the policy emerging.

Further, the poor of household are also vulnerable to individual economic risks or shocks such as a death of a family member, crop loss, sickness and bankruptcy. Thus, it is necessary to analyze the poverty impact of micro fiscal policies, economic risks and shocks in order to obtain a comprehensive picture of how a fiscal policy influences poverty in Indonesia. Further, since the poverty incidence can change overtime, it is important to conduct the dynamic analysis in order to distinguish between chronic, transient poverty and never poor, to find out the important factors differentiating among groups and also to evaluate the effectiveness of government policies on changing poverty status in Indonesia.

1.5 Research Questions

The Indonesian fiscal policies appears to be moving on the right direction, but effectiveness of these policies on alleviating poverty in Indonesia has not yet been verified; is still questioned. According to the challenges and opportunities of fiscal policies and poverty in Indonesia, there are four issues that should be addressed:

1. The role of fiscal policy as a stabilization policy responding to the global crisis.
    - Do tariff policies effectively protect the poor from volatility of world commodity prices?
    - Should the government complement tariff policies with other policies to protect the poor?
2. The role of fiscal policy as a reallocation policy.
    - What is the relation between fuel subsidies and the fiscal balance?

- Do reallocation fuel subsidies to education, health and transfer effectively reduce the poverty incidence?

3. The role of fiscal policy as a distribution policy.
   - What is the impact of 2008 tax reforms on the fiscal sustainability?
   - Do the poor get benefit from the 2008 corporate income tax reform?
4. The role of micro-fiscal policies as poverty alleviation policies.
   - What is the role of the government assistance on poverty dynamics?
   - Could the government assistance change the poverty status and protect the poor from income shocks and economic risks?

1.6 The Scope and Flow of Study

In the decentralized system, the role of regional (provincial and municipal) fiscal policy cannot be easily neglected since the regional governments manage one third of total expenditure. However, by the law, the fiscal policies such as tariffs, taxation, energy subsidies, poor targeted health insurances are still managed by the central government; thus, this dissertation focuses only on contributions, challenges and opportunities of central government's fiscal policies on supporting poverty alleviation in Indonesia. Figure 1.3 explains the systematic linking between the national development plan and the core analyses of PhD dissertation.

Since 2004, the president and vice president were directly elected; therefore, the National Medium-Term Development Plan (RPJMN: *Rencana Pembangunan Jangka Menengah Nasional*) 2004-2009 and 2010-2014 are guided by the National Long-Term Development Plan (RPJPN) 2005-2005 and elaborated with the vision and mission of president and vice president elect. There are eleven priorities of RPJMN 2010-2014: 1) bureaucratic and governance reform; 2) education; 3) health; 4) poverty reduction; 5) food resilience; 6) Infrastructure; 7) investment and business climate; 8) energy; 9) environment & disaster management; 10) less developed and post-conflict area; 12) culture and technological innovation. Furthermore, the selected targets of RPJMN 2010-2014 are: 1) decrease in the poverty rate of 8-10 percent by the end of 2014; 2) annual of average economic growth of 6.3-6.8 percent/year; 3) decrease in unemployment rate 5-6 per cent by the end of 2014; 4) increase in production of paddy, corn, soybean, sugar and beef by 3.2 per cent, 10.0 per cent; 20.0 per cent; 12.6 per cent and 7.3 per cent respectively.

In order to achieve targets, GOI implements several policies including fiscal policies, social policies, law policies, and cultural policies. All policies and budget allocation are directed to the priorities of RPJPMN 2010-2014. This dissertation is intended to measure and evaluate the role of implemented and planned fiscal policies on supporting to the poverty reduction in Indonesia as targeted in RPJMN 2010-2014. This dissertation includes four chapters of core analyses addressing main and current issues of fiscal policy in Indonesia.

Chapter 4 analyzes volatility of world commodity prices, import tariffs and poverty. This chapter is in accordance with the RPJMN’s priority of No.5, food resilience. GOI has implemented the policy package to stabilize domestic commodity price aiming to protect and help low income group from a dramatic surge in the international price of food commodities. The stabilization can guarantee that food’s price can be afforded by poor consumers. Chapter 5 analyzes reallocation of fuel subsidies, fiscal balance and poverty. This chapter is in accordance with the RPJMN’s priority of No.8, energy; No.6, infrastructure; No.3, health and No.2, education. The reallocation of fuel subsidies will reduce inequality and promote more efficient and clean energy consumption. Moreover, the reallocation subsidies to education, health, infrastructure and direct subsidies might have a greater impact on the future. An increase in infrastructure spending can remove infrastructure bottleneck and create job opportunities. While an increase in both education and health can increase capacity and empower the poor.

Chapter 6 scrutinizes the 2008 corporate tax reform, fiscal sustainability and poverty. This chapter is in line with the RPJMN's priority of No.7, business and investment climate. The 2008 corporate income reforms might encourage investment and expanding business for both big business and SMEs. This reform is able to promote economic growth and provide job opportunities that will be beneficial to the poor. Chapter 7 explores the role of micro fiscal policies such as poor targeted health insurance and subsidized rice on changing poverty status. This chapter is directly linked to the RPJMN's priority of No. 4, the poverty reduction.

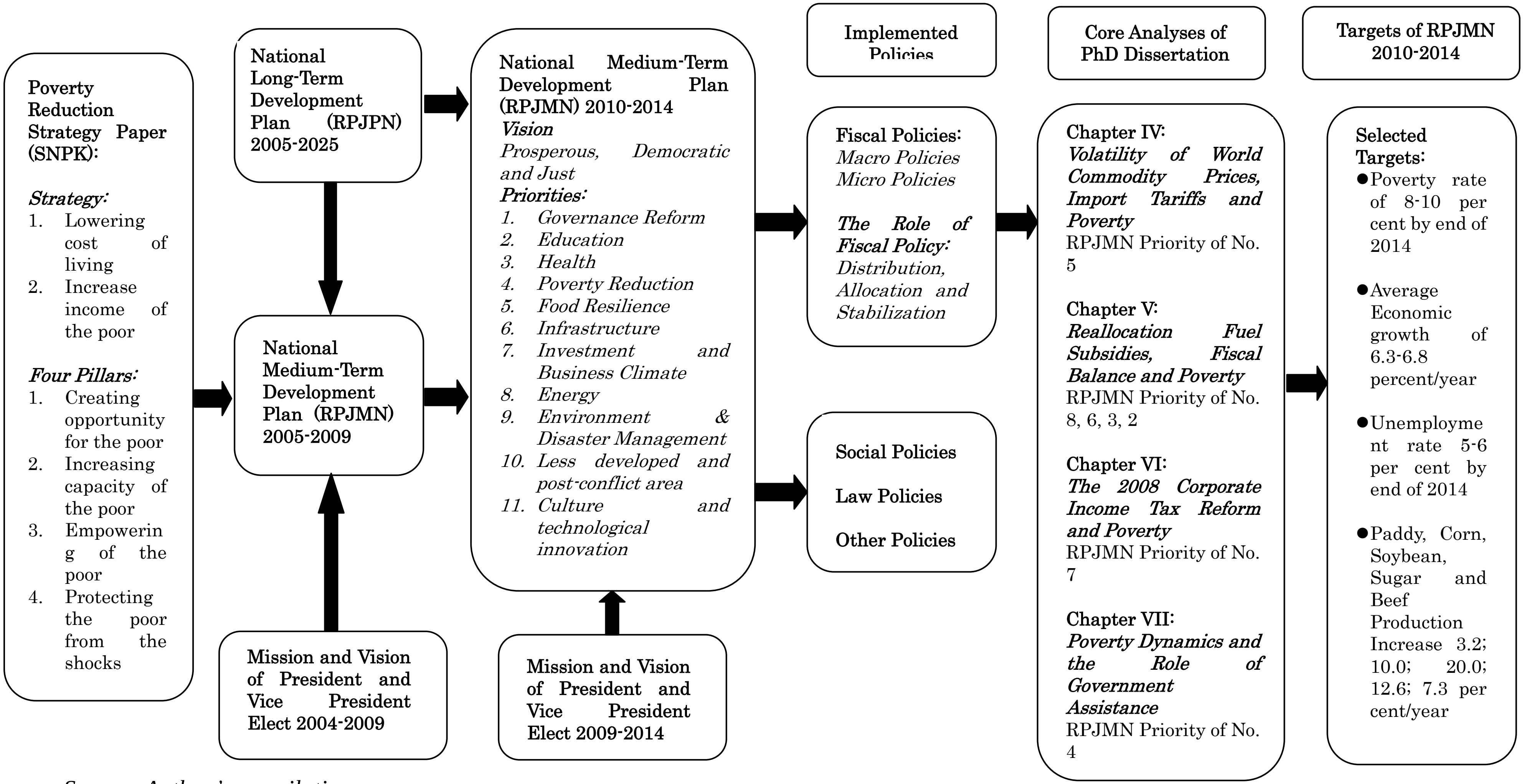
1.7 The Contribution of Dissertation

The main contributions of this research in the field of fiscal policy and poverty are **comprehensiveness analyses** dealing with a theoretical development, a new methodological approach and empirical analyzes on the poverty impacts of fiscal policy reforms**.** This dissertation aims to be a comprehensive research addressing the relation between fiscal policies and poverty alleviation issues in Indonesia which considers all functions of fiscal policy in the economy: 1) reallocation policy, 2) redistribution policy and 3) stabilization policy. This dissertation also analyzes the impact of micro-fiscal policies on poverty dynamics. The specific contributions of this study are:

1. A theoretical and empirical investigation of an endogenous poverty line and its implication to the poverty impact of policy reforms.

2. Introducing a new methodological approach (A CGE-Microsimulation with an endogenous poverty line) on analyzing the poverty impacts of policy reforms.

Figure 1.3 The Flow of Study: Linking between the Core Analyses of PhD Dissertation and the National Development Plan



Source: Author's compilation

3. Measuring the effectiveness of current stabilization domestic price policies in providing a protection to the poor responding to the external shocks of volatility of world commodity prices.
4. A comprehensive analysis of the impacts of reallocation fuel subsidy on both a fiscal balance and a poverty impact.
5. Measuring the 2008 corporate tax reforms and its contribution on supporting poverty alleviation.
6. Analyzing the role of government policies on poverty dynamics and changing poverty status of households.

1.8 The Dissertation Outline

This dissertation is divided into nine chapters explained as follows:

Chapter 1: Poverty in Indonesia: An Old Issue with New Challenges and Opportunities of Fiscal Policy. This chapter explains: an Indonesian poverty profile and the medium term of the national development plan, why this research should be done, what the main and latest challenges of fiscal policy in Indonesia, the research questions, the scope and flow of study and the main contribution.

Chapter 2: How Fiscal Policy Influences Poverty: A Theoretical Framework. This chapter focuses on theoretical frameworks consists of: 1) how the fiscal policy influences an economy using the aggregate demand and supply framework; 2) how the fiscal policy influences the poverty using the microeconomic theory of consumer behavior, the poverty function and the theoretical development of an endogenous poverty line; 3) an empirical application of an endogenous poverty line.

Chapter 3: Research Methodology: A CGE-Microsimulation. This part describes research methodologies of A CGE-Microsimulation. The flow of methodology will be explained deeply and comprehensively. The first part explains the construction of CGE modeling while the last part explains the microsimulation model, the endogenous of poverty line and the poverty measurements.

Chapter 4: Volatility of Commodity Prices and the Role of Import Tariffs on Protecting the Poor in Indonesia. The analysis focuses on rice and soybean commodities. This chapter simulates the poverty impact of commodity price volatility and the effectiveness of import tariff policy on protecting the poor from the commodity price vulnerability. Lastly, this chapter also provides the simulation result of other policies in complementing zero import tariff policies to provide maximum protection to the poor responding to the volatility of world prices.

Chapter 5: Reallocation Fuel Subsidies, Fiscal Balance and Poverty in Indonesia. This chapter scrutinizes the flow of oil and gas revenue on the central government budget. The analysis then continues to examine the impact of reducing fuel subsidies and reallocation policies on the poverty incidence in Indonesia.

Chapter 6: The 2008 Corporate Income Tax Reform and Its Contribution to the Poverty Reduction in Indonesia. The first part of this chapter explores the history of CIT reforms and its implication on the government revenue. The analysis then continues to investigate whether the poor benefit from the 2008 income tax reform.

Chapter 7: Poverty Dynamics and the Role of Government Assistance on Changing Poverty Status and Protecting the Poor in Indonesia. This chapter is different with previous chapters that apply A CGE-Microsimulation. The analysis of this chapter is based on the panel data to overview the poverty dynamics in Indonesia during 2005-2007. This chapter aims to find out the determinants of poverty dynamics and evaluates the effectiveness of government assistance on changing the poverty status and on protecting the poor from shocks.

Chapter 8: Frontier Researches on Fiscal Policy and Poverty. This chapter divides into two issues: an inter-temporal (dynamic) general equilibrium and a relationship between corruption and public investment. The first part examines the importance of application the dynamic general equilibrium on analyzing the long run impact of policy reforms on an economy. The second part discusses theoretically and empirically investigation the relationship between corruption and public investment in Indonesia.

Chapter 9: Conclusion and Policy Recommendation. This part summarizes the important findings of all the chapters and will end with policy recommendations to alleviate poverty in the effective and efficient way. This chapter also provides information related to the limitations of this study and future research.

Chapter 2

How Fiscal Policy Influences Poverty: A Theoretical Framework[Φ]

2.1 The Role of Fiscal Policy in the Economy and How a Fiscal Policy influences the Poverty

The public finance is considered to be threefold of governmental effects on: 1) efficient allocation of resources, 2) distribution of income and 3) macroeconomic stabilization (Musgrave, 1959). The government could intervene to an economy to create more efficient resource allocations when there are externalities and market imperfections. For instance, the provision of public goods such as road, bridge, school and defense would be less than a society need if the provision of those public goods is voluntary. Thus, the government provision on public goods is a more effective and efficient way.

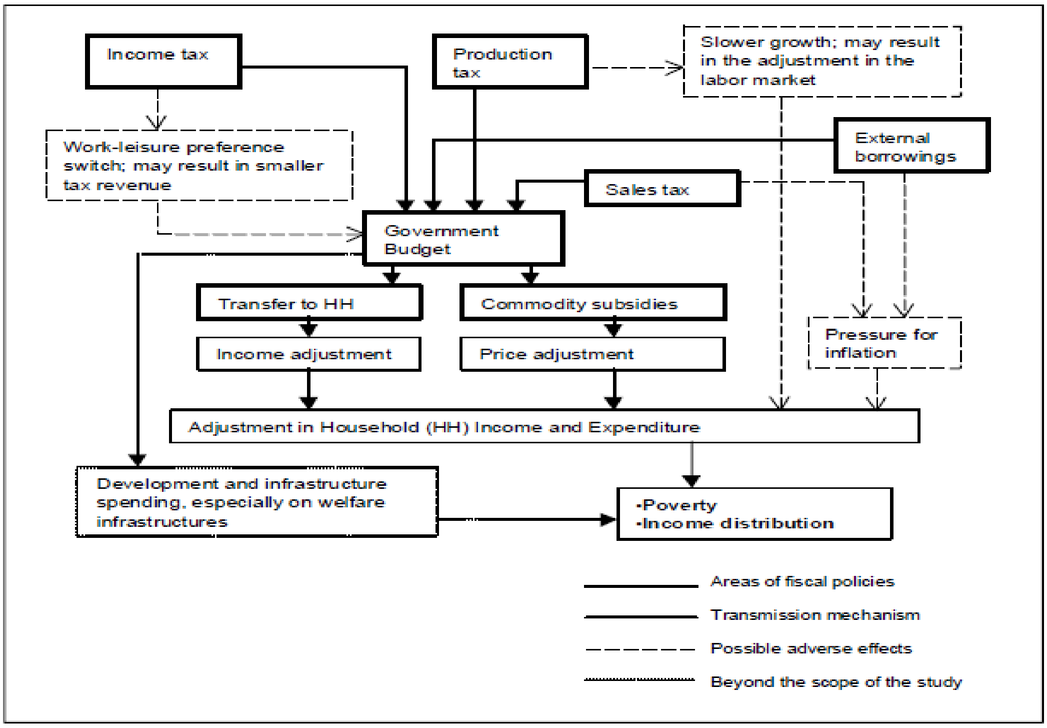
In the term of distribution, a market economy distributes income and wealth depending on a number of factor's endowments including education attainments, inheritances, innate talents and social mobility. As a result of these factors, the distribution of income would be unequal which would call for government intervention to improve more equal society. Lastly, the function of stabilization differs sharply from that of the other two. This function concerns to utilize resources to maintaining an economic growth, a full employment and price stability.

Further, fiscal policy refers to government attempts to influence the direction of the economy, in an effort to achieve economic objectives of price stability, full employment,

[Φ] Some parts of this chapter are drawn from "Dartanto, T. (2011b), Does Choice between an Endogenous and a Fixed Poverty Line Affect the Poverty Outcome of Policy Reforms?, *Modern Economy*, Vol.2, No.4: pp. 667-673".

income distribution, resource allocation, and economic growth, through changes in government taxation system, or through changes in government spending. This spending can be financed by taxes, government borrowing, asset sales, or *seigniorage*. How a government chooses to finance its activities can have effects on the income distribution and on the market efficiency.

Figure 2.1 Transmission Mechanism: The Effect of Fiscal Instruments on Poverty and Income Distribution



Source: Damuri and Perdana, 2003

The fiscal policy, whether government spending or taxation policies, will directly/indirectly influence the poor, even though the poor is not potentially a taxable object. The fiscal policies can influence poverty through several ways (Figure 2.1) (Damuri and Perdana, 2003): *first*, an increasing income tax can switch work-leisure preference which can influence households to adjust their expenditure or life style. The households may reduce charity to the poor, lay off a maid, and reduce consumption that has an overall effect of lowering economic growth. Consequently, the income tax indirectly worsens the poor. *Second*, production tax and value added tax may result in the adjustment in labor and product market. These adjustments directly influence household's income/expenditure in which the increasing price reduces purchasing power parity.

Third, an increasing of government revenue resulting from increasing tax revenue may increase the government expenditure on subsidies, cash transfers that may beneficial to the poor. *Fourth*, a lowering/increasing tariff will directly lower/increase price level that will directly lower/increase both household's expenditure and poverty line. The poverty incidence will increase/decrease as a decrease/increase in household income/expenditure.

2.2 Theoretical Framework of the Relationship between Fiscal Policy and Poverty

The framework of aggregate demand (AD) and aggregate supply (AS) are utilized to analyze how policy reforms (economic shocks) can influence both price and income level in the economy. The aggregate demand is a downward sloping relationship between output and price level while the aggregate supply is an upward sloping relationship among output and prices.

The aggregate demand could be derived by applying the IS-LM framework. Equilibrium in the goods market (IS):

$$y = C(y, tx) + I(y, r) + G + EX(er, y^*) - IM(er, y, p^*) \tag{2.1}$$

Equilibrium in the money market (LM):

$$(m/p) = L(y, i) \tag{2.2}$$

Where, C is private consumption, $\partial C/\partial y = C'_y > 0, \partial C/\partial tx = C'_{tx} < 0$; y is aggregate demand; tx is the tax rate; I is investment, $\partial I/\partial y = I'_y > 0, \partial I/\partial r = I'_r < 0$; r is the real interest rate; G is government consumption; *IM* is import, $\partial IM/\partial er = IM'_{er} < 0, \partial IM/\partial y = IM'_y > 0, \partial IM/\partial p^* = IM'_{p^*} < 0$; *er* is the exchange rate; *EX* is export, $\partial EX/\partial er = EX'_{er} > 0, \partial EX/\partial y^* = EX'_{y^*} > 0$; p^* is the world price; y^* is the foreign output of trade partner; m/p is the real money supply, $\partial(m/p)/\partial y = L'_y > 0$, $\partial(m/p)/\partial i = L'_i < 0$; *p* is the price level; *i* is the nominal interest rate; let us assume *r*=*i*.

Taking total derivative of Eq. 2.1 and Eq. 2.2 then we get:

$$dy = C'_y dy + C'_{tx} dtx + I'_y dy + I'_r dr + dG + EX'_{er} der \tag{2.3}$$

$$+ EX'_{y^*} dy^* - IM'_{er} der - IM'_y dy - IM'_p dp^*$$

$$(dm/p) - (m/p^2)dp = L'_y dy + L'_r dr \tag{2.4}$$

Substituting Eq. 2.4 into Eq. 2.3, then we obtain the aggregate demand (AD):

$$dp = -(p^2/m)(L'_r/I'_r)\begin{bmatrix}[1 - C'_y - I'_y + IM'_y + L'_y \cdot I'_r/L'_r]dy - (I'_r/L'_r)(dm/p) - \\ [C'_{tx} d_{tx} + dG + EX'_{er} der + EX'_{y^*} dy^* - IM'_{er} der - IM'_{p^*} dp^*]\end{bmatrix} \tag{2.5}$$

According to Eq. 2.5, we know that, for instance, an increase in government spending or the imported price of goods will raise the price level in the economy $\left(dp/dG = (p^2/m)(L'_r/I'_r) > 0, dp/dp^* = -(p^2/m)(L'_r/I'_r)IM'_{p^*} > 0\right)$.

On the other hand, the aggregate supply function can be derived from the production function of a representative firm in which *L* is labor; $\overline{K}$ is capital; $\overline{A}$ is augmented technology; *w* is the nominal wage rate; *p* is the price level. In its most general form, it would be:

$$y = f(\overline{A}, L, \overline{K}) \tag{2.6}$$

where $\partial y / \partial L = f' > 0$ and $\partial^2 y / \partial L^2 = f'' < 0$. The representative firm maximizes profit:

$$\max_L (py - wL) \text{ given } p \tag{2.7}$$

The first order condition (foc) is $w/p = \partial y / \partial L =$ the marginal product of labor. Since the marginal product of labor is a function of *L*, then we have $w/p = f'(\overline{A}, L, \overline{K}) = g(L)$. Thus,

$$L = g^{-1}(w/p) = h(w/p), h' < 0 \tag{2.8}$$

Substituting Eq.2.8 into Eq.2.6, then we have the inverted aggregate supply curve,

$$y = f(\overline{A}, h(w/p), \overline{K}) \tag{2.9}$$

According to Eq. 2.9, we have $dy/dp > 0$ and also $dp/dy > 0$. Thus, the slope of the aggregate supply is upward sloping. From Eq. 2.9, we also know that, for instance, an increase in technology will raise the price level and output in the economy. An increase in the price level will then reduce the real wage rate. However, in order to keep the real wage rate, an increase in the price level must be compensated with an increase in the nominal wage rate.

The aggregate demand and supply framework clearly showed that policy reforms (economic shocks) will always affect an economy through changes in price and income level (wage rate) and these changes have significant effects on poverty incidence. We then utilize the Utility Maximization Theory (UMP) and the Expenditure Minimization Theory (EMP) as theoretical framework to analyze how price and factors price change influencing poverty incidence. The comprehensive derivation will be explained in the part of 2.4.2.

2.3 The Poverty Definition and the Poverty Measurement

Five-W Questions in Poverty

The poverty alleviation policy might not be effective in reducing poverty because of a lack of information related to the five-W questions on poverty. The poverty alleviation policy should address the five-W questions (What, Who, Where, When and Why) of poverty. **What** refers to what is the poverty measurement used to calculate poverty, e.g. expenditure or income approaches, basic need approaches, subjective approaches. A different approach results in a different poverty outcome and a policy implication. **Who** refers to who are is the poor? This implies to whom the assistance, and the poverty reduction programs should be targeted. Without knowing who the poor are, poverty eradication policies will not be targeted at the appropriate people and will be ineffective in reducing poverty.

Where refers to where is the poor located. A different location calls a different policy implication, i.e. a housing policy and a widening access on the tab water might be appropriate to deal with the urban poverty but these might inappropriate implemented in the rural area. **When** refers to when the poor condition happens? Is the poor condition a temporary or continuous condition during a long period? If the poor condition is temporary, the transiently poor, the strategy would be geared towards providing safety nets and coping mechanisms to reduce their vulnerability and help them return to a non-poor situation. Further, if the poor condition is observed all time, the chronically poor, then the appropriate strategy would be to redistribute assets, providing basic physical and human capital infrastructure. Lastly, **Why** refers to what is the cause of poverty? The poverty has multidimensional characteristics and many factors influence the poor. It is necessary for the government to find out the important factors of poverty determinant and try continuously and consistently to solve the problem.

The Poverty Definition and Measurement

There are two main approaches for measuring poverty: 1) welfare approach and 2) non-welfarist approach. The welfare approach interprets “welfare” as an (inter-personally comparable) utility, i.e. attainment of personal satisfaction. Poverty means not having a sufficient income to attain some normative (reference) level of utility. Meanwhile, the non-welfarist approach is divided into two schools of thought: basic needs approach and capabilities approach. The basic needs approach attempts to define the absolute minimum resources necessary for long-term physical well-being, usually in terms of consumption goods. The poverty line is then defined as the amount of income required to satisfy those needs. On the other hand, the capabilities approach, well known as Sen's Capabilities Approach, argues that welfare should be thought of in terms of the functioning ("beings and doings") that a person is able to achieve. Poverty means not having a sufficient income to support specific normative functioning. Utility can be viewed as one such functioning relevant to well-being, but only one. Independently of utility, one might say that a person is better off if she or he can participate fully in social and economic activity (Ravallion, 1994 and 1998).

The problem of defining and measuring of poverty has been debated in the last decade because there are many definitions and methods for calculating the poverty incidence and the poverty has multi-characteristics. Researchers in the field of poverty employ a wide definition of poverty. Basically, all definitions can fit into one of the following categories (Hagenaars and de Vos, 1988):

1. Poverty is having less than objectively defined, absolute minimum; *Basic Needs Approach* defines the absolute minimum in terms of "basic need" such as food, clothing, and housing. It requires the assessment of a minimum amount necessary to meet each of these needs. *Food/Income Ratio* defines every household spending more than one-third of the total household income on food is considered to be poor. *Total Expenditure/Income Ratio* states that a person is considered as poor if their total expenditure cannot be paid for out of current income.

2. Poverty is having less than others in society; *Relative Deprivation with Respect to*

Various Commodities defines households as poor when they are lacking certain commodities that are common in the society they are living in.

3. Poverty is feeling you do not have enough to get along; *Subjective Minimum Income Definition:* if their actual income level is less than the amount they consider to be "just sufficient" they are said to be poor. This approach is subjective judgment. *Subjective Minimum Consumption Definition:* an approach reconciling the subjective poverty definitions and the basic needs definition is to ask people what they consider to be basic needs, and to let them specify how much they need to meet these basic necessities. *Official Minimum:* the official minimum income level is an important measuring rod for comparison. If the actual household income is lower than or equal to the amount households receive when they are on social assistance, we deduct that people are poor according to the official definition.

Applying these three categories of poverty definitions may result in a different result of poverty determinants. The choice for a certain definition is often made on the basis of the pragmatic argument of data availability.

However, most researchers agree that poverty can be conceptualized in the idea of absolute deprivation suffered by the population. A person suffers from absolute deprivation if he or she cannot enjoy the society's minimum standard of living. If one accepts a definition of minimum standard of living as consumption at a certain level which is mainly known as the poverty line (z), then the poverty measurement is straightforward: those with consumption expenditure (E) below the line are considered "poor" and the rest are "non-poor".

Counting the poor is easy if one accepts a definition of the poverty line as consumption at a certain level, then the poverty measurement is straightforward: those with consumption below the line are considered ‘’poor’’ and the rest are ‘’non poor’’. However, setting the poverty line is a complex exercise as it needs social convention to decide what mix of food commodities are to be included in the food basket. Moreover, the poverty calculation will be more complicated if it considers not only the consumptions bundle but also security, access to health services, educational attainment, and social status etc.

The common starting point of many poverty calculations is a food intake requirement of 2,100 calories per person per day (Ravallion, 1994). A food poverty line (FPL) is the expenditures necessary to achieve this caloric intake. Calories are just a proxy for an overall nutritional adequacy, which requires protein and micronutrients as well as calories. While the total amount of calories in food poverty basket is fixed ‘’absolutely’’, the basket and quality of those foods used to reach that level is ultimately a social convention (Pradhan et al., 2000).

The Central Statistic Agency of Indonesia (BPS henceforth) used 2,100 calories/capita/day resulted from 52 commodities for calculating food poverty line (FPL). The food poverty line will be heterogeneous among region due to the different of food price among region. To calculate the poverty line, it must be added with non food expenditures such as health, education, transportation, etc. However, choosing the allowance made for the non food expenditures is ever more difficult because there is no equivalent of nutritional standard to provide even a weak anchor to the amount.

2.4 A Measurement Problem on Analyzing the Poverty Impact of Policy Reforms: Choice between an Endogenous Poverty Line versus a Fixed Poverty Line

Policy reforms as well as economic shocks) frequently have a large impact on household welfare through changing both the price level and income (factors’ income). How policy reforms influence price and income can be explained clearly by the framework of the aggregate demand and the aggregate supply in macroeconomic theory. The policy reforms (e.g. intervention policies), such as a decrease in value added tax or an increase in public investment in infrastructure, will shift the aggregate demand curve to the right side. Supposing there is no change in the aggregate supply curve, the shifting of the aggregate demand curve to the right side will increase both the price and income.

In the case of poverty, a price increase would reduce the household's ability to afford an initial bundle of basic consumption needs; thus, the new consumption bundle might be below the poverty line (the threshold of minimum consumption). On the other hand, an increase in the factors' income would increase the household's income, which implies an increase in the ability to consume more. The increase in household consumption above the poverty line will change the household's status from poor to non-poor. Moreover, an increase in price will directly change the money metric of obtaining 2,100 calories as the minimum standard calories for measuring the poverty line (Ravallion, 1994; Decaluwe et al., 2005; Azis, 2010).

Policy reforms that increase the price level will have a double effect on poverty: 1) reduce the purchasing power and 2) increase the poverty line. The first effect has been observed by many studies which are mainly focused on the relationship between changes in price (inflation) and poverty. Powers (1995), using a US data set, found that inflation worsens a consumption-based poverty measure over the period 1959-92, but has no significant impact on the income-based poverty rate. Datt and Ravallion (1996) found in a cross-time, cross-state study of India that observations with higher inflation rates also had higher poverty rates. Agenor (1998) also found poverty rates to be positively related to inflation in cross-country data. Moreover, Son and Kakwani (2006) showed changes in price influence poverty in terms of two components, namely the income effect and the distributional effect. The income effect measures the change in poverty when all prices increase uniformly, whereas the distributional effect captures the changes in poverty because of the changes in relative prices.

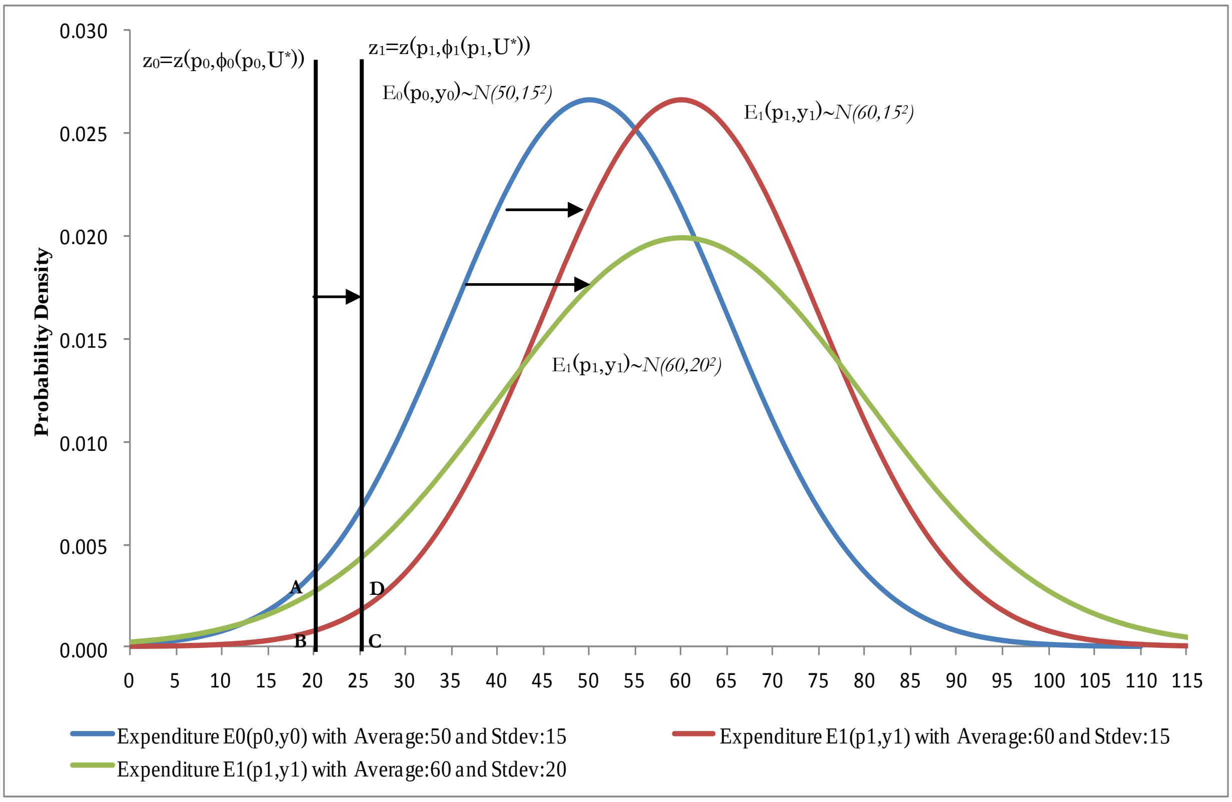
However, most of the studies on the poverty impact of policy reforms as well as economic shocks do not pay much attention to the second effect, as the poverty line is assumed as a fixed line; thus, the poverty outcome of policy reforms may underestimate (overestimate) and mislead in policy guidance. The next part aims to theoretically investigate the difference of poverty outcomes between applying a fixed and an endogenous poverty line.

2.4.1 The Graphical Analysis: Difference in Outcome between Applying a Fixed and an Endogenous Poverty Line

Figure 2.2 shows the graphical analysis of the difference in poverty outcome of applying the endogenous or the fixed poverty line. Let us simplify that *E* is expenditure/capita/month (Indonesian Rupiah (IDR)); *N* is a Normal Distribution; and *z* is a poverty line (IDR/capita/month) in which z_0 is the initial poverty line equal to 20 while z_1 is the endogenous (new) poverty line equal to 25. The initial poverty incidence is the area of the expenditure distribution curve, ($E_0(p_0,y_0)$~$N(50,15^2)$), below the initial poverty line, ($z_0=z(p_0,\phi_0(p_0,U^*))$), which is equal to the area of 020A. If the policy reforms affect an increase in income and price level and assuming the constant income distribution and the fixed (constant) poverty line, the poverty incidence will decrease significantly from the area of 020A to the area of 020B. However, it is very difficult to guarantee that the effect of policy reforms could be equally distributed among households. Hence, the income distribution might be changed responding to policy reforms.

Under the fixed poverty line and changing income distribution, the new poverty incidence is not very different from the initial poverty incidence. It is shown by the area of the expenditure distribution curve ($E_1(p_1,y_1)$~$N(60,20^2)$), below the poverty line ($z_0=z(p_0,\phi_0(p_0,U^*))$), is almost equal to the area of the expenditure distribution curve ($E_1(p_1,y_1)$~$N(50,15^2)$) below the poverty line ($z_0=z(p_0,\phi_0(p_0,U^*))$). Hence, the policy reforms do not successfully decrease the poverty incidence.

Figure 2.2 An Illustration of Poverty Impact of Shifting the Expenditure Distribution Curve and the Poverty Line responding to Change in Price and Income Level



Source: Author

Note: p_0 is the initial price level while p_1 is the new price level as a result of policy reforms (economic shocks). y_0 is the initial income level while y_1 is the new income level. ϕ_0 is the initial minimum consumption bundle both food and non-food while ϕ_1 is the new minimum consumption bundle both food and non-food after policy reforms or economic shocks. $z_0=z(p_0,\phi_0(p_0,U^*))$ is the initial poverty line when price level p_0. $z_1=z(p_1,\phi_1(p_1,U^*))$ is the endogenous poverty line. $E_0(p_0,y_0)$~$N(50,15^2)$ is the initial expenditure distribution function which is normally distributed with average=50 and variance=15^2. $E_1(p_1,y_1)$~$N(60,15^2)$ is the new expenditure distribution function which is normally distributed with average=60 and variance=15^2. $E_1(p_1,y_1)$~$N(60,20^2)$ is the new expenditure distribution function which is normally distributed with average=60 and variance= 20^2. The expenditure distribution in Figure 1 is drawn using an imaginary data, conveniently chosen to simplify a real condition.

However, assuming the fixed (constant) poverty line, when the price level is significantly changed, it does not seem appropriate. It should be remembered that the common starting point of many poverty calculations is a food intake requirement of 2,100 calories per person per day (Ravallion, 1994); therefore, the increasing commodity price would also increase the money metric of obtaining 2,100 calories. Thus, the poverty line will change following a variation in relative prices. If the poverty line becomes endogenous following the price change, ($z_1=z(p_1,\phi_1(p_1,U^*))$), and the income distribution is assumed as a constant, the new poverty incidence is the area of 025C which is larger than that of 020B. Moreover, if the poverty line becomes endogenous and the income distribution changes following the price and income changes, the new poverty incidence is the area of 025D which is larger than either that of 020A or 020B. Therefore, the policy reform, which pushes high inflation and worsens the income distribution, is not beneficial to the poor.

According to this figure, the impact of policy reforms or economic shocks on poverty depends on three main parts: 1) change in household expenditure distribution following change in price and income level; 2) change in income distribution since the impact of policy reforms commonly does not equally distributed among households; 3) change in the poverty line following change in the price level. It can also be concluded that if the fixed poverty line is applied, the poverty impact of policy reforms as well as economic shocks which significantly increase (decrease) the price level in the economy will always underestimate (overestimate); consequently, it might provide biased policy guidance.

2.4.2 Mathematical Model

Microeconomic Theory of Consumer Behavior

The graphical illustration has clearly shown the underestimate of poverty incidence when the fixed poverty line is applied to analyze policy reforms. In order to strengthen the finding from the graphical analysis, this part aims to prove mathematically the underestimate of poverty impact of policy reforms when the fixed poverty line is applied. The microeconomic theories of consumer behavior - both the Utility Maximization Theory (UMP) and the Expenditure Minimization Theory (EMP) - will be utilized as a basic framework for examining how important an application of an endogenous poverty line is when analyzing the poverty impact of policy reforms.

We assume throughout that the consumer has a rational, continuous, and locally non-satiated preference relation, and we take $U(x)$ to be a continuous utility function representing this preference. The consumption set is $\mathrm{X} = R_{+}^{l}$ in which l is a unit of commodity $(1 \leq i \leq l)$. The initial income is y which comes from selling its endowment of labor and capital for production activities. The price vector is $p = (p_i, ..., p_l) \in R_{++}^{l}$ in which p_i is the price of a unit of commodity $(1 \leq i \leq l)$. Therefore, the set of all feasible commodity bundles for the consumer is $B(p, y) = \{x \in \mathrm{X} | px \leq y\}$. The set $B(p, y)$ is called the budget set of the consumer if his income is *y* and the price system is *p*.

Then the optimization problem of a consumer with utility function $U(x)$, income *y* and price system *p* is $\max U(x)$ subject to $px \leq y$, $x \geq 0$. This optimization results in the consumer's demand function $x = x(p, y)$. If $x = x(p, y)$ is the consumer's demand function, the indirect utility function of the consumer is $V = R_{++}^{l+1} \rightarrow R$ which is given by $V(p, y) = U(x(p, y))$. The properties of $V(p, y)$ are strictly increasing in *y* for all *p* and non-increasing in p_i for all *i=1,…,l* (decreasing in *p*); homogeneous of degree zero in *(p,y)*, continuous in *(p,y)*, and quasi-convex in *(p,y)* (Mas-Collel, Whinston and Green, 1995).

On the other hand, the consumer can also look for a commodity bundle which guarantees him to achieve a utility level $U(x)$ with minimum expenditure *y*. This is well known as the expenditure minimization problem (EMP). The value of the EMP is denoted

$e(p,U)$ which is called the consumer's expenditure function. Its value for any (p,U) is simply px^*, where x^* is any solution to the EMP. The properties of $e(p,U)$ are strictly increasing in U for every *p* and non-decreasing in p_i for all *i=1,...,i*; homogeneous of degree one in *p*; concave in *p*; continuous in *p* and *U* (Mas-Collel, Whinston and Green, 1995). The set of optimal commodity in the EMP is denoted $h(p,U)$ and is known as the *Hicksian, or compensated, demand correspondence or function* if single-valued. One of the properties of the Hicksian demand correspondence $h(p,U)$ is homogeneity of degree zero in *p:* $h(\alpha p,U) = h(p,U)$ for any *p, U* and $\alpha > 0$ (Mas-Collel, Whinston and Green, 1995).

If the x^* is the solution to the Utility Maximization Problem (UMP) when $y = px^* > 0$, in which x^* is a solution to the problem of maximization $U(x)$ subject to $px \leq y$ and $x \geq 0$, then x^* is also the solution of the Expenditure Minimization Problem (EMP) when the required utility level is $U(x^*)$. Moreover, the minimized expenditure level in this EMP is exactly *y*. If the x^* is optimal in the EMP when required utility level is $U(x) > U(0)$, then x^* is optimal in the UMP when income is $y = px^*$. Moreover, the maximized utility level in this UMP is exactly *U*. The EMP is the "dual" problem to the UMP. From UMP and EMP, then we have:

$$y = px^* = e(p,U) = e(p,U(x^*)) = e(p,V(p,y)) \tag{2.10}$$

$$U = U(x^*) = V(p,y) = V(p,px^*) = V(p,e(p,U)) \tag{2.11}$$

$$h(p,U) = x^*(p,y) = x^*(p,e(p,U)) \tag{2.12}$$

$$x^*(p,y) = h(p,V(p,y)) \tag{2.13}$$

The Poverty Function

Even though there are many definitions, measurements and characteristics of poverty, in this study the definition is simplified: those people whose consumption expenditure is below the poverty line are considered “poor” and the rest are “non-poor”. According to Atkinson (1970), Sen (1976), Sen (1973), Kakwani (1980), Foster, Greer and Thorbecke (1984) and Kakwani (1993), the poverty definition could be summarized that the poverty (HC) is a function of the welfare indicator (w), the poverty line (z) and the income distribution (σ). The poverty function is shown as follows:

$$HC = f(w, z, \sigma) \tag{2.14}$$

The properties of poverty function are continuous and decreasing in *w*, continuous and increasing in both *z* and σ. Decreasing in *w* implies poverty indicators will decrease following an increase in the welfare indicators. The measurable welfare indicators commonly used in analyzing poverty are either income or expenditure. Meanwhile, increases in both *z* and σ implies that poverty indicators will increase in line with an increase in the poverty line and the income distribution. Supposing the expenditure as the welfare indicator and following Eq. 2.10, then we have the welfare function shown below:

$$w = y = p \cdot x^* = e(p, U) = e(p, V(p, y)) \tag{2.15}$$

On the other hand, the ideal poverty line should then be the minimum cost to a given individual of a reference level of welfare fixed across all individuals, (U^*) (Ravallion, 1994). Thus, the poverty line can be defined as cost of achieving (U^*) when facing price vector *p* and the vector of consumption bundle (ϕ). The vector of consumption bundle (ϕ) is a function of *p* and U^*, $\phi(p, U^*)$, the Hicksian demand correspondence. $\phi(p, U^*)$ is the minimum consumption bundle to achieve U^* (e.g. 2,100 calories) when price vector is *p*. According to Eq. 2.12 and Eq. 2.13, $\phi(p,U^*)$ must be equal to $\varphi(p,y)$, the demand function. Thus, the poverty line can be shown as below:

$$z = z(p,\phi(p,U^*)) \tag{2.16}$$

The poverty line, $z = z(p,\phi(p,U^*))$, is continuously increasing in *p* and ϕ. Suppose U^* is a fixed value overtime[3], then $U_t^{*'} = \partial U^* / \partial t = 0$, and the one property of the Hicksian demand correspondence is the homogeneity of degree zero in *p*, then $\partial\phi/\partial U^* = 0$ and $\partial\phi/\partial p = 0$.

Lastly, let us simplify that the income distribution, which is mainly measured by either the Gini Index or Theil Index, is a function of the distribution of endowments (ω) among households in a society. Endowments could be defined as labor, capital, land ownership and education attainment etc. Let us assume that the properties of income distribution are continuous and increasing in ω. Increasing in ω means an unequal distribution of endowments in society related to more unequal in income distribution. The income distribution function is shown below:

$$\sigma = \sigma(\omega) \tag{2.17}$$

Substituting Eq. 2.17, Eq. 2.16, Eq. 2.15 into Eq. 2.14, then we obtain the poverty function as shown below:

$$HC = f\left(e(p,V(p,y)), z(p,\phi(p,U^*)), \sigma(\omega)\right) \tag{2.18}$$

2.4.3 The Mathematical Proof of Different Poverty Outcome

As mentioned in the graphical analysis, if the fixed poverty line is applied, the poverty

[3] The utility is fixed because the standard reference of welfare as a basis of calculation of poverty line is not easily changed overtime. For instance, the minimum standard of 2,100 calories for measuring the poverty line does not change for many years.

impact of policy reforms as well as economic shocks which increase the price level will always be underestimated. This study will mathematically prove the evidence from the graphical analysis by utilizing Eq. 2.18 and the properties of expenditure function, indirect utility function, poverty function and income distribution function.

Proposition:

Supposing the application of a fixed poverty line, the poverty impact of policy reforms which largely increase (decrease) the price level, will always be underestimated (overestimated).

Proof:

Let us take the total derivate of Eq. 2.18 and if $HC_t' = dHC/dt$; $f_e' = \partial f/\partial e$; $e_p' = \partial e/\partial p$; $p_t' = \partial p/\partial t$; $e_V' = \partial e/\partial V$; $V_p' = \partial V/\partial p$; $V_y' = \partial V/\partial y$; $y_t' = \partial y/\partial t$; $f_z' = \partial f/\partial z$; $z_p' = \partial z/\partial p$; $z_\phi' = \partial z/\partial \phi$; $\phi_p' = \partial \phi/\partial p$; $z_{U^*}' = \partial z/\partial U^*$; $\phi_{U^*}' = \partial \phi/\partial U^*$; $U_t^{*'} = \partial U^*/\partial t$; $f_\sigma' = \partial f/\partial \sigma$; $\sigma_\omega' = \partial \sigma/\partial \omega$; and $\omega_t' = \partial \omega/\partial t$ then we have:

$$HC_t' = f_e' \cdot e_p' \cdot p_t' + f_e' \cdot e_V' \cdot V_p' \cdot p_t' + f_e' \cdot e_V' \cdot V_y' \cdot y_t' + f_z' \cdot z_p' \cdot p_t' + f_z' \cdot z_\phi' \cdot \phi_p' \cdot p_t'$$

$$+ f_z' \cdot z_{U^*}' \cdot \phi_{U^*}' \cdot U_t^{*'} + f_\sigma' \cdot \sigma_\omega' \cdot \omega_t' \qquad (2.19a)$$

Suppose $U_t^{*'} = 0$ (there is no change in the reference of utility, U^*) and $\phi_p' = 0$ (the homogeneity of degree zero in p), then Eq. 2.19a will be:

$$HC_t' = f_e' \cdot e_p' \cdot p_t' + f_e' \cdot e_V' \cdot V_p' \cdot p_t' + f_e' \cdot e_V' \cdot V_y' \cdot y_t' + f_z' \cdot z_p' \cdot p_t' + f_\sigma' \cdot \sigma_\omega' \cdot \omega_t' \qquad (19b)$$

Suppose $f_e' < 0$; $e_p' > 0$; $p_t' > 0$; $e_V' > 0$; $V_p' < 0$; $V_y' > 0$; $y_t' > 0$; $f_z' > 0$; $z_p' > 0$; $f_\sigma' > 0$; $\sigma_\omega' > 0$; $\omega' > 0_t$; If $\left|\left(f_e' \cdot e_p' \cdot p_t' + f_e' \cdot e_V' \cdot V_y' \cdot y_t'\right)\right|$ > $\left|\left(f_e' \cdot e_V' \cdot V_p' \cdot p' + f_z' \cdot z_p' \cdot p_t' + f_\sigma' \cdot \sigma_\omega' \cdot \omega'\right)\right|$, then the sign of change in poverty (HC) is negative. It means that the policy reforms or economic shocks benefit the poor. On the contrary, if $\left|\left(f_e' \cdot e_p' \cdot p_t' + f_e' \cdot e_V' \cdot V_y' \cdot y_t'\right)\right| < \left|\left(f_e' \cdot e_V' \cdot V_p' \cdot p' + f_z' \cdot z_p' \cdot p_t' + f_\sigma' \cdot \sigma_\omega' \cdot \omega'\right)\right|$, then the sign of change in poverty (HC) is positive meaning the policy reforms or economic shocks do not benefit the poor.

Eq.19b intuitively shows that the change in poverty responding to policy reforms or economic shocks depends on five components: 1) change in household expenditure as a result of a change in price, 2) change in household expenditure as a response to utility change due to a change in price, 3) change in household expenditure as a response to utility change due to a change in income, 4) change in poverty line as a response to a price change, 5) change in income distribution as a response to a change in endowment.

Eq.19b represents the poverty impact of policy reforms under the endogenous poverty line. The part of $f_z' \cdot z_p' \cdot p_t'$ in Eq.19b is the change of the poverty indicator contributed by the change in the poverty line. Deleting $f_z' \cdot z_p' \cdot p_t'$ in Eq.19b, then we have:

$$HC_t'^{fix} = f_e' \cdot e_p' \cdot p_t' + f_e' \cdot e_V' \cdot V_p' \cdot p' + f_e' \cdot e_V' \cdot V_y' \cdot y_t' + f_\sigma' \cdot \sigma_\omega' \cdot \omega_t' \qquad (2.20)$$

Eq. 2.20 represents the poverty impact of policy reforms under the fixed poverty line. There is no change in the poverty indictor contributed by the change in the poverty line. The different poverty outcome between applying the endogenous poverty line and the fixed poverty line can be calculated by deducting Eq. 2.20 from Eq. 2.19b. The different outcome is shown below:

$$HC_t' - HC_t'^{fix} = f_z' \cdot z_p' \cdot p_t' > 0 \qquad (2.21)$$

According to Eq. 2.21, if $p_t' > 0$, the poverty outcome under the endogenous poverty line will always be large than that of the fixed poverty line. However, if the policy reforms or economic shocks did not affect the price level, then the poverty outcome either under the endogenous poverty line or the fixed poverty line will be equal. Therefore, the proposition, that if the fixed poverty line is applied, the poverty impact of policy reforms which largely increase (decrease) the price level will always be underestimated (overestimated) can be mathematically proven. **QED**

2.5 An Empirical Investigation of an Endogenous Poverty Line and Its Implication to the Poverty Outcome of Policy Reforms[Ξ]

The empirical investigation of an endogenous poverty line should be done to strengthen the finding from the graphical analysis and the mathematical model as shown in the previous part. Four simulations are conducted to empirically show the different outcomes between applying the endogenous poverty line and the fixed poverty line. The simulations are done by applying the CGE-Micro Simulation Approach (CGE-MS) proposed by Dartanto, (2010b) and Dartanto and Usman (2011).

Simulation 1 (SIM_1) simulates a doubling of the imported soybean prices; Simulation 2 (SIM_2) simulates a 60 per cent decrease in the imported soybean prices; Simulation 3 (SIM_3) simulates a doubling of the soybean import tariffs; lastly, Simulation 4 (SIM_4) simulates a 20 per cent decrease in the import tariffs of soybeans. SIM_1 and SIM_2 can be viewed as simulations related with the external economic shocks, while SIM_3 and SIM_4 can be viewed as simulations related with the policy reforms. The simulations are done under the following closure rules: flexible government saving and fixed direct tax rate, flexible exchange rate and fixed foreign saving, fixed capital formation, labor fully employed and mobile between activities, capital fully employed and activity-specific, and fixed domestic producer price (price numeraire).

[Ξ] The part is drawn from the revised article resubmitted to the Singapore Economic Review entitled "The Application of an Endogenous Poverty line and Its Implication to the Poverty Impact of Economic Shocks: An Empirical Investigation".

Changes in the Price Level

Simulation 1, a doubling of the imported soybean prices, significantly raises the consumer price of soybeans in the domestic market by 50 per cent (Table 2.1). An increase in the domestic price of soybeans will directly lift up the price of other products such as livestock and fishery products which utilize soybeans as a production input. A 50 per cent increase in the consumer price of soybeans will be followed by a 1.3 per cent increase in the domestic price of livestock products. This increase is also followed by an increase in the prices of other agricultural products varying from 0.6 per cent to 1.8 per cent and a decrease in the prices of non-agricultural products varying from 0.03 per cent to 2.9 per cent. While Simulation 2, a 60 per cent decrease in the imported soybean prices, significantly decreases the domestic price of soybeans by 46 per cent. This will be followed by an increase in the prices of non-agricultural products ranging from 0.13 per cent to 0.86 per cent and a decrease in the prices of other agricultural products ranging from 0.37 per cent to 1.6 per cent.

Simulation 3, a doubling of the import tariffs, raises the domestic consumer price of soybeans by 7.6 per cent. Due to the income and substitution effect, the prices of agricultural products increase ranging from 0.1 per cent to 0.3 per cent and the prices of non-agricultural products decrease varying from 0.02 per cent to 0.6 per cent. Lastly, Simulation 4, a 20 per cent decrease in the import tariffs of soybeans, decreases both the consumer price of soybeans by 1.6 per cent and the consumer price of agricultural products ranging from 0.034 per cent to 0.065 per cent in the domestic market.

According to simulation results, it is observed that there is a similar pattern in price changes. An increase (decrease) in the consumer price of agricultural products would be followed by a decrease (increase) in the consumer price of non-agricultural products. This is because an increase in the price of agricultural products-mostly related to food consumptions, forces households to reallocate their budget from non-agricultural products to agricultural products. The budget reallocation would reduce the demand of non-agricultural products, pushing down its price.

Table 2.1 Change in Commodity Prices Resulting from CGE Simulations (in per cent)

No.	Commodity	SIM_1	SIM_2	SIM_3	SIM_4
1	Agricultural Food	1.800	-1.483	0.300	-0.065
2	Soybeans	50.000	-46.000	7.600	-1.600
3	Agricultural Non Food	1.600	-1.281	0.200	-0.059
4	Livestock	1.300	-1.076	0.200	-0.053
5	Forestry	1.800	-1.582	0.300	-0.064
6	Fishery	0.570	-0.369	0.100	-0.034
7	Oil, Gas, Metal Mining	-0.182	0.160	-0.099	0.013
8	Non Oil, Gas, and Metal Mining	-0.783	0.760	-0.100	0.017
9	Rice	-0.032	0.243	0.022	-0.014
10	Processed Food	-0.028	0.130	-0.024	-0.004
11	Textile Industries	-0.354	0.454	-0.060	0.004
12	Wood Industries	-0.246	0.353	-0.051	0.002
13	Machine and Metal Industries	-0.378	0.359	-0.093	0.011
14	Chemical Industries	-0.274	0.358	-0.085	0.010
15	Electricity, Water and Gas	-0.758	0.855	-0.071	0.005
16	Constructions	-0.470	0.557	-0.091	0.010
17	Trade	-2.900	-2.000	-0.600	0.400
18	Restaurant	0.040	0.144	0.036	-0.017
19	Hotel	-0.477	0.559	-0.088	0.010
20	Land Transportation	-0.670	0.657	-0.094	0.011
21	Water and Air Transportation, and Telecommunication	-0.558	0.555	-0.067	0.005
22	Warehousehing and Transp. Services	-0.464	0.556	-0.079	0.008
23	Banking and Insurances	-0.740	0.852	-0.042	-0.001
24	Real Estate	-0.564	0.656	-0.074	0.006
25	Government Services	-0.532	0.650	-0.035	-0.003
26	Individual Services	-0.650	0.754	-0.061	0.003

Source: CGE Simulations

Changes in the Poverty Line

Responding to the external shock of a doubling of the imported soybean prices, the composite price of food increases by 0.829 per cent while the composite price of non-food product decreases by 0.396 (Table 2.2). Table 2.2 shows, at the national level, the urban food poverty line should be raised by 0.597 per cent while the urban non-food poverty line should be decreased by 0.111 per cent. Hence, the poverty line should be corrected by 0.486 per cent in the urban area and by 0.571 per cent in the rural area. At the provincial level, the food poverty line in urban area increases varying from IDR 717.49 (Southeast Sulawesi) to IDR 1,406.87 (Riau Island) while the non-food poverty line decreases varying from IDR 29.58 (Bali) to IDR 335.25 (DKI Jakarta) (Table 2.3). In the rural area, the food poverty line should be corrected from IDR 561.28 (East Nusa Tenggara) to IDR 1,227.63 (Bangka Belitung) while the non-food poverty line should be decreased from IDR 86.78 (South Sulawesi) to IDR 146.56 (Riau) (Table 2.4).

Table 2.2 Change in the Composite Price, the Food and Non-Food Poverty Line

Description		A Share of FPL and NFPL	Change (in per cent)			
			SIM_1	SIM_2	SIM_3	SIM_4
Change in Composite Prices						
Food			0.829	-0.620	0.129	-0.035
Non-Food			-0.396	0.475	-0.053	0.002
Change in the Food and Non-Food Poverty Line						
Food Poverty Line (FPL)	Urban	0.720	0.597	-0.447	0.093	-0.025
	Rural	0.789	0.654	-0.489	0.101	-0.028
Non-Food Poverty Line (NFPL)	Urban	0.280	-0.111	0.133	-0.015	0.001
	Rural	0.211	-0.084	0.100	-0.011	0.000
Change in the Poverty Line						
The Urban Poverty Line			0.486	-0.314	0.078	-0.025
The Rural Poverty Line			0.571	-0.389	0.090	-0.027

Source: Author's calculation based on CGE results and the 2005 BPS Poverty Line

Simulation 2 changes the composite price of food and non-food by -0.620 per cent and 0.475 per cent respectively. A decrease in the composite food price lowers the food poverty line by 0.447 per cent (urban) and 0.489 per cent (rural). The non-food poverty line, however, should be increased by 0.133 per cent (urban) and 0.100 per cent (rural) as a consequence of increasing in the composite price of non-foods. Therefore, the poverty line should be corrected by -0.314 per cent in the urban area and -0.389 per cent in the rural area. At the provincial level, the money metric of the rural poverty line decreases varying from IDR 314.81 (East Nusa Tenggara) to IDR 772.30 (Bangka Belitung) (Table 2.4).

On the other hand, as a result of a doubling in the import tariffs of soybeans (SIM_3), the composite price of food and non-food should be adjusted by 0.129 per cent and -0.053 respectively. The food poverty line and the non-food poverty line in the urban area should be corrected by 0.093 per cent and -0.015 per cent correspondingly. These corrections raise the national poverty line by IDR 127.26 (urban) and IDR 99.02 (rural). At the provincial level, this doubling of the soybean import tariffs led to the increase in the rural poverty line ranging from IDR 75.27 (East Nusa Tenggara) to IDR 173.97 (Bangka Belitung) (Table 2.4).

On the contrary, Simulation 4, a 20 per cent decrease in the import tariffs of soybeans, does not significantly decrease the poverty line both in urban and rural area. This is due to little effect in changing prices. The urban poverty line and the rural poverty line should be corrected by -0.025 per cent and -0.027 correspondingly. This simulation benefits most urban households in Riau Island since they enjoy the largest decrease in the poverty line by IDR 58.08 (Table 2.3).

According to Table 2.2, 2.3 and 2.4, it is found that rural households would suffer most from both a doubling in the import price and import tariffs of soybeans since the rural poverty line increases larger than the urban poverty line. On the contrary, rural households would benefit most responding to both decreases in the import price and import tariffs of soybeans, The reason is that a share of foods to total consumption as well as a share of food poverty line to the poverty line in rural area is larger than that of in urban area. Other finding, there are wide ranges of correction in the poverty line. This is due to wide variations in consumption patterns among provinces in Indonesia.

Table 2.3 Change in the Urban Poverty Line after Adjustment in Prices (IDR/Capita/Month)

Province	Food Pov. Line	Change in the Food Poverty Line				Non-Food Pov. Line	Change in the Non-Food Poverty Line				Urban Pov. Line	Change in the Urban's Poverty Line			
		SIM_1	SIM_2	SIM_3	SIM_4		SIM_1	SIM_2	SIM_3	SIM_4		SIM_1	SIM_2	SIM_3	SIM_4
Nanggroe Aceh D.	156,363	1,297.01	-970.02	200.99	-54.67	39,519.09	-156.59	187.71	-20.95	0.78	195,882	1,140.42	-782.31	180.05	-53.89
North Sumatera	132,254	1,097.03	-820.46	170.00	-46.24	42,898.09	-169.98	203.76	-22.74	0.85	175,152	927.05	-616.70	147.26	-45.39
West Sumatera	129,139	1,071.19	-801.14	166.00	-45.15	46,591.12	-184.61	221.30	-24.70	0.92	175,730	886.58	-579.83	141.30	-44.23
Riau	144,347	1,197.34	-895.48	185.55	-50.47	52,544.51	-208.20	249.58	-27.85	1.04	196,892	989.14	-645.90	157.70	-49.43
Jambi	143,562	1,190.83	-890.61	184.54	-50.19	44,045.59	-174.53	209.21	-23.35	0.87	187,608	1,016.30	-681.40	161.19	-49.32
South Sumatera	127,492	1,057.53	-790.92	163.88	-44.57	45,191.72	-179.07	214.66	-23.96	0.89	172,684	878.46	-576.26	139.93	-43.68
Bengkulu	129,446	1,073.73	-803.04	166.39	-45.26	43,213.41	-171.23	205.26	-22.91	0.86	172,659	902.50	-597.78	143.49	-44.40
Lampung	116,793	968.78	-724.55	150.13	-40.83	48,115.83	-190.65	228.55	-25.51	0.95	164,909	778.13	-496.00	124.62	-39.88
Bangka Belitung	153,086	1,269.83	-949.70	196.78	-53.52	43,995.55	-174.33	208.97	-23.32	0.87	197,082	1,095.50	-740.72	173.46	-52.65
Riau Island	169,607	1,406.87	-1,052.18	218.02	-59.30	61,739.24	-244.64	293.26	-32.73	1.22	231,346	1,162.23	-758.93	185.29	-58.08
DKI Jakarta	153,128	1,270.18	-949.96	196.84	-53.54	84,606.61	-335.25	401.87	-44.85	1.68	237,735	934.93	-548.09	151.99	-51.86
West Java	104,878	869.95	-650.63	134.81	-36.67	46,356.55	-183.68	220.19	-24.57	0.92	151,235	686.27	-430.44	110.24	-35.75
Central Java	106,035	879.55	-657.81	136.30	-37.07	37,740.59	-149.54	179.26	-20.01	0.75	143,776	730.01	-478.54	116.30	-36.32
DI Yogyakarta	115,787	960.44	-718.31	148.84	-40.48	44,902.62	-177.92	213.28	-23.80	0.89	160,690	782.52	-505.02	125.03	-39.59
East Java	108,739	901.98	-674.58	139.78	-38.02	38,003.65	-150.59	180.51	-20.15	0.75	146,743	751.39	-494.07	119.63	-37.27
Banten	127,257	1,055.58	-789.46	163.58	-44.49	56,669.98	-224.55	269.18	-30.04	1.12	183,927	831.03	-520.28	133.54	-43.37
Bali	159,498	1,323.01	-989.47	205.02	-55.76	7,464.49	-29.58	35.46	-3.96	0.15	166,962	1,293.43	-954.01	201.07	-55.62
West Nusa Tenggara	102,283	848.43	-634.53	131.48	-35.76	32,204.63	-127.61	152.97	-17.07	0.64	134,488	720.82	-481.56	114.41	-35.12
East Nusa Tenggara	99,542	825.69	-617.53	127.95	-34.80	41,626.02	-164.94	197.72	-22.07	0.82	141,168	660.75	-419.81	105.89	-33.98
West Kalimantan	123,656	1,025.71	-767.12	158.95	-43.23	40,740.79	-161.43	193.51	-21.60	0.81	164,397	864.28	-573.61	137.36	-42.43
Central Kalimantan	120,221	997.22	-745.81	154.54	-42.03	41,009.83	-162.50	194.79	-21.74	0.81	161,231	834.72	-551.02	132.80	-41.22
South Kalimantan	123,839	1,027.23	-768.26	159.19	-43.30	39,725.97	-157.41	188.69	-21.06	0.79	163,565	869.82	-579.56	138.13	-42.51
East Kalimantan	155,217	1,287.50	-962.92	199.52	-54.27	58,160.89	-230.46	276.26	-30.83	1.15	213,378	1,057.05	-686.66	168.69	-53.12
North Sulawesi	108,301	898.35	-671.87	139.21	-37.86	42,119.64	-166.90	200.06	-22.33	0.83	150,421	731.45	-471.80	116.89	-37.03
Central Sulawesi	122,095	1,012.76	-757.43	156.94	-42.69	51,896.49	-205.64	246.50	-27.51	1.03	173,991	807.12	-510.93	129.43	-41.66
South Sulawesi	103,975	862.46	-645.03	133.65	-36.35	34,601.05	-137.10	164.35	-18.34	0.69	138,576	725.35	-480.67	115.31	-35.67
Southeast Sulawesi	86,498	717.49	-536.61	111.19	-30.24	35,568.91	-140.94	168.95	-18.86	0.70	122,067	576.55	-367.66	92.33	-29.54
Gorontalo	106,780	885.73	-662.43	137.26	-37.33	29,056.89	-115.14	138.02	-15.40	0.58	135,837	770.59	-524.41	121.86	-36.76
West Sulawesi	141,938	1,177.36	-880.54	182.45	-49.62	47,234.62	-187.16	224.36	-25.04	0.94	189,173	990.20	-656.18	157.41	-48.69
Maluku	124,714	1,034.48	-773.68	160.31	-43.60	49,711.13	-196.98	236.12	-26.35	0.98	174,425	837.51	-537.56	133.96	-42.62
Papua	152,906	1,268.33	-948.58	196.55	-53.46	40,401.16	-160.09	191.90	-21.42	0.80	193,307	1,108.25	-756.68	175.13	-52.66
National	**118,435**	**982.40**	**-734.73**	**152.24**	**-41.41**	**47,129.93**	**-186.75**	**223.86**	**-24.98**	**0.93**	**165,565**	**795.65**	**-510.87**	**127.26**	**-40.47**

Source: Author's calculation based on CGE results and the 2005 BPS Poverty Line

Table 2.4 Change in the Rural Poverty Line after Adjustment in Prices (IDR/Capita/Month)

Province	Food Pov. Line	Change in the Food Poverty Line				Non-Food Pov. Line	Change in the Non-Food Poverty Line				Rural Pov. Line	Change in the Rural's Poverty Line			
		SIM_1	SIM_2	SIM_3	SIM_4		SIM_1	SIM_2	SIM_3	SIM_4		SIM_1	SIM_2	SIM_3	SIM_4
Nanggroe Aceh D.	138,612	1,149.77	-859.90	178.18	-48.46	27,996	-110.93	132.98	-14.84	0.55	166,608	1,038.83	-726.92	163.34	-47.91
North Sumatera	94,196	781.35	-584.36	121.08	-32.93	23,382	-92.65	111.06	-12.39	0.46	117,578	688.70	-473.30	108.69	-32.47
West Sumatera	98,008	812.96	-608.01	125.98	-34.27	27,594	-109.34	131.07	-14.63	0.55	125,602	703.63	-476.94	111.36	-33.72
Riau	116,095	962.99	-720.21	149.23	-40.59	35,623	-141.15	169.21	-18.88	0.71	151,718	821.83	-551.01	130.35	-39.88
Jambi	97,628	809.81	-605.65	125.49	-34.13	24,557	-97.31	116.64	-13.02	0.49	122,185	712.50	-489.01	112.48	-33.65
South Sumatera	91,282	757.17	-566.28	117.34	-31.91	29,049	-115.10	137.98	-15.40	0.58	120,331	642.07	-428.31	101.94	-31.34
Bengkulu	84,970	704.81	-527.12	109.22	-29.71	25,305	-100.27	120.20	-13.41	0.50	110,275	604.54	-406.93	95.81	-29.21
Lampung	84,081	697.44	-521.61	108.08	-29.40	29,647	-117.47	140.82	-15.72	0.59	113,728	579.97	-380.79	92.36	-28.81
Bangka Belitung	147,999	1,227.63	-918.13	190.24	-51.74	30,702	-121.66	145.83	-16.28	0.61	178,701	1,105.97	-772.30	173.97	-51.14
Riau Island	119,718	993.04	-742.69	153.89	-41.86	36,735	-145.56	174.49	-19.47	0.73	156,453	847.48	-568.20	134.42	-41.13
DKI Jakarta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Java	83,588	693.36	-518.56	107.45	-29.22	30,376	-120.36	144.28	-16.10	0.60	113,964	572.99	-374.27	91.35	-28.62
Central Java	90,001	746.54	-558.34	115.69	-31.47	30,114	-119.33	143.04	-15.96	0.60	120,115	627.22	-415.30	99.73	-30.87
DI Yogyakarta	97,764	810.94	-606.49	125.67	-34.18	33,043	-130.93	156.95	-17.52	0.65	130,807	680.01	-449.54	108.15	-33.53
East Java	86,099	714.18	-534.13	110.68	-30.10	29,173	-115.60	138.57	-15.46	0.58	115,272	598.59	-395.56	95.21	-29.52
Banten	81,239	673.87	-503.98	104.43	-28.40	27,616	-109.43	131.17	-14.64	0.55	108,855	564.44	-372.81	89.79	-27.86
Bali	104,496	866.78	-648.26	134.32	-36.53	32,401	-128.39	153.90	-17.18	0.64	136,897	738.40	-494.36	117.15	-35.89
West Nusa Tenggara	86,167	714.75	-534.55	110.76	-30.13	23,236	-92.07	110.37	-12.32	0.46	109,403	622.68	-424.19	98.45	-29.67
East Nusa Tenggara	67,665	561.28	-419.77	86.98	-23.66	22,099	-87.56	104.97	-11.71	0.44	89,764	473.71	-314.81	75.27	-23.22
West Kalimantan	85,405	708.42	-529.82	109.78	-29.86	24,372	-96.57	115.76	-12.92	0.48	109,777	611.85	-414.06	96.86	-29.38
Central Kalimantan	101,675	843.38	-630.76	130.70	-35.55	24,305	-96.31	115.45	-12.88	0.48	125,980	747.07	-515.31	117.81	-35.07
South Kalimantan	85,187	706.62	-528.47	109.50	-29.78	22,268	-88.23	105.77	-11.80	0.44	107,455	618.38	-422.71	97.70	-29.34
East Kalimantan	125,741	1,043.00	-780.05	161.63	-43.96	36,169	-143.32	171.80	-19.17	0.72	161,910	899.68	-608.25	142.46	-43.25
North Sulawesi	92,442	766.79	-573.48	118.83	-32.32	26,233	-103.95	124.61	-13.91	0.52	118,675	662.84	-448.87	104.92	-31.80
Central Sulawesi	91,039	755.16	-564.78	117.02	-31.83	30,154	-119.48	143.23	-15.98	0.60	121,193	635.67	-421.55	101.04	-31.23
South Sulawesi	75,127	623.16	-466.06	96.57	-26.27	21,900	-86.78	104.02	-11.61	0.43	97,027	536.39	-362.04	84.96	-25.83
Southeast Sulawesi	83,170	689.88	-515.96	106.91	-29.08	24,732	-98.00	117.48	-13.11	0.49	107,902	591.88	-398.48	93.80	-28.59
Gorontalo	90,639	751.84	-562.29	116.51	-31.69	24,379	-96.60	115.80	-12.92	0.48	115,018	655.23	-446.49	103.59	-31.21
West Sulawesi	116,353	965.13	-721.81	149.56	-40.68	33,918	-134.40	161.11	-17.98	0.67	150,271	830.73	-560.70	131.58	-40.01
Maluku	97,611	809.67	-605.55	125.47	-34.13	25,325	-100.35	120.29	-13.42	0.50	122,936	709.32	-485.26	112.05	-33.63
Papua	116,634	967.46	-723.56	149.93	-40.78	28,976	-114.82	137.64	-15.36	0.57	145,610	852.64	-585.92	134.56	-40.20
National	**88,809**	**736.66**	**-550.94**	**114.16**	**-31.05**	**28,556**	**-113.15**	**135.64**	**-15.14**	**0.57**	**117,365**	**623.51**	**-415.31**	**99.02**	**-30.48**

Source: Author's calculation based on CGE results and the 2005 BPS Poverty Line. Note: - means no rural area in DKI Jakarta

The Poverty Outcome under the Different Poverty Lines

Table 2.5 and 2.6 calculated based on the microsimulation procedure clearly show the difference outcome of poverty measurements between applying the endogenous poverty line and the fixed poverty line. Table 2.5 shows changes in the headcount index while Table 2.6 shows changes in the poverty gap index. The general pattern of changes in both poverty measurements is similar.

The initial poverty incidence in 2005 was 16.4 per cent which is equivalent to 34,320,060. If the endogenous poverty line is applied, Simulation 1, a doubling of the imported soybean prices, significantly increases the headcount index (poverty rate) from 16.40 per cent to 16.88 per cent or equal to 0.483 percentage points. However, if the fixed poverty line is applied, the poverty rate increases by only 0.167 percentage points. It is found that there is 0.315 percentage point difference in the poverty outcome. This figure equals 660,138 people, a large number which cannot be easily neglected.

In the disaggregate level, under the fixed poverty line, this simulation is beneficial to the agricultural households either land holder or landless households. The headcount index of land holder agricultural households and landless agricultural households decreases by 0.001 and 0.089 respectively. This figure might be true if Indonesia is a soybean exporting country. However, according to Food and Agriculture Statistic (FAO), and Dartanto and Usman (2011), since 2000, the imported soybeans have played a crucial role in supplying the domestic demand of soybean products. On average, the imported soybeans contribute more than 60 per cent of the domestic consumption of soybeans. Therefore, it is doubtful that 100 per cent increase in the imported soybean prices benefits both land-holder and landless agricultural households.

Simulation 2, a 60 percent decrease in the imported soybean prices, decreases poverty by 0.281 percentage points under the endogenous line and 0.055 percentage point under the fixed poverty line. The 0.226 percentage point difference in outcome equals 472,862 people. Under the endogenous poverty line, the poverty index of all household categories significantly shrinks particularly for households working in the electricity, water, gas and construction sectors, while under the fixed poverty index, the poverty index of all household categories except landless agricultural households also decreases a little in value. The decrease in the imported soybean prices will reduce the factors income (wage rate) of agricultural labors which are mostly supplied by landless agricultural households. Thus, this group will suffer from the decreasing in the imported soybean price. However, it again might be true if Indonesia is an exporting country.

Simulation 3, a doubling of the soybean import tariffs, will increase the number of poor by 155,579 (0.074) under the endogenous poverty line and 41,314 (0.020) under the fixed poverty line. Supposing a fixed poverty line, this simulation seems beneficial to both landless agricultural households and land-holder agricultural households as shown by decreasing the poverty index of both groups. These results might provide biased policy guidance. This is because under the assumption of the fixed poverty line, a doubling in the import tariffs of soybeans does not significantly affect an increase in poverty. This seems beneficial to either land owner or landless agricultural households. Therefore, the government might choose to increase import tariffs as one of its poverty alleviation policies specifically intended to help agricultural households. However, if the endogenous poverty line is applied, the poverty outcome is totally different; then government might not choose to increase the import tariffs of soybeans due to suffering to the poor.

Table 2.5 Change in the Headcount Index: the Endogenous Poverty Line versus the Fixed Poverty Line

Sector	Population	Head Count Index 2005	Change in the Head Count Index (Percentage Point Change)							
			An Endogenous Poverty Line				A Fixed Poverty Line			
			SIM_1	SIM_2	SIM_3	SIM_4	SIM_1	SIM_2	SIM_3	SIM_4
Agriculture (with Land)	57,332,312	23.81	0.517	-0.272	0.061	-0.004	-0.001	0.064	-0.006	0.006
Agriculture (without Land)	20,448,294	25.73	0.358	-0.182	0.022	-0.039	-0.089	0.131	-0.043	0.000
Industry	19,916,155	11.25	0.574	-0.407	0.096	-0.021	0.312	-0.251	0.052	0.000
Electricity, Water, Gas and Constructions	14,312,875	17.66	0.744	-0.658	0.079	-0.120	0.546	-0.369	0.032	-0.024
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	0.371	-0.217	0.103	-0.019	0.161	-0.059	0.040	0.009
Banking, Financial Int., Government and Private Services	26,863,587	6.94	0.576	-0.258	0.077	-0.021	0.396	-0.164	0.031	0.000
Others	23,201,581	15.81	0.387	-0.206	0.071	0.000	0.199	-0.016	0.051	0.000
Total	**209,309,307**	**16.40**	**0.483**	**-0.281**	**0.074**	**-0.022**	**0.167**	**-0.055**	**0.020**	**0.002**
Number of Poor		**34,320,060**	**1,010,250**	**-587,702**	**155,579**	**-46,218**	**350,112**	**-114,840**	**41,314**	**4,158**

Source: Author's Calculation

Table 2.6 Change in the Poverty Gap Index: the Endogenous Poverty Line versus the Fixed Poverty Line

Sector	Population	Poverty Gap Index 2005	Change in the Poverty Gap Index (Percentage Point Change)							
			An Endogenous Poverty Line				A Fixed Poverty Line			
			SIM_1	SIM_2	SIM_3	SIM_4	SIM_1	SIM_2	SIM_3	SIM_4
Agriculture (with Land)	57,332,312	4.71	0.121	-0.059	0.020	-0.004	0.014	0.008	0.005	0.005
Agriculture (without Land)	20,448,294	5.52	0.070	-0.020	0.010	-0.010	-0.040	0.050	-0.010	0.000
Industry	19,916,155	2.10	0.120	-0.070	0.020	0.000	0.070	-0.040	0.010	0.000
Electricity, Water, Gas and Constructions	14,312,875	3.01	0.199	-0.139	0.030	-0.010	0.120	-0.090	0.020	0.000
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	2.01	0.089	-0.053	0.013	0.000	0.043	-0.023	0.010	0.000
Banking, Financial Int., Government and Private Services	26,863,587	1.36	0.106	-0.068	0.010	0.000	0.077	-0.049	0.010	0.000
Others	23,201,581	3.40	0.113	-0.063	0.020	-0.001	0.045	-0.023	0.010	0.009
Total	**209,309,307**	**3.24**	**0.111**	**-0.062**	**0.017**	**-0.003**	**0.039**	**-0.017**	**0.007**	**0.002**

Source: Author's Calculation

Dartanto and Usman (2011) found that the agricultural households would theoretically be better off, in the presence of high import tariffs and prices on soybeans, but in the fact these groups are worst off. The reasons are that Indonesia is not a net-exporting soybean country and most of low income groups particularly those living in rural area are highly depended on soybeans and soybeans based products such as *Tempe* and Tofu as a main source of protein.

One of most interesting findings from these simulations is that, as shown in Simulation 4, the magnitude of poverty impact of a 20 per cent decrease in the import tariffs of soybeans depends on the applied poverty line. Under the fixed poverty line, this policy will increase the poverty index by 0.002 percentage points (4,158 people), while, under the endogenous poverty line this policy will reduce the poverty index by 0.022 percentage point (46,218). These results might confuse policy makers because which of the results reflects the real condition. However, this study believes that since the imported soybeans contribute more than half of the domestic consumption, decreasing the import tariffs of soybeans will advantage the poor rather than hurt them.

2.6 Concluding Remarks

There are two main issues that should be identified firstly in analyzing the poverty impacts of fiscal policies: first, the five-W (what, who, where, when and why) questions in poverty. What is the measurement used to calculate the poverty? There are many definitions on the poverty however this study utilizes the poverty measurement based on the expenditure approach. The next W-question is who the poor is. Where is the poor located? When does the poor condition happen? Lastly, why does the poverty occur? Well understanding on these questions is important in proposing and implementing appropriate policies in alleviating and protecting the poor.

The second issue is how fiscal policy influencing poverty. Fiscal policies frequently have a large impact on household welfare (poverty) through changing both the price level and factors' income. Changing price and income level resulted from fiscal policies will influence poverty through five channels: 1) change in expenditure as a result of a change in price, 2) change in expenditure as a response to utility change due to a change in price, 3) change in expenditure as a response to utility change due to a change in income, 4) change in poverty line as a response to a price change, 5) change in income distribution as a response to a change in endowment. Channel 1, 2 and 3 are a basis of microsimulation while Channel 4 is a basis of an endogenous poverty line.

Applying the microeconomic theory of consumer behavior and the properties of poverty function, this study has theoretically proven that, under the fixed poverty line, the poverty impact of policy reforms which significantly increase (decrease) price will always be underestimated (overestimated). Further, applying the CGE-Micro Simulation Approach (CGE-MS), this study empirically shows that there is 0.315 percentage point (660,138 people) difference of outcome between applying the endogenous poverty line and the fixed poverty line. Under the fixed poverty line, a doubling of the imported soybean prices changes the poverty incidence by 0.167 percentage points. Hence, due to a small impact on poverty, the government might not take an action responding to an increase in the world price of soybeans. However, if the endogenous poverty line is applied, the poverty incidence will change by 0.483 percentage points. Then, the government might actively intervene to stabilize the domestic price of soybean in order to reduce the negative effect of increasing the world soybean prices. These results might provide biased policy guidance and call a different policy implication.

Chapter 3

Research Methodology: A CGE-Microsimulation Analysis

3.1 A CGE-Microsimulation

In recent years, a number of papers have presented different approaches using CGE models to analyze poverty and income distribution. Savard (2003) has classified previous works into three main categories and he also proposed one new category. Therefore, the CGE model widely used to analyze poverty can be classified into four categories. Table 3.1 summarizes the advantageous of these four approaches.

CGE Model with Representative Household (CGE-RH), this approach is the traditional method which has been widely applied in addressing an impact of policy on income distribution. The poverty analysis is performed by using the variation of income of the RH generated by CGE model with household survey data to perform ex-ante poverty comparison. Although this approach is easier to use because it does not require specific modeling effort, it cannot capture intra-group income distribution change. Many researchers used this approach such as Dervis et al. (1982), Colatei and Round (2001), Agenor et al. (2001), Damuri and Perdana (2003) and Oktaviani et al. (2005).

Integrated Multi-Households CGE Analysis (CGE-IMH): this approach consists of multiplying the number of representative household compared to the CGE-RH approach. Since computing efficiency, it is quite simple to add as many households in CGE model and it is also easily to solve a large model. The main advantages of this approach, compared to previous approach, are that they allow for intra-group income distributional change as well as leaving the modeler free from pre-selecting housing grouping or aggregation. The main disadvantage of this approach is the limit it imposes in terms of microeconomic household behavior. As a matter of fact, the size of model can quickly become a constraint, and data reconciliation can be relatively difficult. Cogneu and Robilliard (2000), Cockburn (2001), Cororatan and Chockburn (2001), Decaluwe et al. (2005), Warr (2005) and Warr (2009) applied this method.

CGE-Microsimulation Approach (CGE-MS): this approach uses a CGE model to generate prices that link in to a micro-econometric household micro-simulation model. The main advantage of this approach is that it provides richness in household behavior, while remaining extremely flexible in term of specific behaviors which can be modeled. The main drawbacks to the approach are that coherence between the macro and micro models is not always guaranteed, and the fact that the feedback effects of household behavior are not taken into account in the CGE/Macro model. Chen and Ravallion (2003; 2004), Ikhsan et al. (2005a), Boccafunso and Savard (2006), Dartanto (2009; 2010b), Dartanto and Usman (2011) utilized this approach addressing many issues related to poverty analysis.

CGE-Household Microsimulation (CGE-HHS), this approach, pioneered by Savard (2003), attempts to use the advantages of CGE-IMG and CGE-MS method. He proposed to examine coherence between the household model and the CGE model, introducing a bi-directional link and, therefore, obtaining a converging solution between the two models. The basic idea of the approach is to use the CGE model to generate a price vector (including wage rates) and a household micro-simulation (HHMS) model, to calculate the household behaviors (consumption and labor supply). The value added of this approach comes from the fact that feedback effects, provided by the household model, which are back in the CGE to insure coherence between the two models. The CGE-HHS approach provides richer information than the standard CGE-RH approach, more flexibility (larger number of households and use of more flexible functional forms) than the CGE-IMH approach, and more global coherence than the unidirectional CGE-MS approach.

Table 3.1 Comparative Advantages of the Four Approaches

	Simplicity in application	Intra-group variation	Richness in behaviour	Macro coherence	# of house-holds used	Structural richness
CGE-RH	***	*	*	***	*	***
CGE-IMH	**	**	*	***	**	**
CGE-MS	*	***	***	*	***	***
CGE-HHS	**	***	**	**	***	***

*** High

** Medium

* Low

Source: Savard, 2003

3.2 The Flow of Methodology

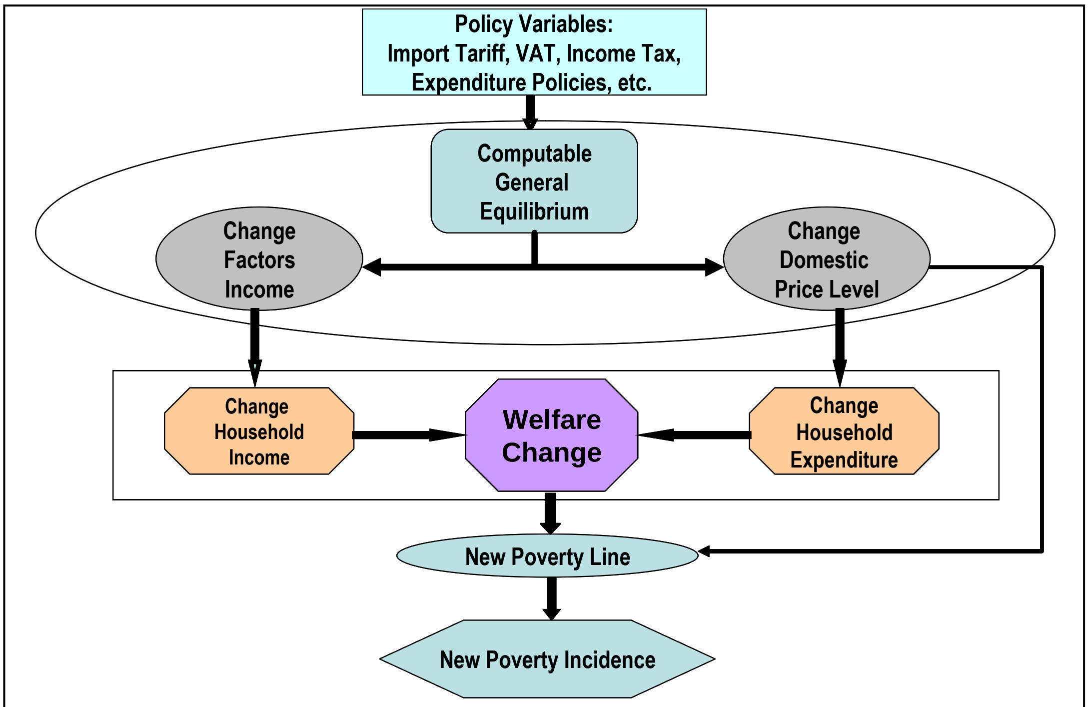
The main methodology used in this study is the CGE-Micro Simulation Approach (CGE-MS henceforth). CGE-MS is utilized in Chapter 4, Chapter 5 and Chapter 6. The general idea of the CGE-MS approach is that a CGE model feeds market and factor price changes into a microsimulation household model. Ravallion and Chen (2004) used this methodology and built micro simulations on economic assumptions that are consistent with the CGE model notably that households take prices as given and those prices clear all markets — they also do not attempt to assure full consistency between the micro-analysis and the CGE model's predictions. The Ravallion and Chen's model will be adjusted to be fit with the data of Indonesia.

The main advantage of this approach is that it provides richness in household behavior, while remaining extremely flexible in terms of specific behaviors which can be modeled. However, the main drawback of this approach is that the micro-feedback effects are not necessarily taken into account. In the CGE-MS approach the income and expenditure of household do not need to be balanced (Boccafunso and Savard, 2006).

There are five steps in calculating the impact of fiscal policies on poverty (Figure 3.1): *First*, calculate the initial condition of poverty which uses the 2005 SUSENAS data (National

Socio-Economic Survey), covering 64,407 households, published by the Central Statistic Bureau of Indonesia *(Badan Pusat Statistik (BPS))*[4]. *Second*, using the CGE model, simulate the price (factor income) impact of fiscal policies change, for example by decreasing import tariffs, reducing the tax rate, cutting subsidies and infrastructure investments.

Figure 3.1 The Flow Chart of Methodology



Source: Author

Third, data on increases in prices (including factors income) obtained from a CGE model is entered into SUSENAS data set to calculate the impact of fiscal policy on household welfare. This step is known as a microsimulation procedure. *Fourth*, adjust the poverty line using the price changes obtained from a CGE where the poverty line becomes endogenous. The increasing commodity price would also increase the money metric of obtaining 2,100 calories; therefore, the poverty line will change following a variation in relative prices (Dartanto, 2011b; Decaluwe, Savard and Thorbecke, 2005). *Fifth*, recalculate the poverty

[4] This sample has to be weighted by population weights in SUSENAS to obtain the national population. Each sample has its own weighted value.

incidence using the data from the step three and four and then comparing with the initial poverty incidence.

3.3 A Standard Computable General Equilibrium Model (CGE Model)

The Computable General Equilibrium (CGE) models are a class of economic model that use actual economic data to estimate how an economy might react to changes in policy, technology or other external factors. According to Hoseo et al. (2004), the CGE analyses usually take the four following steps: *first,* construction of data base; *second,* model estimation (calibration) by utilizing information from SAM database; *third,* solving the model for the reference run; *fourth,* solving the model with counter factual scenarios to identify changes from the base run and comparing these two equilibriums to know the policy impact quantitatively as well as qualitatively.

Basically, a Standard CGE Model requires data set and set of simultaneous equation. The data set is used to define model parameter values in a manner that assures that the base solution to the model exactly reproduces the value in SAM. The model is ‘’calibrated’’ to the SAM. One of the merits of the CGE models is that necessary data for model estimation are input-output/social accounting matrix tables for only a single year. The other data used in the CGE model is the data of elasticities including household expenditure elasticity, Armington elasticity, elasticity substitution between factor production, and elasticity between intermediate input and factor production.

3.3.1 Construction of Database (Social Accounting Matrix)

A social Accounting Matrix (SAM) is a comprehensive, economy wide data framework, typically representing a single year static picture of the economy. Each cell shows the payment form account of its column to the account of its row-the incomes of an account appear along its row, its expenditures along its column. For each account in the SAM, total revenue (row total) equals total expenditure (column total).

Table 3.2 shows the flows of payment in SAM. *The activity accounts* pay to value of intermediate consumption paid to commodity accounts, to value of factor cost (wages and rents) and taxes on value added paid to institutions, while they receipt payment from sales paid by the commodity account. *The commodity accounts* receipt a payment from intermediate consumption sales, household and government consumptions, export sales and investment demands. They pay to value of sales to sector accounts, taxes on goods and the value of import.

The household revenue comes from wage, returns to capital and transfer paid by other institution while the Household expenditure is on consumption, tax, transfer, and saving. *The firm account* receipts revenues from return to capital and transfer, and spends on payments of dividends to shareholding institution and income tax. Firm saving is paid to the saving account-investment account. *The government account* collects revenue from direct tax/income tax, indirect taxes such as import tariff, export tax, value added tax, sales tax and receives transfer. The government revenues are used to fund the government consumptions, transfers to other institution, subsidies, and savings paid to the saving investment account.

Since the domestic economy relates with other countries' economy through international trade, *Rest of the World account (ROW)* is an important part in the SAM. ROW receipts value of imports and transfers paid to domestic institutions such as remittances, factors income from foreign countries, foreign savings, and debts. ROW spends on payments of the value of exports, transfers to other institutions such as remittances, surplus, repayments of foreign debts, and capital outflow. *Saving-Investment account* collects household savings, firm savings, government savings, and foreign savings and invests on commodity account.

Table 3.2 A Basic SAM structure used in A CGE Model

Receipts	Expenditures								
	Activities	**Commodities**	**Factors**	**Households**	**Enterprise**	**Government**	**Savings-Investment**	**Rest of the World**	**Total**
Activities		Marketed Outputs							Activity Income
Commodities	Intermediate Input	Transaction Costs		Private Consumption		Government Consumption	Investment	Exports	Final Demand
Factors	Value Added							Factor Income from ROW	Factor Income
Households			Factor Income to Households	Inter-Household Transfers	Surplus to Households	Transfer to Households		Transfer to Households from ROW	Household Income
Enterprise			Factor Income to Enterprise			Transfer to Enterprise		Transfer to Enterprise from ROW	Enterprise Income
Government	Producer Taxes, Value-Added Tax	Sales Taxes, Tariffs, Export Taxes	Factor Income to Government Factor Taxes	Transfers to Government, Direct Household Taxes	Surplus to Government Direct Enterprise Taxes			Transfer to Government from ROW	Government Income
Savings-Investment				Household Savings	Enterprise Savings	Government Savings		Foreign Savings	Savings
Rest of the World		Imports	Factor Income to ROW		Surplus to ROW	Government Transfers to ROW			Foreign Exchange Outflow
Total	Activity Expenditures	Supply	Factor Expenditures	Household Expenditures	Enterprise Expenditures	Government Expenditures	Investment	Foreign Exchange Inflow	

Sources: Lofgren, Harris and Robinson, 2001

3.3.2 Overview of the Standard CGE Model (Lofgren, Harris and Robinson, 2001)

The CGE model follows the neoclassical-structuralist modeling tradition that is presented in Dervis et al. (1982). The model explains all the payments that are recorded in the SAM which means the model follows the SAM disaggregation of factors, activities, commodities, and institutions. The equations define the behavior of the different actors and also include a set of constraints that have to be satisfied by the system as a whole but which are not necessarily considered by any individual actor.

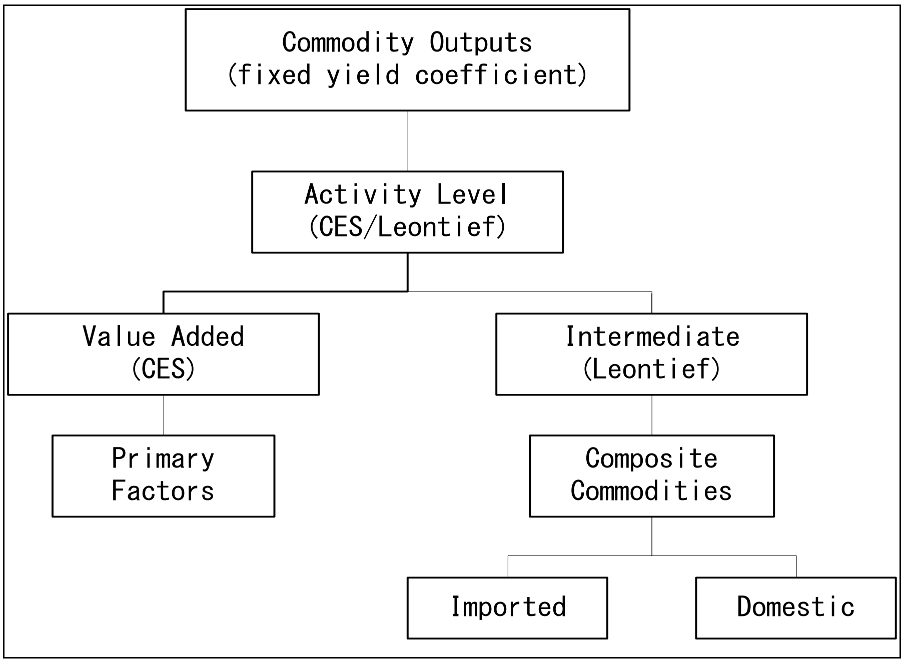
Activities, Production and Factor Markets

Each producer (represented by an activity) is assumed to maximize profits, defined as the difference between revenue earned and the cost of factors and intermediate inputs. Profits are maximized subject to a production technology, the structure of which is shown in Figure 3.2. At the top level, the technology is specified by a constant elasticity of substitution (CES) function or, alternatively, a Leontief function of the quantities of value-added and aggregate intermediate input. Each activity uses a set of factors up to the point where the marginal revenue product of each factor is equal to its wage/rent. An economy-wide wage variable is free to vary to assure that the sum of demands from all activities equals the quantity supplied. Factor wages may differ across activities, not only when the market is segmented but also for mobile factors.

Institutions

In the CGE model, institutions are represented by households, enterprise, government, and rest of the world. The households (disaggregated as in the SAM) receive income from the factors of production (directly or indirectly via the enterprises) and transfers from other institutions. Transfers from the rest of the world to households are fixed in foreign currency (based on a fact). The households use their income to pay direct taxes, save, consume, and make transfers to other institutions. In the basic model version, direct taxes and transfers to other domestic institutions are defined as fixed shares of household income whereas the savings share is flexible for selected households.

Figure 3.2 Production Technology



Sources: Lofgren, Harris and Robinson, 2001

Household consumption covers marketed commodities, purchased at market prices that include commodity taxes and transaction costs, and home commodities, which are valued at activity-specific producer prices. Household consumption is allocated across different commodities (both market and home commodities) according to linear expenditure system (LES) demand functions.

Factor incomes may be paid to enterprise. Enterprise may also receive transfers from other institutions. Enterprise incomes are allocated to direct taxes, savings, and transfers to other institutions. The government collects taxes and receives transfers from other institutions.

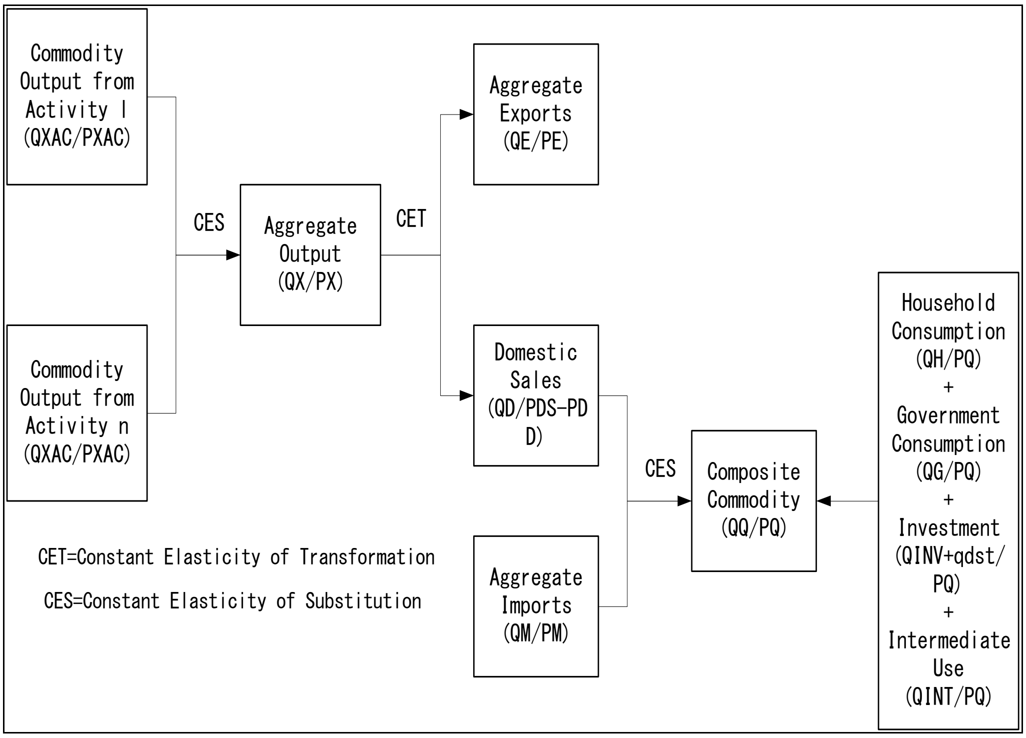
In the basic model version, all taxes are at fixed *ad-valorem* rates. The government uses this income to purchase commodities for its consumption and for transfers to other institutions. Government consumption is fixed in real (quantity) terms whereas government transfers to domestic institutions (households and enterprises) are CPI-indexed. Government savings (the difference between government income and spending) is a flexible residual. The final institution is the rest of the world. As noted, transfer payments between the rest of the world and domestic institutions and factors are all fixed in foreign currency. Foreign savings (or the current account deficit) is the difference between foreign currency spending and receipts.

Commodity Markets

With the exception of home-consumed output, all commodities (domestic output and imports) enter markets. Figure 3.3 shows the physical flows for marketed commodities along with the associated quantity and price variables as defined in the model equations discussed in the following section. Domestic output may be sold in the market or consumed at home. The demand for the output of each activity is derived from the problem of minimizing the cost of supplying a given quantity of aggregated output subject to this CES function.

At the next stage, aggregated domestic output is allocated between exports and domestic sales on the assumption that suppliers maximize sales revenue for any given aggregate output level, subject to imperfect transformability between exports and domestic sales, expressed by a constant elasticity of transformation (CET) function. In the international markets, export demands are infinitely elastic at given world prices. The price received by domestic suppliers for exports is expressed in domestic currency and adjusted for the transaction costs (to the border) and export taxes (if any). The supply price for domestic sales is equal to the price paid by domestic demanders minus the transaction costs of domestic marketing (from the supplier to the demander) per unit of domestic sales.

Figure 3.3 Flows of Marketed Commodities



Source: Lofgren, Harris and Robinson, 2001

Domestic demand is made up of the sum of demands for household consumption, government consumption, investment (the determination of which is discussed below), intermediate inputs, and transactions (trade and transportation) inputs. To the extent that a commodity is imported, all domestic market demands are for a composite commodity made up of imports and domestic output, the demands for which are derived on the assumption that domestic demanders minimize cost subject to imperfect substitutability.

Mathematical Model Statement of CGE

The mathematical model statement is presented equation by equation in the CGE model. In its mathematical form, the model system is a system of simultaneous, non-linear equations. The model is the square-number of equations is equal to the number of variables in order to the system of equation can be solved. The equations of this CGE model are divided into four blocks: prices, production and trade, institution and system constraints (for detailed derivation see Lofgren, Harris and Robinson, 2001).

However, this CGE model is not square due to containing 48 equations and 43 endogenous variables (Lofgren, Harris and Robinson, 2001). In this system, the number of endogenous variables exceeds that of equations by five. The system is ‘’over-identified”; however it can be solved in different ways and it depends on the school of taught (Rattso, 1982). A treatment of this problem is known as ‘’closure rule’’. The system needs five closure rules for balancing between equations and variables. The closure rules which could be chosen are government savings, foreign savings, saving-investment, factor markets and price numeraire. The choices made have no influence on the solution to the base simulation but will typically influence the results for other simulations. The closure rule will be explained in the next part.

Macroeconomic Closure Rules

According to Robinson and Lofgren (2005), the real CGE model must include three standard macro balances such foreign trade and the current account balance, the Saving-Investment balance and the government balance (Table 3.3). The applied model assumes that the current account balance is exogenous and the resulting flow of funds is given to the saving-investment account. For the savings-investment (S-I) account, a simple mechanism for ensuring balance is to specify fixed savings rates for households and scale investment demand so that investment spending equals the value of savings. This is referred to as a savings-driven ‘neoclassical’ S-I closure. In the alternative ‘Johansen’ closure, investment demand is fixed while savings rates are adjusted endogenously.

Table 3.3 Alternative Closure Rules for Macro-System Constraints

Constraint		
Government	**Rest of the World**	**Savings–Investment**
GOV-1: Flexible government savings; fixed direct tax rates	ROW-1: Fixed foreign savings; flexible real exchange rate	SI-1: Fixed capital formation; uniform MPS point change for selected institutions
GOV-2: Fixed government savings; uniform direct tax rate point change for selected institutions	ROW-2: Flexible foreign savings; fixed real exchange rate	SI-2: Fixed capital formation; scaled MPS for selected institutions
GOV-3: Fixed government savings; scaled direct tax rates for selected institutions		SI-3: Flexible capital formation; fixed MPS for all non government institutions
		SI-4: Fixed investment and government consumption absorption shares (flexible quantities); uniform MPS point change for selected institutions
		SI-5: Fixed investment and government consumption absorption shares (flexible quantities); scaled MPS for selected institutions

Notes: For the specified closure rules, the choice for one of the three constraints does not constrain the choice for the other two. MPS is marginal propensity to save.

Source: Lofgren, Harris and Robinson, 2001

A common specification of government balance is that government expenditure, both consumption and transfers, is fixed in real terms; government revenue is determined by fixed tax rates; and government savings (the current surplus of the government) is determined residually as the gap between revenue and expenditure. Under an alternative closure rule, government savings may be fixed at some level that is achieved via endogenous adjustment of tax rates, in effect transferring any shock affecting the government budget to taxpayers.

Since this analysis is a single-period model, a closure combining fixed foreign savings (ROW-1), fixed real investment (SI-1), and fixed real government consumption/flexible government saving (GOV-1) is preferable for simulations that explore the equilibrium welfare changes of alternative policies (Robinson and Lofgren, 2005).

Other Closure Rules

The user can choose between alternative factor markets which are the mechanism for equilibrating supplies and demands in factor markets. According to the default closure, the quantity supplied of each factors is fixed at the observed level. An economy-wide wage variable is free to vary assure that the sum of demands from all activities equal the quantity supplied. Alternative closure, factor is unemployed and the real wage is fixed. This alternative might be appropriate in settings where there is considerable unemployment for a given labor category.

In the last alternative closure, the factor market is segmented and each activity is forced to hire the observed, base-year quantity-the factor is activity specific. This closure may be preferred in short run analysis. Factor market’s closures are that labor is fully employed and mobile between activities. Capital is fully employed and activity-specific. According to this closure, the quantity supplied each factor fixed at the observed level. An economy-wide wage variable is free to vary to assure that the sum of demands from all activities equal the quantity supplied.

3.4 A CGE Modeling in GAMS

This CGE model is run in GAMS (The General Algebraic Modeling System) package. This research basically follows the IFRI CGE model which has already been written in GAMS[5,6]. The IFRI model is extended and adjusted to be fit with the Indonesian data. The

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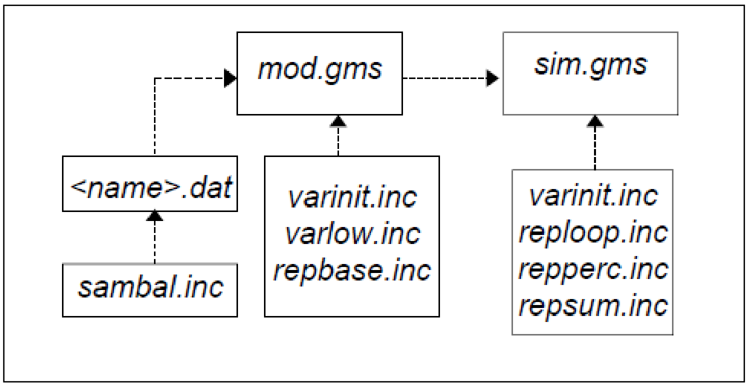
[5] This file is the core model file for the IFPRI/TMD Standard CGE Model, documented in: Lofgren, Hans, Rebecca Lee Harris, and Sherman Robinson, with the assistance of Moataz El-Said and Marcelle Thomas. 2002. A Standard Computable General Equilibrium (CGE) Model in GAMS. Microcomputers in Policy Research, Vol. 5. Washington, D.C.: IFPRI.

[6] This program is free software; you can redistribute it and/or modify it under the terms of the GNU

file structure in GAMS standard CGE modeling system is shown in Figure 3.4. The modeling system is segmented into two main files, *mod.gms* and *sim.gms*. In the first main files, the *mod.gms* includes all items (sets, parameters, variables, model equations) that appear in the standard CGE model. The model is set up and calibrated to an Indonesia data set *(<name>.dat)* which consists of set elements, the SAM of Indonesia and elasticities. The *sambal.inc* is a simple program for balancing the SAM if its account imbalances exceed a cut-off point. The file *varinit.inc* as same as to file *repbase.inc* is used to initialize all variables at base levels. In the optional file *varlow.inc,* lower limits close to zero are imposed for selected variables as this may improve a solver performance.

Figure 3.4 Structures of GAMS Model and Data Files



Sources: Lofgren, Robinson and Thierfelder, 2002

In the second main files, *sim.gms* which restarts from the save files of *mod.gms,* simulation are defined and carried out. The file *sim.gms* includes declarations and definitions of: sets for simulations, experiment parameters, closures for macro system constraints, closures for market factors, and sets for report. In addition, this file also consists of additional processing of report parameter. The file *reploop.inc* defines report parameters and the file

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repperc.inc computes a percentage change from base and non-base simulations. The last file *repsum.inc* summarizes tables based on report parameters defined in *reploop.inc* and *repperc.inc.*

3.5 A Microsimulation Model

The microsimulation procedure basically translates how price (factors income) changes resulted from the CGE can influence the household's welfare. This research modified Ravallion and Chen's (2003; 2004) work[7] to calculate the monetary value of household's welfare changes responding to the changes in prices and factors income. The increasing price would reduce the household's ability to afford the initial bundle of consumption while the increasing of factors income would increase the household's income. The formula for household welfare change is shown below:

$$\Delta W_i = -\sum_{j=1}^{m} p_j (q_{ij} - s_{ij}) \frac{dp_j}{p_j} + \sum_{k=1}^{n} \left(w_k L_{ik} \frac{dw_k}{w_k} \right) + \sum_{l=1}^{1} \left(r_l K_{il} \frac{dr_l}{r_l} \right) \qquad (3.1)$$

Where, ΔW_i is the welfare change of household-i, i: 1,2,3,…, 64,407; q_{ij} is the quantity of product-j consumed by household-i, j=1,2,3,…,26; product-*j* refers to classification in the CGE model; s_{ij} is the quantity of product-*j* provided/supplied by household-*i*; $(q_{ij} - s_{ij})$ is the net consumption of product-*j* which must be bought by household-*i.* According to SUSENAS data set, the value of household consumption is always larger than or equal to the value of household production $(q_{ij} \geq s_{ij})$; p_j is the price of product-*j*; dp_j is price change of product-*j*; L_{ik} is the labor supply of household-*i* in sector-*k*; sector-*k* refers to a labor category in the CGE model; w_k is wage in sector-*k*; dw_k is the wage change in sector-*k*; K_{il} is the

[7] This formula is derived from the maximizing behavior of both consumer and producer. They utilize the envelope theorem to create this formula (see Chen and Ravallion, 2003 and 2004).

non-labor endowment of household-*i*; r_l is the rate of return; and dr_l is the change in the rate of return.

The change of household welfare is the sum of the change in household expenditure and household income. The negative sign in the first part of the formula indicates that increasing prices will increase a money metric of household expenditure, and consequently lower household welfare. Conversely, the positive signs of the last two parts of the formula indicate that increasing wages and the non-labor rate of return will increase household income, and thus increase household welfare. This study assumes that the consumption pattern of households do not change following the price change. This assumption might be unrealistic in the long run. However, due to the lack of information about the elasticity of substitution and also to simplify the model, this study is forced to assume “no change in the consumption pattern” to calculate the household welfare change.

The model also assumes that the change of household welfare will directly influence household consumption (expenditure) and there is no saving activity, i.e. households are not allowed to save the net welfare. The new expenditure function is shown as below:

$$E_i((p_{0j} + dp_j),(y_{0i} + \Delta W_i)) = E_{0i}(p_{0j}, y_{0i}) + \Delta W_i \tag{3.2}$$

$E_i((p_{0j} + dp_j),(y_{0i} + \Delta W_i))$ is household-*i*’s expenditure after the simulations in fiscal policies and economic shocks; $E_{0i}(p_{0j}, y_{0i})$ is the initial household-*i*’s expenditure; p_{0j} is the initial vector price and y_{0i} is the initial endowment/income of household-i. $E_i((p_{0j} + dp_j),(y_{0i} + \Delta W_i))$ is used to calculate the new poverty incidence.

3.6 The Poverty Line Adjustment and the Poverty Calculation

3.6.1 The Poverty Line Adjustment

BPS (The Central Statistic Agency of Indonesia) used 2,100 calories/capita/day resulted from 52 commodities to calculate the food poverty line. The food poverty line is heterogeneous among regions due to the differences in food price and food consumption pattern among regions. To obtain the poverty line, it must be added with non-food expenditures such as health, education, transportation etc. By 2005, the monthly monetary value of the national poverty line was IDR 117,259 (USD 11.7) in rural and IDR 150,799 (USD 15) in urban. BPS is updating the poverty line for each province every year. The 2005 poverty line is shown in Appendix 3.1.

The increasing commodity price would also increase the money metric of obtaining 2,100 calories and, therefore, the poverty line will change following a variation in relative prices (Dartanto, 2011b; Decaluwe, Savard and Thorbecke, 2005). Hence, the initial food poverty line should be adjusted with the price change of food products as proportional to the share of those products in the poverty line and also be adjusted with the price change of non-food products. This study assumes that the composition of commodities in the poverty line does not change following the change in prices. This assumption follows the fact that the commodities in the poverty line are basic need products that are price inelastic. This study also found that the composition and quantity of commodities in the poverty line does not much change in SUSENAS 2002, 2005 and 2008. The endogenous poverty line can theoretically be calculated as below:

$$z = \sum_{j=1}^{n} p_j \bar{\phi}_j \left(1 + \frac{dp_j}{p_j}\right) + \sum_{k=1}^{m} p_k \bar{\phi}_k \left(1 + \frac{dp_k}{p_k}\right) \qquad (3.3)$$

Where, z is the poverty line; $\sum_{j=1}^{n} p_j \bar{\phi}_j$ is the food poverty line; $\sum_{k=1}^{m} p_k \bar{\phi}_k$ is the non-food poverty line; p_j is the food price-*j*, *j=1,…,n*; $\bar{\phi}_j$ is the minimum consumption of food product-*j*; dp_j is the change in food price-*j, j=1,…,n*; p_k is the non-food price-*k*, *k=1,…,m;* $\bar{\phi}_k$ is the minimum consumption of non-food product-*k*, *k=1,..,m;* dp_k is the change in non-food price-*k, k=1,…,m*; However, the Central Statistic Agency (BPS) only annually published the aggregate value of the food poverty line (FPL) and the non-food poverty line (NFPL) for each province at rural and urban levels, therefore, Eq.3.3 is modified as below:

$$z_{pr} = PL_{pr} = FPL_{0pr}\left(1+\frac{\Delta FP_{pr}}{FP_{0pr}}\right) + NFPL_{0pr}\left(1+\frac{\Delta NFP_{pr}}{NFP_{0pr}}\right) \tag{3.4}$$

Where, $z_{pr} = PL_{pr}$ is the poverty line in province-*p, p=1,…,31,* at region-*r*, *r=urban and rural*; FPL_{0pr} is the initial food poverty line in province-*p* at region-*r*; ΔFP_{pr} is the change in composite food price in province-*p* at region-*r*; FP_{0pr} is the initial composite food price in province-*p* at region-*r*; $NFPL_{0r}$ is the initial non-food poverty line in province-*p* at region-*r*; ΔNFP_{pr} is the change in composite non-food price in province-*p* at region-*r*; NFP_{0pr} is the initial composite non-food price in province-*p* at region-*r*. The price changes for either food or non-food price are the same over all regions. This is because the CGE model can only produce price and factor income changes at a national level. The composite prices of either food or non-food are calculated based on the composition of consumption in the Social Accounting Matrix and in the SUSENAS dataset.

3.6.2 The Poverty Calculation

The FGT (Foster, Greer, and Thorbecke, 1984) `class of poverty measures is as follows:

$$\pi_{\alpha} = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right)^{\alpha} \tag{3.5}$$

π_{α} : poverty index,

n : number of population

i : individual i

z : poverty line (equal to PL)

y_i : income/expenditure of individual i (equal to expenditure $E_i(P_i, U_{0i})$)

q : number of individual below or at the poverty line

α : parameter for the FGT class.

When α is zero, the poverty measure is the headcount index, HC, which represents the percentage of the population below the poverty line. The poverty-gap index, PG, which measures the depth of poverty, is calculated by setting α to 1: where μ_q is the average income of the population living under the poverty line. The intuition behind the poverty gap index is to measure the average relative distance of the poor from the poverty line. If most individuals are clustered around the poverty line, the poverty gap index will be relatively small and policies to alleviate poverty are likely to be rather effective. If individuals at the lower end of the distribution are on average far from the poverty line, the poverty gap measure will be high, and policies to alleviate poverty will be more difficult. The squared poverty gap is obtained with α equal to 2, and will be abbreviated here by FGT. The greater the value of α , the greater is the weight placed on the poorest individuals.

3.7 The 2005 of Indonesian Social Accounting Matrix and Elasticity in CGE

The static CGE model is built based on the extension of the 2005 Indonesian Social Accounting Matrix (SAM) (BPS, 2005a) and follows the algorithm of the International Food Policy Research Institute (IFPRI) standard CGE model developed by Lofgren, Harris and Robinson (2001). The data used for the extension of SAM refers to the 2005 Input-Output Table (BPS, 2005c), the 2005 National Socio-Economic Survey (BPS, 2005b), the Labor Force Survey and other sources. Table 3.4 shows a simple version of the 2005 Indonesian Social Accounting Matrix and table 3.5 shows the distribution of consumption by expenditure group.

Activities/Commodities

The extended 2005 Indonesian SAM has 26 industry/commodity categories: food crops, soybeans, other crops, livestock, forestry, fishery, oil and metal mining, other mining and quarrying, rice, food-beverage industry, textile-clothes-leather industry, wood processing industry, pulp-paper and metal industry, chemical industry, electricity-gas-water, construction, trade, restaurants, hotels, land transportation, air-water transportation and telecommunication, warehousing, financial services, real estate, government and private services, and individual/other services.

Factors of Production

The factors of production in this SAM are classified broadly into five factors: agricultural labor, production-operator-unskilled labor, sales and administration (semi-skilled), skilled labor and non-labor factors, including land and capital. However, each factor except the non-labor factor is divided into two categories: rural and urban labor. Hence, the factors of production consist of nine categories overall.

Institutions and Households

There are three main institutions in the 2005 SAM: government, enterprises and households. The representative household is divided into two categories: agricultural households and non-agricultural households. Agricultural households are classified into agricultural labor, agricultural households with less than 0.5 hectares of land, agricultural households with land between 0.5 to 1 hectares, and agricultural household with more than 1 hectare of land. Non-agricultural households are separated into rural and urban households. Each category of households in the urban and rural grouping is further classified into low-income, non-labor force households and high-income households. Other account accounts in the CGE model are the rest of the world (export-import), saving-investment and taxation. Taxation is divided into indirect taxes, subsidies, income tax and import tariff.

3.8 Concluding Remarks

Since fiscal policies would influence the economy at macro level while the poverty is household phenomena, therefore, there is a need to link between the macro and micro model to evaluate the poverty impact of fiscal policies. Three chapters of this dissertation apply the *CGE-Microsimulation Approach (CGE-MS)*. The main advantage of this approach is that it provides rich data on household behavior, while remaining extremely flexible in term of specific behaviors which can be modeled. This study also applies the endogenous poverty line to reduce a biased poverty outcome of policy reforms.

Table 3.4 A Simple Version of the 2005 Indonesian Social Accounting Matrix

Description		1	2	3	4	5	6	7	8	9	10
Unskilled Labor	**1**								326,522	234,611	201,284
Skilled Labor	**2**								24,832	70,474	628,455
Capital	**3**								322,449	491,985	530,040
Agriculture HH	**4**	261,810	111,034	82,438	1,311	3,722	15,299	71,914			
Non Agriculture HH	**5**	500,099	611,081	353,517	1,432	3,890	48,056	68,477			
Enterprise	**6**			819,048	14,587	31,703	106,496	43,495			
Government	**7**							99,297			
Agricultural and Extraction Act.	**8**										
Industry Act.	**9**										
Services Act.	**10**										
Transportation	**11**										
Agricultural and Extraction Comm.	**12**				86,303	163,196		14	73,994	445,722	119,414
Industry Comm.	**13**				240,022	644,278		15,894	76,656	732,903	648,082
Services Comm.	**14**				166,162	569,580		125,122	34,696	153,839	467,208
Saving-Investment	**15**				44,593	141,628	506,254	108,813			
Income Tax	**16**				14,349	52,850	313,112				
Sales Tax	**17**										
Tariff	**18**										
Subsidies	**19**							108,136	-148	-55,943	-9,835
Rest of World	**20**	780	2,574	91,452	3,089	8,612	45,646	14,155			
Total	**21**	762,689	724,688	1,346,454	571,848	1,619,460	1,034,864	655,318	859,002	2,073,590	2,584,648

Table 3.4 Continued

Table 3.4 A Simple Version of the 2005 Indonesian Social Accounting Matrix (Continued)

Description		**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
Unskilled Labor	**1**										272	762,689
Skilled Labor	**2**										927	724,688
Capital	**3**										1,979	1,346,454
Agriculture HH	**4**										24,320	571,848
Non Agriculture HH	**5**										32,909	1,619,460
Enterprise	**6**										19,533	1,034,863
Government	**7**						380,312	69,955	62,263	42,210	1,281	655,318
Agricultural and Extraction Act.	**8**		859,002									859,002
Industry Act.	**9**			2,073,590								2,073,590
Services Act.	**10**				2,584,648							2,584,648
Transportation	**11**		124,200	496,648	141							620,989
Agricultural and Extraction Comm.	**12**					2,617					215,281	1,106,541
Industry Comm.	**13**					185,411					657,935	3,201,181
Services Comm.	**14**	620,989				541,318					103,890	2,782,804
Saving-Investment	**15**											801,288
Income Tax	**16**											380,312
Sales Tax	**17**		19,129	12,344	38,482							69,955
Tariff	**18**		4,472	57,791								62,263
Subsidies	**19**											42,210
Rest of World	**20**		99,739	560,807	159,533	71,942						1,058,327
Total	**21**	620,989	1,106,541	3,201,181	2,782,804	801,288	380,312	69,955	62,263	42,210	1,058,327	

Source: summarized from SAM 2005

Table 3.5 The Distribution of Household Consumption by Expenditure Group

Products	Expenditure Group (per cent)												
	5	**10**	**15**	**20**	**25**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Food Crops	23.53	23.40	23.34	23.38	23.70	23.40	23.11	22.84	22.65	22.42	21.88	21.28	19.79
Non Food Crops	10.45	10.46	10.51	10.58	10.58	10.47	10.22	10.06	9.80	9.56	9.21	9.02	8.46
Other Agriculture Sector	5.55	6.22	6.57	6.88	7.20	7.40	7.77	8.07	8.45	8.91	9.29	9.44	9.72
Processed Food, Beverage, etc.	19.03	18.98	18.91	19.03	18.88	18.85	18.82	18.66	18.58	18.52	18.32	17.98	17.64
Industrial Products	3.30	3.44	3.45	3.41	3.45	3.51	3.59	3.68	3.79	3.76	3.90	4.02	4.05
Gasoline and Fuels	5.41	5.08	4.72	4.59	4.37	4.32	4.04	3.82	3.53	3.24	2.98	2.67	2.40
Electricity, Gas, Water and Public Utilities	5.29	5.22	5.22	5.16	5.08	5.16	5.09	5.01	4.97	4.90	4.80	4.74	4.50
Restaurant, Hotel and Sales	5.02	5.48	5.81	5.86	5.88	5.89	6.37	6.72	6.98	7.30	8.00	8.67	10.34
Transportation and Telecommunication	2.11	2.10	2.17	2.17	2.16	2.25	2.30	2.39	2.54	2.66	2.86	3.11	3.56
Financial Services	3.08	2.81	2.71	2.62	2.56	2.57	2.49	2.44	2.37	2.33	2.27	2.26	2.19
Government and Private Services	17.24	16.81	16.59	16.32	16.12	16.19	16.19	16.31	16.35	16.41	16.50	16.82	17.35
Total	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Author's calculation based on SUSENAS 2005

Chapter 4

Volatility of Commodity Prices and the Role of Import Tariffs on Protecting the Poor in Indonesia

The increases in world food prices raise the real incomes of those selling food, many of whom are relatively poor, while hurting net food consumers, many of whom are also relatively poor. The government of Indonesia, however, consistently controls staple foods prices responding to a temporarily increase in world food prices by implementing several policies such as import tariffs, value added tax, income tax and subsidy policies. The policy packages aim at stabilizing the domestic food prices intended to protect and help low income groups from a dramatic surge in the international price of staple foods.

This chapter only focuses on rice and soybeans because Indonesia is highly dependent on both products. Rice is the staple food while soybeans are a main protein source of low income groups. The Ministry of Finance has issued various regulations for controlling prices including: the regulation No.180/PMK.011/2007 cut the import tariff of rice from IDR 550/Kg to IDR 450/Kg and the regulation No.241/PMK.0011/2010 imposed zero import tariffs on rice; the regulation No.01/PMK.011/2008 cuts the import tariff of soybean from 5 per cent to 0 per cent. Thus, the effectiveness of both these tariff policies should be evaluated.

4.1 Volatility of World Rice Prices, Import Tariffs and Poverty in Indonesia[Ψ]

4.1.1 Introduction

Since 2007, the world has experienced a dramatic fluctuation in the world price of rice. The world price of rice jumped from USD 313.48/metric ton (January 2007) to USD 1,015/metric ton (April 2008) then dropped to USD 472.48/metric ton (May 2009) and again increased to USD 536.78 (December 2010)[8]. The increases in the price of rice raise the real incomes of those selling rice, many of whom are relatively poor, while hurting net rice consumers, many of whom are also relatively poor.

Ivanic and Martin (2008), using household data for ten observations on nine low-income countries, showed that the short-run impact of higher staple food prices on poverty differ considerably by commodity and by country, but poverty increases are much more frequent, and larger, than poverty reductions. However, responding to drastically increasing rice prices and protecting low-income groups, in December 2010 the government imposed the short period of zero import tariffs (during December 22, 2010 to March 31, 2011) on rice through Regulation Ministry of Finance No. 241/PMK.0011/2010.

[Ψ] This part is the modification of the article of "Dartanto, T. (2010b), Volatility of World Rice Prices, Import Tariffs and Poverty in Indonesia: A CGE-Microsimulation Analysis, *Economics and Finance Indonesia*, Vol.58, No.3, pp.335-364". Further, the earliest version of this article is also published in *the Journal of European Economy* Vol.10, a Special Issue, 2011, pp. 104-119, as a selected paper of International Conference on Applied Economics 2010 (Greece-Athens, August 2010).

[8] IMF Primary Commodity Statistics, accessed in January 2011. (**http://www.imf.org/external/np/res/commod/index.asp**)

It is widely accepted that in most developing countries, especially where rice normally accounts for larger shares of both the consumers' budgets and total employment, controlling price and quantity policy through tariff and trade barriers are always politically sensitive. In Indonesia, rice represents 8.18 per cent of average consumer expenditure, and even agricultural households spend 12.61 per cent to 14.17 per cent of their consumer expenditures on rice (Table 4.1). Moreover, approximately 65 per cent of agricultural households holding land and almost 90 per cent of landless agricultural households are net buyers. Food and Agriculture Organization (FAO) showed that Indonesia is the fourth-largest importing country in the world, and in 2007 the country imported about 1.37 million metric tons of rice, which equals 2.35 per cent of domestic production. Consequently, an increase in the world price of rice will directly raise the domestic price and create hardship to most households in Indonesia.

According to the 2003 Agricultural Census, approximately 56 per cent of agricultural household only own less than 0.5 hectares of land, meaning that many of them are small and subsistence farmers (BPS, 2003). Thus, an increase in the rice price may not benefit them, since their agricultural production is probably not sufficient to meet their needs. On the contrary, a drop in the rice price will lower the incomes of farmers and create fewer jobs for workers, particularly in the rural areas where a large share of employment depends on the agricultural sector. According to the 2003 Agricultural Census, the agricultural sector employs 46.34 million people, almost a half of total employment in Indonesia. About one-fourth of them are engaged in rice paddy and crop activities. Hence, a price decrease of rice and other crop commodities will directly cause suffering for about 11.6 million farmers.

Table 4.1 Overview of Rice's Consumption in 2005

Sector	Population	Initial Poverty 2005 (% of Population)	Net Producer (% of Household)	Net Consumer (% of Household)	Rice Exp. (IDR/Capita /Month)	Rice Expenditure (% of Total Expenditure
Total Agriculture	77,780,606	24.31	28.66	71.34	25,935	13.74
Agriculture (without Land)	20,448,294	25.73	10.62	89.38	25,418	12.61
Agriculture (with Land)	57,332,312	23.81	35.06	64.94	26,119	14.17
Owning Land 0-0.5 Hectare	27,376,123	26.95	35.01	64.99	23,974	13.86
Owning Land > 0.5 Hectare	29,956,189	20.94	35.10	64.90	28,014	14.42
Industry	19,916,155	11.25	7.58	92.42	21,882	6.46
Electricity, Water, Gas and Constructions	14,312,875	17.66	9.17	90.83	21,987	7.87
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	5.83	94.17	22,103	6.47
Banking, Financial Institution, Government and Private Services	26,863,587	6.94	6.17	93.83	22,569	5.15
Others	23,201,581	15.81	10.97	89.03	23,398	7.31
Total	**209,309,307**	**16.40**	**15.38**	**84.62**	**23,711**	**8.18**

Source: Author's Calculation based on Socio Economic Survey (SUSENAS 2005).

Note: Not included Nanggroe Aceh Darussalam. Net Consumer (Buyer) is a household whose rice consumption exceeds its rice production (included harvest sharing). Net Producer (Seller) is a household whose rice production (harvest sharing) equals to or greater than its rice consumption. The summation of Net Producer and Net Consumer equals to 100 per cent.

The impact of price volatility on poverty will certainly be very diverse, but the average impact on poverty depends upon the balance between the two effects, both on consumers and producers. There are many studies applying either a general or partial equilibrium model concerning rice price and poverty in Indonesia. Leith et al. (2003), using a general equilibrium representative household model found that an *ad valorem* increase in the rice import tariff from 25 per cent to 45 per cent would increase poverty in both urban and rural areas by 0.06 per cent and 0.04 per cent, respectively, in the medium-term. Warr and Yusuf (2009), applying a general equilibrium multi-household model, observed that the main beneficiaries of the food price increases during 2007 to 2008 were not the poor, but the owners of agricultural land and capital. In the case of rice, it showed that a 212 per cent increase in real world rice prices did not have a significant effect on poverty in Indonesia. This is because the increase in the rice price produces almost no increase in the producer price of rice, or the output of rice, or its consumer price, and no reduction at all in imports of rice. The reason is the (partially effective) ban on rice imports.

Warr (2005), utilizing a general equilibrium multi-household model, showed that a 90 per cent effective ban on Indonesia's rice imports increases the poverty incidence in that country by a less than one per cent of the population. Utilizing a net benefit analysis model, McCulloch (2008) found that high rice prices hurt the large majority of Indonesians—perhaps 80 per cent—and benefit only a minority. Ikhsan (2003), using a partial equilibrium model, found that a 10 per cent increase in the domestic rice price is associated with a one per cent increase in poverty incidence.

Unlike the previous studies, this study aims at estimating the impact of the volatility of the world price of rice and import tariffs of rice on poverty in Indonesia by applying a computable general equilibrium-microsimulation approach (top-down approach) and also the endogenous poverty line. It is expected that this study could identify comprehensively who will benefit or lose from the change in the world rice price and import tariffs of rice. The comprehensive results are valuable for policy makers in proposing an effective rice policy which could accommodate both consumers' and producers' interests.

4.1.2 Overview of Rice Policy and Fluctuation of Rice Price in Indonesia

Rice Policy

Food policy in Indonesia is mainly dominated by rice policy. Three types of rice policy could be distinguished: 1) pricing policy through price protection, 2) support programs through subsidies, credits and training, and 3) investments in the rehabilitation, improvement and extension of irrigated areas. By the end of the 1960s, *BULOG,* the National Logistics Agency, was established to carry out three main mandates: stabilizing price, controlling a national food security stock and distributing rice to the military and civil servants on a monthly basis. However, after the 1998 financial crisis, the latter task was abolished. The combination effect of three policies led to significant achievements, as rice production doubled from 12 to 24 million tons between 1969 and 1983, while self-sufficiency was attained in 1985.

In 1998, under the structural adjustments agreements with the International Monetary Fund (IMF), *BULOG*'s monopoly was abolished and private companies were allowed to import rice. However, *BULOG* still accounted for around 75 per cent of total rice imports. On September 22, 1998 rice imports were freed (that is, with a 0 per cent tariff). On January 1, 2000, the Ministry of Trade began imposing tariffs on rice imports of IDR (Indonesian Rupiah) 430 per kg (equivalent to 21 per cent *ad-valorem* tariff at that time). Based on *BULOG*'s recommendation, the Directorate General of Customs and Excise in September 2000 introduced a red lane inspection on rice imports in place, meaning stricter standards of customs inspection than other food items (Leith et al., 2003). In 2003, the import tariff was increased from IDR 430 per kg to 750 per kg, raising the *ad valorem* equivalent tariff from 21 per cent to approximately 37 per cent (Warr, 2005). In early 2004, a seasonal ban on rice imports was introduced.

Responding a dramatic increase in the world rice price, in August 2007 the government reduced the import tariff from IDR 750 per kg to IDR 550 per kg which was again reduced to IDR 450 per kg in December 2007. These policies were enacted by the Ministry of Finance Regulations No.180/PMK.011/2007 and No.93/PMK.011/2007, respectively. The government again imposed a short period of zero import tariffs on rice starting from December 22, 2010 to March 31, 2011. This policy was enacted through the

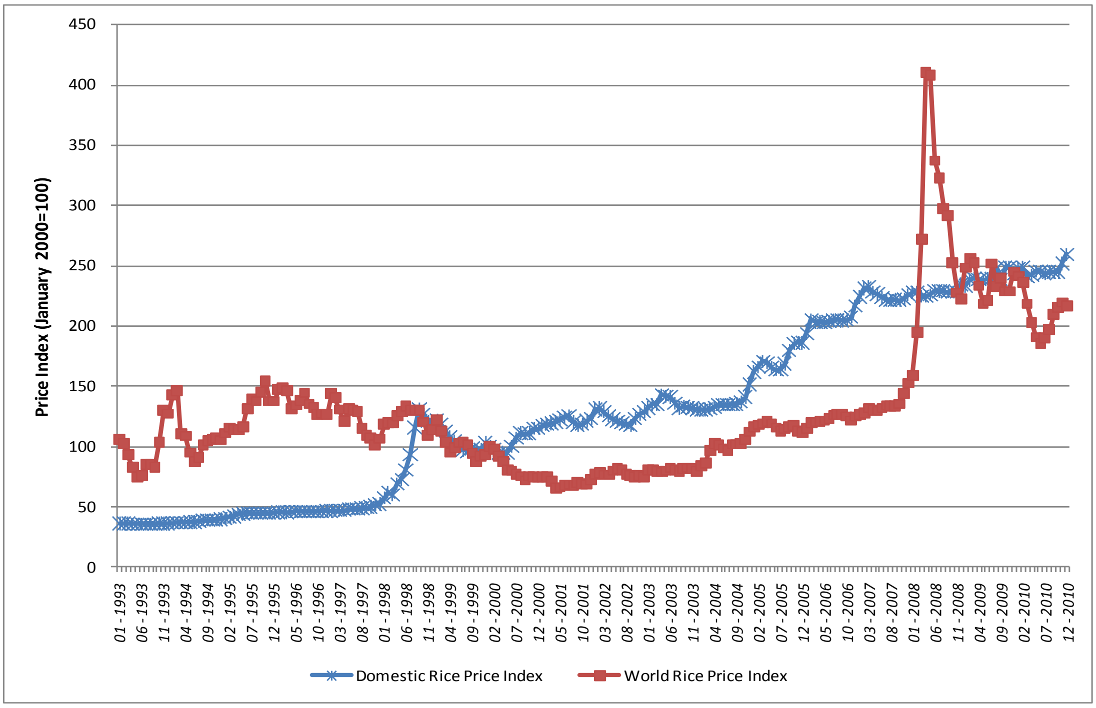
Ministry of Finance Regulation No.241/PMK.011/2010. Starting from April 1, 2011, the import tariffs of rice were set again at IDR 450 per kg. In addition to tariff policies, the government also actively intervened in the rice market through market operations, distributing *raskin* (cheap rice for the poor) and setting a floor price for dry paddy *(harga gabah kering giling).*

Fluctuation of Rice Price

The world price and import tariff of rice can affect the domestic price of rice following a simple formula: $P_r^c = \phi P_r^d + \gamma(1+t)\varepsilon P_r^w$. Where, P_r^c is consumer price of rice; P_r^d is domestic producer price of rice; P_r^w is price of imported rice in foreign currency; ϕ is proportion of domestic rice production to total domestic consumption; γ is proportion of imported rice to total domestic consumption; t is import tariff of rice; and ε is exchange rate USD/IDR. To what extent the world price can influence the domestic price depends on the exchange rate, the share of imported rice in domestic consumption and the import tariffs.

Figure 4.1 shows the trend of the indices of the monthly world and domestic prices of rice from 1993 to 2010. During 1993 to 1996, the domestic price was less volatile compared to the world price, which was indicated by low ratio of the standard deviation between domestic and world prices (0.19). It is apparent that the effects of *BULOG*'s market interventions were relatively effective. Nevertheless, due to the liberalization of the rice market and exchange rate volatility, the ratio of imported rice to total rice production increased from 0.57 per cent (1997) to 5.55 per cent (1998) and 7.25 per cent (1999). During 1998-2003 the domestic rice prices were also more volatile following the volatility in the world rice price. During 2001-2003 the fluctuation of the domestic rice price was 1.5 times larger than that of world rice price.

Figure 4.1 The Indices of Monthly World Price and Domestic Price of Rice, 1995-2010 (January 2000=100)



Source: Author's compilation. The world rice's price refers to FOB Bangkok of nominal price. (**http://www.imf.org/external/np/res/commod/index.asp**). *The domestic rice price during the period January 1993 to November 2008 refers to an average retail price of medium quality rice from 31 cities (CEIC Database). Starting from December 2008 to December 2010, the domestic rice price refers to the average daily rice price for medium quality of rice. These data are available at the homepage of the Ministry of Agriculture (http://database.deptan.go.id/smsharga/LapHarian.asp) and also at the BULOG's Website (http://www.bulog.co.id/gabahberas_v2.php).*

The import ban imposed in early 2004 was able to reduce the ratio of imported rice below one per cent, but was not able to stabilize the domestic rice price. It was also found that during 2004-2007 the fluctuation of the domestic rice prices was 2.5 times larger than that of the world rice price. An increase in production, reduction in the import tariff, and restricted import policy were able to insulate the domestic price from the dramatic fluctuations in the world price of rice during 2008-2010. This study also calculates that the correlation between the domestic and world price of rice during 1993 to 2010 is 0.56, meaning the fluctuations of the domestic price of rice are more influenced by internal factors, such as weather changes, production and government policies rather than the fluctuations in the world price of rice.

4.1.3 Research Methodology and Simulation Scenarios

This research uses the CGE micro-simulation approach (CGE-MS) in order to calculate how world rice prices and zero import tariffs influence poverty in Indonesia. The detailed methodology that follows Dartanto (2010b), Dartanto and Usman (2011) is already explained in the Chapter 3[9]. The model then is used to simulate several scenarios of world rice

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[9] The elasticity data used in this CGE refers to sources such as elasticity in the Indonesian IFPRI CGE model, Wayang model and other estimations of elasticity. The Armington elasticities, the elasticity of substitution between imports and domestic output in domestic demand, are 0.5 for all commodities except soybeans (1.5), rice (1.5), food crops (1.5) and food and beverage industry (1.5). The constant elasticity of transformation (CET) for domestic marketed output between exports and domestic supplies is set at 0.5 for all commodities except rice (1.5), soybeans (1.5), food crops (1.5), and food-beverage industry (1.5). The elasticity of substitution (CES) between factors of production is 0.25 for all activities. The elasticity of substitution between aggregate factors and intermediate input is 0.5 and the elasticity of output aggregation for commodities is 3. Household consumption is modeled under the Linear Expenditure System (LES),

prices and tariff policies.

The aim of simulations is to find out how much change occurred in the poverty under the various scenarios of the world prices and import tariffs of rice. The scenarios simulations are done referring to the fact that the world price of rice could sharply increase (decrease) only in short period. In 2008, the monthly world price of rice could increase or decrease in the range from -17.31 per cent to 50.93 per cent. In addition, the government also actively intervenes in the domestic rice market through changing the import tariffs of rice. It is counted that the effective import tariff of rice in the 2005 SAM is equivalent to 5.6 per cent; thus a decrease in the import tariff from IDR 750/kg to IDR 450/kg as a response to a dramatic increase in the world rice prices is identical to a decrease of 40 per cent of the effective import tariff. This is equal to a decrease of the import tariff from 5.6 per cent to 3.36 per cent. As mentioned before, in December 2010 the government again imposed a zero import tariff on rice.

The simulations are done under several scenarios which are basically divided into four categories: first, simulating an increase in the world rice price by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent; second, simulating a decrease in world rice prices

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whereby elasticities vary between commodities, and is less than 1 for food products and more than 1 for industrial products and services.

by 20 per cent, 40 per cent, 60 per cent and 80 per cent[10] respectively; third, simulating various decreases in import tariffs on rice by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent respectively; lastly, simulating various increases in import tariffs on rice by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent respectively. Various simulations are conducted in order to ascertain the sensitivity of poverty in respect to the change in world prices and import tariffs.

The simulations are done under the following closure rules: investment driven saving, flexible government saving and fixed direct tax rates, flexible exchange rates and fixed foreign saving, fixed capital formation, labor fully employed and mobile across activities, capital fully employed and activity-specific and fixed domestic producer price (price numeraire).

4.1.4 The Impact of World Rice Prices and Import Tariffs on Poverty in Indonesia

4.1.4.1 CGE Results in Macroeconomic Indicators, Consumer Prices and Factor Incomes

Generally, an increase (decrease) in world rice prices will be followed by a decrease (increase) in macroeconomic indicators, such as private consumption, imports, net indirect tax, exports and gross domestic product (GDP), while the consumer price index (CPI) moves in

[10] We did not simulate a 100 per cent decrease in the world rice price. This is because a 100 per cent decrease means the world rice price equal to 0 which is impossible in the CGE's simulation.

the same direction to change the world prices (Appendix 4.1). The simulation results shows that a 60 per cent increase in world rice prices decreases private consumptions by 0.107 per cent, imports by 0.201 per cent, net indirect tax by 0.439 per cent, exports by 0.031 per cent and GDP by 0.032 per cent, while increasing CPI by 0.431 per cent. An increase in the CPI depletes households' welfare that in the end decreases household (private) consumptions as well as GDP. The same magnitude of change in macroeconomic indicators is also observed on increases (decreases) in the import tariffs on rice.

An increase (decrease) in the world rice price would decrease (increase) the composite good supply in the domestic market. A 60 per cent increase in the world price leads to a decline in the composite supply of rice by 0.93 per cent. Theoretically, an increase in import prices reduces demand for imported goods and provides incentives to domestic producers to raise production. However, due to the lack of flexibility in domestic production of rice to respond to price increases, an increase in the domestic production of rice is unable to fill a gap of composite supply resulting from massive decreases in imported rice. Hence, the composite rice supply declines below the previous level.

Turning to changes in consumer price and factor incomes, the CGE simulations shows that an increase in the world prices of rice by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent raises the domestic consumer price of rice by 2.49 per cent, 4.60 per cent, 6.30 per cent, 8.00 per cent and 9.40 per cent respectively. Moreover, if the world price decreases by 20 per cent, 40 per cent, 60 per cent and 80 per cent, the domestic price of rice decreases by 2.92 per cent, 6.76 per cent, 12.07 per cent and 20.96 per cent respectively (Appendix 4.2). The domestic price is apparently sensitive to the decrease in the world price of rice since the volume of imported rice tends to increase when the world price decrease.

An increase in the world price of rice is advantageous only for non labor factors (capital or land). All labor categories are worse off under this condition due to a sharp decrease in average wage rates. In contrast, all labor categories are better off if the world rice price decrease up to 40 per cent. However, a high decrease in the world rice price of more than 60 per cent adversely affects agricultural labor due to declining wage rates (Appendix 4.3). This contradicts to what many theories predict that agricultural labor should benefit (suffer) from an increase (decrease) in the world rice prices, because responding to the rise in the domestic price of rice as a result of an increase in the world prices, households might choose or combine three alternatives: 1) allocating more resources to afford rice through reduced consumption of others products, 2) reducing consumption of rice and 3) substituting rice for other products. These three alternatives would affect the decrease in aggregate demand in an economy that would be followed by decreasing factor incomes.

On the other hand, the reduction of import tariffs by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent will lower the domestic price of rice by 0.30 per cent, 0.70 per cent, 1.10 per cent, 1.40 per cent and 1.90 per cent respectively. This policy is able to raise the average incomes of all factors of production, except for non labor factor varying from 0.017 per cent to 0.301 per cent. Meanwhile, the increase in import tariffs at the same rate can raise the domestic price of rice by 0.40 per cent, 0.70 per cent, 1.00 per cent, 1.40 per cent and 1.70 per cent respectively. An increase in the import tariffs at any level will increase wage rates of agricultural labors and the returns of non-labor factor. However, all labor categories, except agricultural labor, are worse off when responding to an increase in the import tariffs. Agricultural labor is the only factor that consistently gets benefits from any increase or decrease in the import tariffs. These simulation results appear to contradict the common belief that a decrease in the import tariffs of rice would adversely affect labor in the agriculturalal sector, because a decrease in the import tariffs of rice lowers the domestic rice prices driving up the domestic consumption of both non agricultural and agricultural products and at the end bidding up the wage rates of all labor factors.

According to the CGE simulations, there are differences in the percentage change of domestic consumer prices when the world rice prices (import tariffs) increase or decrease at the same percentage points. For instance, a 60 per cent increase (decrease) in the world price will be followed by a 6.3 per cent increase (12.07 per cent decrease) in the domestic consumer price of rice. Declines in world rice prices directly decrease domestic rice prices through lowering the imported rice prices and dropping the domestic prices as consequence of excess supply in the domestic market. The other transmission is that a decrease in the price of domestic rice lowers the real incomes of those selling rice. When incomes fall, goods and services will be demanded less, and domestic price will decline. On the contrary, increases in the world rice price directly raise the imported rice price as well as the domestic rice price. Unfortunately, a high price of domestic rice forces households to reduce their demand and in the end lowers its price. Therefore, in the case of a world price decrease, both direct and indirect effects move in the same direction; while in the case of a world price increase, the direct and indirect effect cancel out each other. Hence, this clearly shows that a change in domestic prices in response to a decrease in world prices is larger than the response to an increase in world prices.

4.1.4.2 Volatility of World Rice Prices, Import Tariffs and Poverty in Indonesia

World Rice Prices and Poverty

In a CGE-Microsimulation analysis, the impact of world price volatility and import tariffs of rice on poverty solely depends on how large the effect of these shocks on changing the price level and factors income in the economy are. However, how large the price changes, including factors income, can influence the poverty incidence depends on the poor’s consumption pattern and the poor’s source of income. It also depends on how sensitive the poverty line is in responding to the price change.

Table 4.2 summarizes the impact of various world prices and import tariffs of rice on poverty in Indonesia. As many other imported countries, an increase in the world prices of rice raises the incidence of poverty, while a decrease in the world price also reduces poverty. The 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent respectively of an increase in the world price raises poverty by 819,189; 1,245,530; 1,687,270; 2,292,026; and 2,581,536 respectively. This is equivalent to an increase in the poverty index by 0.39 per cent, 0.60 per cent, 0.81 per cent, 1.10 per cent and 1.23 per cent respectively. On the other hand, a decline in the world price of rice at any rate is good for all household categories. The decrease in the world price at 20 per cent, 40 per cent, 60 per cent and 80 per cent respectively reduces poverty by 622,857; 1,628,371; 2,910,403; and 3,719,739 respectively which are equal to a decrease in the poverty index by 0.30 per cent, 0.78 per cent, 1.39 per cent and 1.78 per cent respectively. The fluctuations in the world rice price and the poverty incidence move in the same direction. However, the elasticity of poverty in relation to the world rice price is not constant and decreases in line with the higher price change.

At the disaggregate level, all household categories, agricultural and non-agricultural, suffer from an increase in the world rice price. Landless agricultural households suffer most from an increase in the world price. If the world price rises by 40 per cent, the headcount index rises by 0.90 per cent. In terms of absolute numbers, poverty increases are more frequently observed among small landowners of agricultural households. An increase of 40 per cent in the world price raises the number of poor by 247,061. Landless households and small landowning households are basically low-income groups characterized by a high proportion of their expenditure on rice and a high dependency on agricultural activity as a main source of income. Therefore, a sudden increase in rice prices to unaffordable level adversely affects these groups.

Table 4.2 Simulated Changes in the Headcount Index (per cent) under Various Changes in the World Rice Prices

Sector	Population	Initial Poverty 2005	Increase in the World Rice Price					Decrease in the World Rice Price			
			20%	40%	60%	80%	100%	20%	40%	60%	80%
Total Agriculture	77,780,606	24.31	0.51	0.76	1.07	1.38	1.54	-0.43	-1.14	-1.89	-2.30
Agriculture (without Land)	20,448,294	25.73	0.59	0.90	1.24	1.60	1.82	-0.54	-1.50	-2.33	-2.69
Agriculture (with Land)	57,332,312	23.81	0.49	0.71	1.00	1.30	1.44	-0.39	-1.01	-1.74	-2.16
Owning Land 0-0.5 Hectare	27,376,123	26.95	0.60	0.90	1.12	1.42	1.59	-0.44	-1.09	-1.95	-2.44
Owning Land >0.5 Hectare	29,956,189	20.94	0.38	0.54	0.90	1.18	1.30	-0.35	-0.93	-1.55	-1.91
Industry	19,916,155	11.25	0.38	0.59	0.71	0.94	1.06	-0.28	-0.60	-1.23	-1.53
Electricity, Water, Gas and Constructions	14,312,875	17.66	0.39	0.65	0.71	1.04	1.22	-0.31	-1.05	-2.15	-2.68
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	0.28	0.39	0.57	0.88	0.96	-0.21	-0.55	-1.00	-1.27
Banking, Financial Institutions, Government and Private Services	26,863,587	6.94	0.33	0.47	0.60	0.85	1.01	-0.16	-0.40	-0.71	-1.06
Others	23,201,581	15.81	0.28	0.57	0.80	1.04	1.18	-0.20	-0.46	-0.96	-1.54
Total	**209,309,307**	**16.40**	**0.39**	**0.60**	**0.81**	**1.10**	**1.23**	**-0.30**	**-0.78**	**-1.39**	**-1.78**

Source: Author's calculation.

Note: Nanggroe Aceh Darussalam was not surveyed in the SUSENAS 2005.

These simulations show that, in contrast to what many theories predict, households working in the agricultural sector do not benefit from an increase in the world price of rice, because of the high proportion of their budgets going towards rice, subsistence level of production and rigidity in the domestic production of rice in response to an increase in price. BPS reports that even though the budgeted share on food has been continuously decreasing since 1999, food expenditure in 2009 still represented 50.62 per cent of average consumer expenditure, which is mostly spent on food crops. An increase in the world rice prices that suddenly increases the domestic rice prices forces agricultural households to choose two difficult options - either reduce food consumption or use substitutes. However, substitution is not a feasible option because rice consumption is related to taste and customs. Even though agricultural households benefit through a gradual increase in the wages of agricultural labor, it can only compensate partially for the increase in expenditure as a result of price increases. Therefore, increases in world commodity prices hurt agricultural households rather than benefits them.

On the other hand, the decrease of world price of rice at any level is advantageous not only for non-agricultural households, but also for agricultural households with and without land. The poverty of agricultural households with land declines by 224,551 and 997,545 responding to an increase in 20 per cent and 60 per cent of the world price of rice. This is equivalent to a decline in the poverty incidence by 0.39 per cent and 1.74 per cent respectively. Meanwhile, landless agricultural households benefit most from lower world rice prices. The headcount index decreases by 2.33 per cent responding to a 60 per cent decline in the world price. From these results, the argument that a high price of rice is better and low price of rice is bad for agricultural households do not have strong empirical support.

Table 4.3 Simulated Changes in the Poverty Gap Index (per cent) under Various Changes in the World Rice Prices

Sector	Population	Initial Poverty Gap Index 2005	Increase in the World Rice Price					Decrease in the World Rice Price			
			20%	40%	60%	80%	100%	20%	40%	60%	80%
Total Agriculture	77,780,606	4.93	0.13	0.20	0.28	0.38	0.44	-0.11	-0.26	-0.46	-0.57
Agriculture (without Land)	20,448,294	5.52	0.15	0.24	0.33	0.45	0.52	-0.14	-0.32	-0.55	-0.71
Agriculture (with Land)	57,332,312	4.71	0.12	0.19	0.26	0.35	0.41	-0.10	-0.24	-0.43	-0.52
Owning Land 0-0.5 Hectare	27,376,123	5.44	0.14	0.22	0.29	0.40	0.46	-0.11	-0.27	-0.48	-0.60
Owning Land >0.5 Hectare	29,956,189	4.05	0.11	0.17	0.23	0.31	0.36	-0.09	-0.21	-0.38	-0.46
Industry	19,916,155	2.10	0.07	0.11	0.15	0.21	0.24	-0.06	-0.14	-0.26	-0.35
Electricity, Water, Gas and Constructions	14,312,875	3.01	0.10	0.17	0.23	0.31	0.36	-0.10	-0.23	-0.40	-0.51
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	2.01	0.07	0.10	0.14	0.19	0.21	-0.05	-0.13	-0.24	-0.30
Banking, Financial Institutions, Government and Private Services	26,863,587	1.36	0.05	0.09	0.11	0.16	0.19	-0.05	-0.10	-0.19	-0.28
Others	23,201,581	3.40	0.09	0.14	0.19	0.26	0.30	-0.07	-0.18	-0.33	-0.43
Total	**209,309,307**	**3.24**	**0.09**	**0.15**	**0.20**	**0.27**	**0.31**	**-0.08**	**-0.19**	**-0.34**	**-0.43**

Source: Author's calculation.
Note: Nanggroe Aceh Darussalam was not surveyed in the SUSENAS 2005.

In order to complement the headcount index analysis, Table 4.3 provides the Poverty Gap Index. This index represents the gap between poor people's standard of living and the poverty line, which shows the shortfall in the poor's expenditure from the poverty line expressed as an average of the population. This can be interpreted as how far the poor are below the poverty line. This index can also be utilized as an indicator of the minimum cost of eliminating poverty using perfectly targeted transfers. The pattern of change in the poverty gap index responding to an increase (decrease) in world rice prices (import tariffs) is not different from the changes in the headcount index. The higher the world rice prices, the wider the poverty gap index and vice versa. A 20 per cent, 40 per cent, 60 per cent, 80 per cent and

100 per cent increase in the world price raises the poverty gap index by 0.09 per cent, 0.15 per cent, 0.20 per cent, 0.27 per cent and 0.31 per cent, respectively.

Import Tariff Policies and Poverty

The impact of import tariffs of rice on poverty is not that much different in pattern with the impact of world price volatility of rice on poverty. Table 4.4 shows that an increase in import tariffs of rice by 20 per cent, respectively 40 per cent, 60 per cent, 80 per cent and 100 per cent will be followed by an increase in poverty by 141,900; 215,060; 312,875; 474,441; and 578,952 persons which equals to an increase in the poverty incidence by 0.07 per cent, 0.10 per cent, 0.15 per cent, 0.23 per cent and 0.28 per cent respectively. Both landless and landholder households are worse off responding to an increase in import tariffs. If the import tariffs of rice increase by 20 per cent, those working in the trade-hotels-restaurants and transportation sectors suffer most. However, the high protection on agricultural sectors, i.e. 100 per cent increase in the import tariff of rice, intended to help agricultural producers, will result in the opposite direction. The poverty index of this group rises by 0.36 per cent. On the other hand, generally most of the households acquire benefits from lower import tariffs. The number of poverty will be reduced by 68,694; 161,546; 258,569; 293,618; and 390,160 persons responding to the decrease in import tariffs of rice by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent (zero import tariffs) respectively. The numbers are equivalent to the decrease in the poverty index by 0.03 per cent, 0.08 per cent, 0.12 per cent, 0.14 per cent and 0.19 per cent respectively.

Table 4.4 shows three important findings: first, both a 40 per cent decrease in the effective import tariff of rice enacted by Regulation No.180/PMK.011/2007 and No.93/PMK.011/2007 in response to high world rice price during 2007 to 2009 and the zero import tariffs implemented by regulation No.241/PMK.011/2010 in response to high world prices in 2010 could not perfectly absorb the negative impact of rising world rice prices on poverty in Indonesia. Second, high import tariffs on rice, intended to help agricultural producers, does not have strong empirical support. Third, a surprising finding was that agricultural households, whether they own land or not, will benefit from lower import tariffs and suffer from higher import tariffs. This appears to contradict a common belief that a decrease in import tariffs would cause suffering for agricultural households while an increase in import tariffs would be advantageous for agricultural households.

Theoretically, increases in import tariffs have two effects: an income effect from an increase in incomes of those who sell either rice or agricultural labor, and the price effect which results from an increase in the price of rice. It is observed that the price effect is more dominant than the income effect when import tariffs either increase or decrease. Similar to the earlier finding, this is due to the high budget share of food and rigidities in domestic production of rice in response to an increase in price. Therefore, both landless agricultural households and landowning agricultural households are worse off in the presence of high import tariffs on rice.

Table 4.4 Simulated Changes in the Headcount Index (per cent) under Various Changes in the Import Tariffs of Rice

Sector	Population	Initial Poverty 2005	Increase in the Import Tariffs of Rice					Decrease in the Import Tariffs of Rice				
			20%	40%	60%	80%	100%	20%	40%	60%	80%	100%
Total Agriculture	77,780,606	24.31	0.06	0.12	0.19	0.29	0.36	-0.02	-0.09	-0.18	-0.20	-0.25
Agriculture (without Land)	20,448,294	25.73	0.09	0.13	0.26	0.34	0.47	-0.04	-0.11	-0.26	-0.26	-0.33
Agriculture (with Land)	57,332,312	23.81	0.05	0.12	0.17	0.28	0.32	-0.01	-0.09	-0.14	-0.18	-0.22
Owning Land 0-0.5 Hectare	27,376,123	26.95	0.10	0.18	0.23	0.40	0.45	0.00	-0.07	-0.15	-0.19	-0.23
Owning Land > 0.5 Hectare	29,956,189	20.94	0.01	0.06	0.10	0.16	0.21	-0.03	-0.10	-0.14	-0.17	-0.21
Industry	19,916,155	11.25	0.04	0.07	0.11	0.17	0.18	-0.02	-0.06	-0.11	-0.11	-0.18
Electricity, Water, Gas and Constructions	14,312,875	17.66	0.05	0.06	0.10	0.19	0.34	-0.12	-0.17	-0.17	-0.17	-0.22
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	0.10	0.12	0.15	0.22	0.25	-0.03	-0.05	-0.10	-0.11	-0.14
Banking, Financial Institutions, Government and Private Services	26,863,587	6.94	0.03	0.07	0.13	0.16	0.16	-0.03	-0.03	-0.03	-0.05	-0.10
Others	23,201,581	15.81	0.09	0.09	0.10	0.16	0.21	-0.04	-0.09	-0.09	-0.11	-0.15
Total	**209,309,307**	**16.40**	**0.07**	**0.10**	**0.15**	**0.23**	**0.28**	**-0.03**	**-0.08**	**-0.12**	**-0.14**	**-0.19**

Source: Author's calculation.
Note: Nanggroe Aceh Darussalam was not surveyed in the SUSENAS 2005.

Table 4.5 shows changes in the poverty gap index under various changes in the import tariffs of rice. A 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent decrease in the import tariffs reduce the poverty gap index by 0.02 per cent, 0.03 per cent, 0.04 per cent, 0.05 per cent and 0.06 per cent, respectively. The poverty gap index of some groups, such as industry and service employees, does not change in response to a decrease in import tariffs of rice up to 20 per cent. This shows that the poverty gap index is insensitive to a change in the import tariffs of rice because adjustments in the import tariffs have little effect on changing prices and factor incomes in the economy.

Table 4.5 Simulated Changes in the Poverty Gap Index (per cent) under Various Changes in the Import Tariffs of Rice

Sector	Population	Initial Poverty Gap Index 2005	Increase in the Import Tariffs of Rice					Decrease in the Import Tariffs of Rice				
			20%	40%	60%	80%	100%	20%	40%	60%	80%	100%
Total Agriculture	77,780,606	4.93	0.02	0.03	0.05	0.07	0.09	-0.01	-0.02	-0.04	-0.05	-0.07
Agriculture (without Land)	20,448,294	5.52	0.02	0.04	0.05	0.08	0.10	-0.01	-0.03	-0.05	-0.06	-0.08
Agriculture (with Land)	57,332,312	4.71	0.02	0.03	0.05	0.06	0.08	0.00	-0.02	-0.03	-0.04	-0.06
Owning Land 0-0.5 Hectare	27,376,123	5.44	0.03	0.04	0.05	0.07	0.09	0.00	-0.02	-0.04	-0.05	-0.07
Owning Land > 0.5 Hectare	29,956,189	4.05	0.02	0.03	0.04	0.06	0.07	0.00	-0.02	-0.03	-0.04	-0.06
Industry	19,916,155	2.10	0.01	0.02	0.03	0.04	0.05	0.00	-0.01	-0.02	-0.03	-0.03
Electricity, Water, Gas and Constructions	14,312,875	3.01	0.02	0.03	0.04	0.05	0.07	-0.01	-0.02	-0.04	-0.05	-0.06
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	2.01	0.01	0.02	0.02	0.03	0.04	0.00	-0.01	-0.02	-0.02	-0.03
Banking, Financial Institutions, Government and Private Services	26,863,587	1.36	0.01	0.01	0.02	0.03	0.03	0.00	-0.01	-0.02	-0.02	-0.03
Others	23,201,581	3.40	0.02	0.03	0.04	0.05	0.06	0.00	-0.01	-0.02	-0.03	-0.04
Total	**209,309,307**	**3.24**	**0.02**	**0.03**	**0.04**	**0.05**	**0.06**	**0.00**	**-0.02**	**-0.03**	**-0.04**	**-0.05**

Source: Author's calculation.

Note: Nanggroe Aceh Darussalam was not surveyed in the SUSENAS 2005.

4.1.5 Sensitivity Analysis

The CGE estimation results are known to be sensitive to the values of the Armington elasticities. However, there have been few empirical studies on estimating these elasticities. Many studies show that the resulting estimates of these elasticities varied widely. McDaniel and Balistreri (2003) confirmed that the wide range estimates of Armington elasticities depend on the data used, disaggregating sector and methodology applied.

Many CGE studies in Indonesia also applied a wide range of Armington elasticity on Rice. Indonesian IFPRI CGE Model, Leith et al. (2003), Warr (2005), Warr (2009), Warr and Yusuf (2009) assumed the Armington elasticity to be 10, 6, 6, 6 and 6 respectively. However, Warr (2008) estimated that though imported and domestically produced rice are considered relatively close substitutes in the demand in Indonesia, the Armington elasticity ranges from 2 to 5. For comparison, Kapuschinki and Warr (1999) found that the estimated Armington elasticities of the Philippines' economy range from 0.2 for metal product to 4 for sugar milling and refining and particularly for rice, the elasticity ranges from 0.61 to 2.05

depending on the methodology applied.

Table 4.6 shows that the impact of a 60 per cent increase in the world rice price and a 100 per cent decrease in the import tariffs of rice on poverty (zero import tariffs) are slightly sensitive to the variation of Armington elasticity. An increase (decrease) in the Armington elasticity will be followed by an increase (decrease) in the poverty incidence. At the national level, when the world rice price increases by 60 per cent, changing elasticity from 1.5 to 3 will increase the headcount index from 0.81 per cent to 1.99 per cent which is equivalent to an increase of poor persons from 1,687,270 to 4,156,883. On the contrary, changing elasticity from 1.5 to 0.5 will decrease the number of poverty from 1,687,270 to 590,291 persons. On the other hand, when the import tariffs of rice decrease by 100 per cent, change elasticity from 1.5 to 3 will reduce the headcount index from -0.19 per cent to -0.51 per cent.

Table 4.6 Simulated Changes in the Headcount Index: Varying Armington Elasticity of Substitution in Rice Demand

Sector	Population	Initial Poverty 2005	60% Increase in the World Rice Price				100 % Decrease in the Import Tariffs of Rice			
			0.5	1.5	2.0	3.0	0.5	1.5	2.0	3.0
Total Agriculture	77,780,606	24.31	0.36	1.07	1.53	2.52	-0.03	-0.25	-0.38	-0.72
Agriculture (without Land)	20,448,294	25.73	0.48	1.24	1.81	2.82	-0.07	-0.33	-0.49	-0.90
Agriculture (with Land)	57,332,312	23.81	0.32	1.00	1.43	2.42	-0.01	-0.22	-0.35	-0.65
Owning Land 0-0.5 Hectare	27,376,123	26.95	0.45	1.12	1.58	2.58	0.00	-0.23	-0.37	-0.70
Owning Land > 0.5 Hectare	29,956,189	20.94	0.21	0.90	1.30	2.27	-0.03	-0.21	-0.33	-0.62
Industry	19,916,155	11.25	0.18	0.71	1.05	1.58	-0.02	-0.18	-0.38	-0.45
Electricity, Water, Gas and Constructions	14,312,875	17.66	0.34	0.71	1.22	2.01	-0.12	-0.22	-0.38	-0.65
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	0.26	0.57	0.95	1.60	-0.03	-0.14	-0.18	-0.38
Banking, Financial Int., Government and Private Services	26,863,587	6.94	0.23	0.60	0.99	1.50	-0.03	-0.10	-0.14	-0.29
Others	23,201,581	15.81	0.17	0.80	1.15	1.87	-0.04	-0.15	-0.20	-0.29
Total	**209,309,307**	**16.40**	**0.28**	**0.81**	**1.22**	**1.99**	**-0.04**	**-0.19**	**-0.29**	**-0.51**

Source: Author's calculation.
Note: Nanggroe Aceh Darussalam was not surveyed in the SUSENAS 2005.

Therefore, the crucial question is, what the appropriate Armington elasticity of substitution of rice is? Since the domestic rice market is not fully liberalized, the government actively intervenes in the rice market through tariff and non-tariff policies and paddy's production increased significantly in recent years. Thus it is believed that setting the Armington elasticity of rice equal to 1.5 as a moderate degree of trade openness are fair and reasonable. However, these findings appear higher than that of other studies' findings, such as Leith et al. (2003), Warr (2005), Warr (2009) and Warr and Yusuf (2009), Ikhsan (2003) and McCulloch (2008). The difference in results might come from differences in the methodology applied (CGE-Microsimulation), the utilized database (SAM 2005), the endogenous poverty line, the choice of parameters in CGE, and the change in economic environments.

4.2 Volatility of World Soybean Prices, Import Tariffs and Poverty in Indonesia[Ω]

4.2.1 Introduction

Since 2007, the world has experienced a dramatic surge in the world price of food commodities. The price of soybeans sharply rose from USD 255.87/metric ton (January 2007) to USD 552.47/metric ton (June 2008) and then significantly decreased to USD 379/metric ton (December 2009)[11]. This high volatility of world prices has caused uncertainty and vulnerability particularly in net-importer countries like Indonesia. According to the Food and Agriculture Organization (FAO), in 2007 Indonesia imported 1.44 million metric tons of soybeans for consumption, which was 71 per cent of domestic demand[12]. Nuryanti and Kustiari (2007) observed that, due to increasing consumption and growth in soybean-based food industries, per capita consumption of soybeans has increased by 6.4 per cent per year in the post-crisis period. High pressures from demand, which are not accompanied by an increase in domestic production and in productivity, have made Indonesia highly dependent on imported soybeans.

[Ω] This part is the modification of the article of "Dartanto, T and Usman (2011), Volatility of World Soybean Prices, Import Tariffs and Poverty in Indonesia, *Margin-Journal of Applied Economic Research*, Vol.5 No.2 pp.139-181". doi: 10.1177/097380101100500201

[11] IMF Primary Commodity Statistics, accessed 10 October 2009 at **http://www.imf.org/external/np/res/commod/index.asp**.

[12] FAO Statistic, accessed 1 February 2009 at http://faostat.fao.org/site/342/default.aspx.

The increase in the price of soybeans has had a large impact on the economy as a whole, both at the macro and at the household levels, due to industrial backward and forward linkages. According to the 2005 Input-Output Table of Indonesia, 77.6 per cent of total soybean output in Indonesia is used as intermediate inputs. Moreover, soybean-based industries such as the tempe[13] and tofu industries consume approximately 41 per cent of the soybean output. Therefore, the increase in domestic soybean price, as a consequence of an increase in the world price, raises the price of tempe and tofu, the main protein source for low-income (poor) households, making it less affordable for the poor. On the other hand, in order to minimize the negative impacts of drastically increasing prices on low-income groups, the government has imposed zero import tariffs on soybeans since 2008. Hence, two questions rise from these phenomena: How large is the impact of the volatility of world soybean prices on poverty in Indonesia? Is the zero import tariff policy really effective in protecting the poor?

Warr and Yusuf (2009) applying a general equilibrium multi-household model observed that increases in world food prices between 2007 and 2008 raised the incidence of poverty in Indonesia. The increase in poverty is significant but not dramatic. The poor lose primarily because of the increase in consumer prices of staple foods. The main beneficiaries of increased food prices are not the poor, but the owners of agricultural land and capital. In the case of soybeans, it showed that a 117 per cent increase in real world soybean prices (a 169 per cent increase in the nominal price) raised the headcount index by 0.05 per cent.

Even though soybeans are an important food commodity in Indonesia, unlike rice, the relationship between soybean and poverty has a remained peripheral topic of research.

[13] Tempe, Indonesian origin, is made by a natural culturing and controlled fermentation process that binds soybeans into a cake form. It is especially popular on the island of Java, where it is a staple source of protein. Because of its nutritional value, Tempe is used worldwide in vegetarian cuisine; some consider it to be a meat analogue.

Empirical studies of the socio-economic impact of soybeans on poverty either in Indonesia or in other countries are relatively scarce and there is little variation in methodologies between these studies. This study aims to estimate the impact of world price volatility and import tariffs of soybeans on poverty by applying a computable general equilibrium-microsimulation approach (top-down approach) and also an endogenous poverty line. It is expected that this study will identify comprehensively who benefits and who loses from a change in world price and import tariffs of soybeans. Furthermore, it is hoped that the results will be useful for policy makers in formulating efficacious policy to protect low-income groups from volatility in the world price of soybeans.

4.2.2 Overview of Soybean Production Policies and Their Implications

Floor price policy and import tariff policy

The domestic markets of agriculture products in Indonesia are not purely competitive. Government actively intervenes in these markets in three ways: floor price, domestic price stabilization and trade policies. The basic arguments for these measures are[14]: i) assuring a price guarantee to producers; ii) stabilizing price for agriculture-based industry; iii) supporting food self-sufficiency and decreasing imports; iv) foreign reserve saving; v) stabilizing political tension; and vi) improving resources allocation.

Kumenaung (1994) observed that the government has actively adjusted the floor price for soybeans between 1969 and 1991. Floor prices, in term of the Indonesian Rupiah (IDR) rose from IDR 62 per kg (1969) to IDR 131 per kg (1974), IDR 256 per kg (1979), IDR 346 per kg (1983), IDR 733 per kg (1988), and IDR 889 per kg (1990); at the end of 1992 the

[14] Masdjidin Siregar, Tinjauan Kebijakan Perdagangan Komoditas Kedelai, accessed 13 July 2010 at http://ejournal.unud.ac.id/abstrak/(3) per cent20soca-masjidin per cent20siregar-perdg per cent20komoditas per cent20kedele.pdf

floor price policy was abolished. Moreover, in order to ensure small and medium enterprises receive a stable price and continuity of supply, in the early-1980s the government gave a mandate to the National Logistic Agency (*Badan Urusan Logistik* (*BULOG*)) to procure, store and distribute soybean. However, this was not successful as *BULOG* preferred to import rather than buy from local farmers, because the imported price of soybeans was lower than the domestic price.

In terms of trade policy, the government imposed a 30 per cent *ad valorem tariff* on soybean from 1974 to 1980, but reduced it in 1981 to 10 per cent, a rate that remained unchanged until 1993. From 1994 to 1996, the import tariff remained at 5 per cent. It was then decreased to 2.5 per cent in 1997. Moreover, in 1998, under structural agreements with the International Monetary Fund (IMF), the government was forced to impose zero import tariffs on soybeans. However, due to domestic political pressures, the government through the Ministry of Finance Regulation: 591/PMK.010/2004 again imposed a 10 per cent import tariffs starting from 2005. This policy aims to support *Program Bangkit Kedelai,* a program to encourage domestic production of soybeans to achieve self-sufficiency. Unfortunately, responding to a high world price of soybean, the government of Indonesia through the Ministry of Finance Regulation: 01/PMK.011/2008, enacted the zero import tariff of soybeans product in 2008.

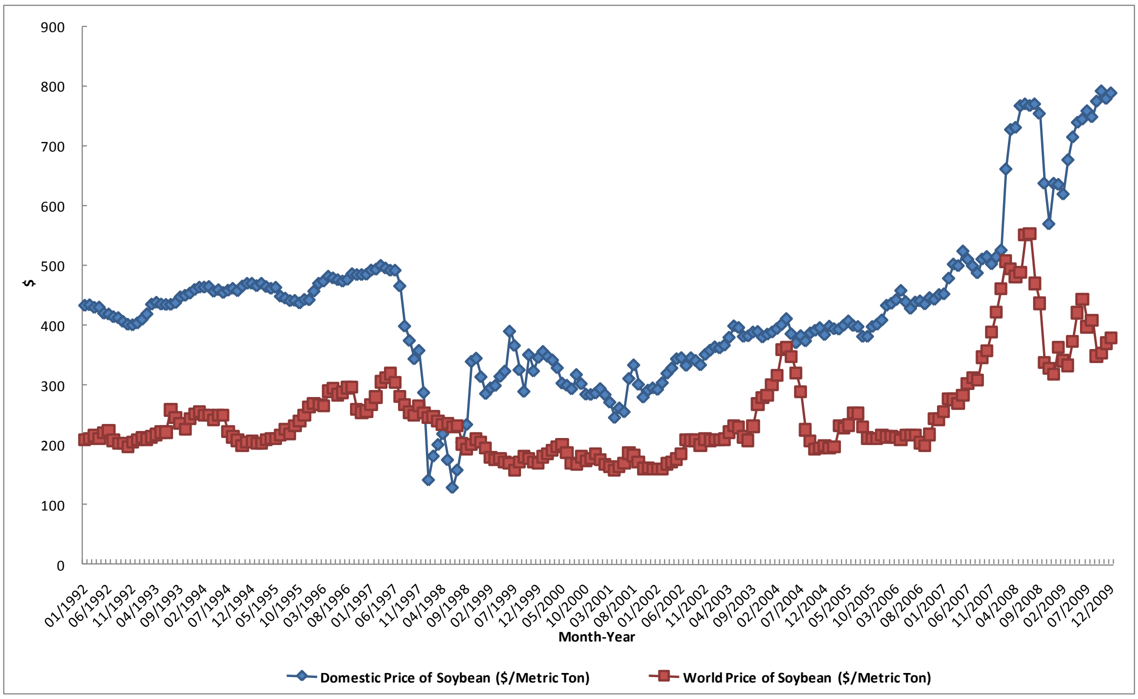
Price trends and domestic production of soybeans

Figure 4.2 shows the monthly trend in world and domestic prices of soybeans from 1992 to 2009. It is observed that the domestic producer price is always higher than the world price except in the period January to June, 1998. It generally shows that the production cost of soybeans in Indonesia is more expensive compared to the exporting soybeans countries. From 1992 to 1996, the average domestic producer price of soybeans was USD 443/metric ton while the average world price was USD 223.37/metric ton. Due to the liberalization of the soybean market in 1998, the average domestic price of soybeans significantly decreased by USD 100/metric ton compared to the previous period. However, liberalization of the market also succeeded in reducing import tariffs, abolishing floor price and reducing the role of BULOG in controlling the domestic price, as a consequence of which the fluctuation of domestic producer prices was double than that of world prices. From 2002 to 2006, average domestic producer price increased 13 per cent, compared to the period 1997-2001, caused perhaps by an increase in the import tariff of soybeans from 0 per cent to 10 per cent in 2005.

Furthermore, from 2007 to 2009, the period of food price crises, average domestic price jumped almost 81 per cent from USD 389/metric ton to USD 706.8/metric ton. In contrast, average world price only increased by 68 per cent. This indicates that the domestic producer price is more sensitive to fluctuations in the world price. Looking at pre and post-crisis price trends, the correlation between domestic and world prices was 0.59 at the pre-crisis period (before 1997) (the sample from 1997-1998 is not included) and 0.88 in the post-crisis period (from 1998 to date). These findings indicate that in the pre-crisis period the fluctuation of soybean prices in the domestic market was not very affected by price fluctuations in the world market, but were more likely caused by internal factors such as weather changes, production scale and government policies. However, in the post-crisis period, fluctuations in the world price of soybeans have been relatively transferred into the domestic market.

In addition, Figure 4.3 shows that domestic production from 1980 to 1992 rose continuously by almost 200 per cent from 653 thousand metric tons (1980) to 1,870 thousand metric tons (1992). Area expansion and productivity improvement were two major causes for the increase in soybean production during this period. It is observed that the land under cultivation expanded from 732,000 hectares to 1,670,000 hectares and that productivity increased from 0.9 metric ton/hectare to 1.1 metric ton/hectare. The increase in both area under cultivation and soybeans productivity might have been influenced by the high import tariff and a floor price policy during that period, as both these policies ensure a stable price and reduce risk for farmers.

Figure 4.2 Monthly World Price and Domestic Producer Price of Soybeans, 1992-2009

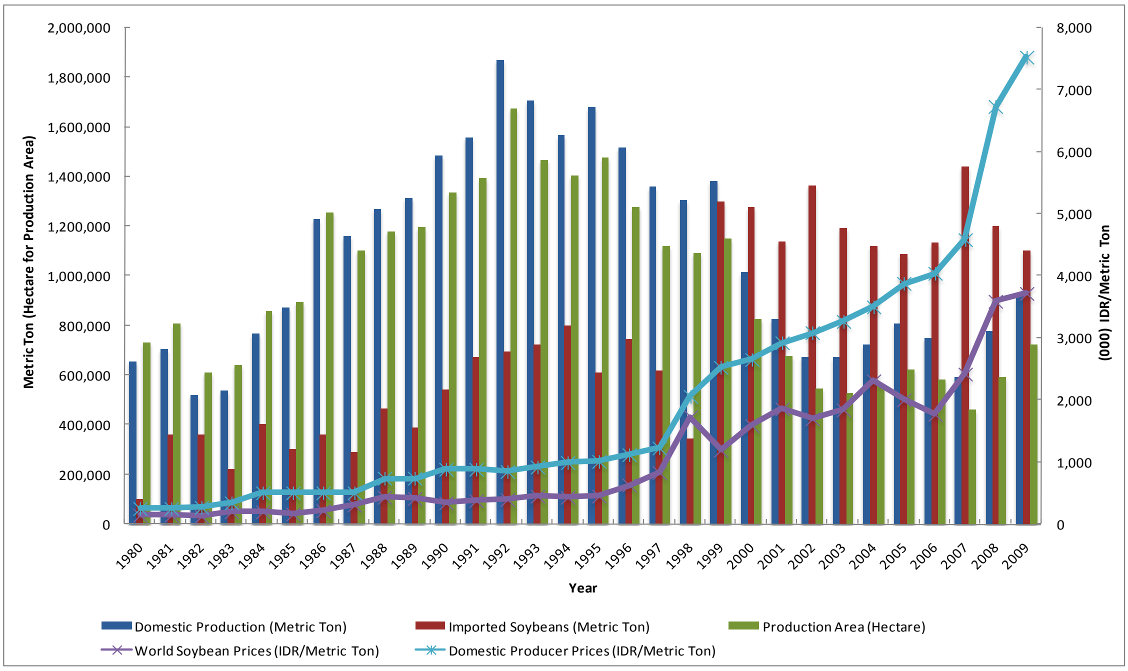


Source: Authors' compilation.

Note: World soybean price refers to soybeans cif. Rotterdam, available at (http://www.imf.org/external/np/res/commod/index.asp). Domestic producer price from January 1992 to November 2008 refers to an average producer price of soybeans from 31 cities (CEIC Database). From December 2008 to December 2009, the domestic price refers to average monthly price for soybeans published by BULOG and the Ministry of State Secretary. The domestic price is converted into US dollars. The exchange rate refers to the rate published by Bank Indonesia.

Unfortunately, the increase in production was not sustainable and was highly dependent on government support. When the government abolished the floor price policy in 1992 and reduced the import tariff from 10 per cent to 5 per cent in 1994, the domestic production of soybeans fell steadily and reached its lowest production level in 2003; at which point Indonesia was only able to produce 671,000 metric tons. Starting from 2004, soybean production began growing in line with government policies to support self-sufficiency in soybeans.

Figure 4.3 Domestic Production, Imports, Production Area, Domestic Producer Price and Imported Price of Soybeans in Indonesia (1980-2009)



Source: Authors' compilation.

Note: From 1980 to 2007, data for domestic production and import of soybeans is from FAO statistics (http://faostat.fao.org/site/342/default.aspx). Data for 2008 and 2009 is from the Ministry of Agriculture (http://www.deptan.go.id/ditjentan/dpi/eksimp.pdf). From 1993 to 2009 production data is from the Central Statistics Agency (BPS). From 1980 to 1990, data is from BPS' statistics in Kumenaung (1994). We estimated the missing production area data for 1991 and 1992 by dividing domestic production with productivity level. Sources for domestic and world price data for 1992 to 2009 are given in the note in Figure 1. Data on domestic prices from 1980 to 1991 is from Kumenaung (1994), while data for world soybean prices from 1980 to 1991 is from soybeans cif. Rotterdam available at (http://www.imf.org/external/np/res/commod/index.asp).

Furthermore, a decline in domestic production since 1993 had to be covered with a rapid increase in imported soybeans to fulfill domestic demand. Figure 4.3 shows that, by 1992, Indonesia imported 694,000 metric tons of soybeans for consumption. From 1993 to 1998, the volume of imported soybeans slightly increased but did not exceed that of domestic production. This indicates that imported soybeans functioned as a complement to domestic production. However, since 1999 domestic production of soybeans and imported soybeans have moved in opposite directions; that is, domestic production has been drastically decreasing, while imports of soybeans are increasing rapidly. Consequently, since 2000, imported soybeans have played a major role in meeting the domestic demand for soybean products. On average, imported soybeans contribute more than 60 per cent of domestic consumption of soybeans. Therefore, the dramatic surge in world commodities prices in 2007-2009 has adversely affected many Indonesians because the prices of soybeans and soybean-based products such as tofu and tempe suddenly increased to unaffordable levels, particularly for the low-income group.

Figures 4.2 and 4.3 show that domestic prices of soybean in Indonesia have remained higher than world prices throughout 1980s and beyond, except for a very short period in 1998. Although the government liberalized the domestic market from 1992 by reducing import tariffs, abolishing the floor price and reducing the role of *BULOG* in controlling the domestic price, the domestic producer price was always higher than the world price between 1992 and 2009. This is mainly for two reasons. First, domestic production of soybean has gone down drastically during this period compared to 1980s due to the decline in the area of production of soybean and abolition of the floor price system. Second, the domestic consumption of soybeans has increased over the years due to the low import price compared the domestic price. However, the high domestic producer price in 1990s and beyond was not followed by an increase in production as it was in the period 1980-91. Thus, the high domestic price might not be the main factor in increasing soybean production. Instead, there are other factors such as input subsidies and price guarantees which can be used to increase domestic production.

4.2.3 Research Methodology and Simulation Scenarios

This research uses the CGE micro-simulation approach (CGE-MS) in order to calculate how world soybean prices and zero import tariffs influences poverty in Indonesia. The detailed methodology that follows Dartanto (2010b), Dartanto and Usman (2011) is already explained in the Chapter 3[15]. The model then is used to simulate several scenarios of world soybeans prices and tariff policies.

The aim of simulations is to find out how much change occurred in poverty under the various scenarios of world prices and import tariffs of soybeans. The scenario simulations are conducted by taking into account the fact that the world price of soybeans could sharply increase (decrease) within a short period. In 2008, the monthly world price of soybeans could increase or decrease from 2 per cent to 100 per cent. In addition, the government also actively intervenes in the domestic soybeans market through changing the import tariffs on soybeans.

The simulations are done under several scenarios which are basically divided into four categories: first, simulating an increase in world soybeans price by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent; second, simulating a decrease in world soybeans prices by 20 per cent, 40 per cent, 60 per cent and 80 per cent[16]; third, simulating various decreases in import tariffs on soybeans by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent; lastly, simulating various increases in import tariff of soybeans by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent. Various simulations are conducted in order to ascertain the sensitivity of poverty in respect to the change in world prices and import tariffs.

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[15] The elasticity data used in this CGE refers to sources such as the elasticity in the Indonesian IFPRI CGE Model, *Wayang* Model and other estimations on elasticity. The Armington elasticities, the elasticity of substitution between imports and domestic output in domestic demand, are 0.5 for all commodities except soybeans (2.0), rice (2.0), food crops (1.5) and food-beverage industry (1.5). Constant elasticity of transformation (CET) for domestic marketed output between exports and domestic supplies is set equal 0.5 for all commodities except rice (2.0), soybeans (1.5), food crops (1.5), and food-beverage industry (1.5). Elasticity of substitution (CES) between factors of production is 0.25 for all activities. Elasticity of substitution between aggregate factors and intermediate input is 0.5 and elasticity of output aggregation for commodities is 3. Furthermore, household consumption is modelled under the Linear Expenditure System (LES), whereby the elasticities vary between commodities, and the elasticity is less than 1 for food products and more than 1 for industrial products and services.

[16] We did not simulate a 100 per cent decrease in the world soybean price. This is because a 100 per cent decrease means the world soybean price equal to 0 which is impossible in the CGE's simulation.

Furthermore, the simulations are done under the following closure rules: flexible government saving and fixed direct tax rates, flexible exchange rates and fixed foreign saving, fixed capital formation, labor fully employed and mobile across activities, capital fully employed and activity-specific and fixed domestic producer price (price numeraire).

4.2.4 The Impact of World Soybean Prices and Import Tariffs on Poverty in Indonesia

4.2.4.1 CGE results

Changes in Macroeconomic Indicators, Consumer Prices and Factor Incomes

Generally, an increase (decrease) in world soybean prices will be followed by a decrease (increase) in macroeconomic indicators such as private consumptions, imports, net indirect tax, and gross domestic product (GDP), while other indicators, exports and consumer price index (CPI), move in the same direction to change the world prices (see Appendix 4.5). The simulation results shows that a 100 per cent increase in world soybean prices decreases private consumptions by 0.233 per cent, imports by 0.294 per cent, net indirect tax by 0.602 per cent and GDP by 0.074 per cent, while increasing exports and CPI by 0.045 per cent and 0.293 per cent, respectively. An increase in CPI depletes households' welfare that at the end decreases household (private) consumptions as well as GDP. The same magnitude of change in macroeconomic indicators is also observed on increases (decreases) in the import tariffs of soybeans.

Furthermore, an increase (decrease) in the world soybean price would decrease (increase) the composite of good supply in domestic market. A 100 per cent increase in the world price leads to a decline in composite supply of soybeans by 6.7 per cent. Theoretically, an increase in import prices reduces demand for imported goods and provides incentives to domestic producers to raise production. However, due to a high dependency on imported soybeans and lack of flexibility in domestic production of soybeans to respond to price increases, an increase in domestic production of soybeans are unable to fill a gap of composite supply resulted from massive decreases in imported soybeans. Hence, the composite of soybean supply declines below the previous level.

Turning to changes in consumer prices and factor incomes, the CGE simulation shows that an increase in the world price of soybeans by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent raises the domestic consumer price of soybeans by 11.5 per cent, 22.1 per cent, 31.8 per cent, 41.1 per cent and 50 per cent, respectively (see Appendix 4.6). An increase in the domestic consumer price of soybeans will directly raise the price of other products such as livestock and fishery products which utilize soybeans as a production input. For instance, a 100 per cent increase in the consumer price of soybeans will be followed by a 1.8 per cent increase in the consumer price of livestock products. Moreover, if the world price decreases by 20 per cent, 40 per cent, 60 per cent and 80 per cent, the domestic price of soybeans decreases by 12.9 per cent, 27.8 per cent, 46 per cent and 69 per cent, respectively.

Furthermore, an increase in the world price of soybeans is advantageous only for agricultural labor factors since the wages of these labor categories significantly increase (see Appendix 4.7). However, other labor categories and non-labor factor are worse off under this condition due to a sharp decrease in average wage rates and rate of return. The wage rate of agricultural labor rises approximately 2 per cent but the wage rate of other labor categories declines from 0.6 to 2 per cent. The reason is that an increase in domestic soybean prices and other agricultural sectors give an incentive to domestic producers to increase production of agricultural sectors that raises the demand for agricultural labor, bidding up its wage. This increase in agricultural labor wages is transmitted through the entire economy, lowering the average return to semi-skilled labor, skilled labor and capital.

On the other hand, the reduction of import tariffs by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent will lower the domestic price of soybeans by 1.6 per cent, 3.2 per cent, 4.7 per cent, 6.4 per cent and 8.1 per cent, respectively (see Appendix 4.6). These policies can raise the average income of non-agricultural factors of production varying from 0.004 per cent to 0.196 per cent (see Appendix 4.7). Meanwhile, the increase in import tariff at the same rate can raise the domestic price of soybean by 1.6 per cent, 3.1 per cent, 4.6 per cent, 6.0 per cent and 7.6 per cent and it is followed by an increase in the return of agricultural labor varying from 0.085 per cent to 0.318 per cent. These findings support the economic theory that agricultural labor would theoretically be better off in the presence of high import tariffs on soybeans, as they transmit into high domestic prices, which will create incentives to domestic producers to increase the production of soybeans, which raises the demand for agricultural labor, which boosts wages. Appendix 4.6 and 4.7 show detailed information of simulated changes in prices and factors income under various changes in the world soybean price and import tariffs.

4.2.4.2 A CGE-Microsimulation analysis

World soybean prices and poverty

In a CGE-Microsimulation analysis, the impacts of world price volatility and import tariffs of soybeans on poverty depend solely on how large the effect of these shocks are on changing price level and factor incomes in the economy. The extent to which price and factor income changes can influence the incidence of poverty depends on consumption patterns and source of income for the poor. They also depend on how sensitive the poverty line is to price changes.

Table 4.7 summarizes the impact of various world prices of soybeans on poverty in Indonesia. An increase in the world price of soybeans theoretically intensifies poverty, while a decrease in world prices reduces it. A 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent increase in the world price raises the headcount index by 0.132 per cent, 0.204 per cent, 0.296 per cent, 0.385 per cent and 0.496 per cent, respectively. These are equivalent to an increase in the number of poor by 275,587; 427,971; 619,134; 805,686 and 1,037,635. On the other hand, a decrease in the world price by 20 per cent, 40 per cent, 60 per cent and 80 per cent reduces the headcount index by 0.118 per cent, 0.201 per cent, 0.296 per cent and 0.427 per cent, respectively. The fluctuation of world soybean price and the poverty incidence move in the same direction. However, the elasticity of poverty in relation to the world soybean price is not constant and decreases in line with the higher price change.

At the disaggregate level, all household categories, agricultural and non-agricultural, suffer from an increase in the world soybean price. Households which are working in the electricity-water-gas and construction sectors are the group that suffers most from an increase in the world soybean price. If the world price rises by 100 per cent, the headcount index rises by 0.731 per cent. In terms of absolute numbers, poverty increases are more frequently observed in households working in the trade-hotel-restaurant-transportation and telecommunication sectors. An increase of 100 per cent in the world price raises the number of poor by 186,116. Most households in both groups, particularly subgroups working in construction and transportation, are basically low-income groups characterized as living in urban areas, unskilled and semi-skilled labor with a high proportion of their protein consumption from tempe and tofu. Hence, an increase in the world soybean price adversely affects these groups from both the expenditure and the income sides. This is due to a sudden increase in domestic price of soybeans and soybean-based products to unaffordable level and also a decline in wages of non-agricultural labor categories.

Table 4.7 Simulated Changes in the Headcount Index under Various Changes in the World Price of Soybeans

Sector	Population	Initial Poverty 2005	Increase in the World Price of Soybeans					Decrease in the World Price of Soybeans			
			20%	40%	60%	80%	100%	-20%	-40%	-60%	-80%
Agriculture (with Land)	57,332,312	23.81	0.096	0.184	0.258	0.379	0.534	-0.108	-0.182	-0.318	-0.406
Agriculture (without Land)	20,448,294	25.73	0.073	0.031	0.126	0.271	0.392	-0.077	-0.156	-0.182	-0.304
Industry	19,916,155	11.25	0.137	0.242	0.329	0.390	0.574	-0.148	-0.304	-0.435	-0.569
Electricity, Water, Gas and Constructions	14,312,875	17.66	0.154	0.441	0.538	0.614	0.731	-0.235	-0.356	-0.658	-0.997
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	0.141	0.190	0.249	0.299	0.394	-0.124	-0.173	-0.217	-0.370
Banking, Financial Int., Government and Private Services	26,863,587	6.94	0.185	0.251	0.410	0.523	0.583	-0.081	-0.169	-0.239	-0.332
Others	23,201,581	15.81	0.171	0.205	0.324	0.369	0.387	-0.112	-0.197	-0.231	-0.338
Total	**209,309,307**	**16.40**	**0.132**	**0.204**	**0.296**	**0.385**	**0.496**	**-0.118**	**-0.201**	**-0.296**	**-0.427**

Source: Authors' calculation.
Note: The province of Nanggroe Aceh Darussalam was not included in the calculation since it was not surveyed in 2005.

On the other hand, in contrast to what many theories predict, households working in the agricultural sectors do not benefit from an increase in the world price. This is because of the high proportion of budgets going towards food, high dependency on imported soybeans and rigidity in domestic production of soybeans in response to an increase in price. BPS reports that even though the budgeted share on food has been continuously decreasing since 1999, food expenditure in 2009 still represented 50.62 per cent of average consumer expenditure, which is mostly spent on food crops. An increase in the world soybean prices that suddenly increases prices of domestic soybeans, soybean-based products and other agricultural products forces agricultural households to choose two difficult options, either reduce food consumption or use substitutes. However, substitution is not a feasible option because food consumption is related to taste and custom. Moreover, even though agricultural households benefit through a gradual increase in wages of agricultural labor, it can only compensate partially for the increase in expenditure as a result of price increases. Therefore, increases in world commodity prices hurt agricultural households rather than benefits them.

On the other hand, a decrease in the world soybean price at any level is advantageous not only for non-agricultural households but also for agricultural households with and without land. A 40 per cent decrease in world price will result in the largest decrease in absolute poverty by almost 104,464 agricultural households owning land. From these results it appears that the argument that a high price for agricultural commodities is good and a low price for these commodities is bad for agricultural households, does not have strong empirical support. On the other hand, households working in the electricity- water-gas and construction sectors benefit most from decreasing prices.

Table 4.8 Simulated Changes in the Poverty Gap Index under Various Changes in the World Price of Soybeans

Sector	Population	Poverty Gap Index 2005	Increase in the World Price of Soybeans					Decrease in the World Price of Soybeans			
			20%	40%	60%	80%	100%	-20%	-40%	-60%	-80%
Agriculture (with Land)	57,332,312	4.71	0.034	0.048	0.069	0.098	0.126	-0.033	-0.051	-0.066	-0.115
Agriculture (without Land)	20,448,294	5.52	0.020	0.020	0.030	0.060	0.080	-0.020	-0.020	-0.020	-0.060
Industry	19,916,155	2.10	0.030	0.050	0.070	0.100	0.120	-0.030	-0.050	-0.070	-0.090
Electricity, Water, Gas and Constructions	14,312,875	3.01	0.050	0.080	0.120	0.159	0.199	-0.050	-0.099	-0.139	-0.199
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	2.01	0.023	0.036	0.053	0.069	0.089	-0.020	-0.033	-0.056	-0.086
Banking, Financial Int., Government and Private Services	26,863,587	1.36	0.029	0.039	0.067	0.087	0.106	-0.019	-0.039	-0.068	-0.098
Others	23,201,581	3.40	0.031	0.051	0.072	0.093	0.115	-0.022	-0.043	-0.073	-0.115
Total	**209,309,307**	**3.24**	**0.030**	**0.044**	**0.065**	**0.090**	**0.114**	**-0.027**	**-0.045**	**-0.066**	**-0.104**

Source: Authors' calculation.
Note: The province of Nanggroe Aceh Darussalam was not included in the calculation since it was not surveyed in 2005.

In order to complement the headcount index analysis, we provide the poverty gap index in Table 4.8. This index represents the gaps between poor people's standard of living and the poverty line, which shows the shortfall in the poor's expenditure from the poverty line expressed as an average of the population. It can be interpreted as how far the poor are below the poverty line. This index can also be utilized as an indicator of the minimum cost of eliminating poverty using perfectly targeted transfers. The pattern of change in the poverty gap index responding to an increase (decrease) in world soybean prices (import tariffs) is not different from the changes in the headcount index. The higher the world soybean prices, the wider the poverty gap index and vice versa. A 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent increase in the world price raises the poverty gap index by 0.030 per cent, 0.044 per cent, 0.065 per cent, 0.090 per cent and 0.114 per cent, respectively. This is because the negative impact of domestic prices dominates over the positive impact of raising wages, so that the expenditure (welfare) of low-income households initially above the poverty line drops below the poverty line and the expenditure of poor that were below the line falls further away from the poverty line.

Although this study shows that the impact of an increase in the world price of soybeans on poverty is similar to the direction of Warr and Yusuf (2009)'s finding, the magnitude is larger than that of their findings, in which they showed that a 169 per cent increase in nominal world soybean prices during 2003-08 raised the headcount index by 0.05 per cent in Indonesia. The difference in the results might be due to differences in the methodology applied, the database used, choice of parameters in the CGE, and the change in economic environments.

Import tariffs of soybeans and poverty

The impact of the import tariffs of soybeans on poverty has a pattern that is similar to the impact of world price volatility of soybeans on poverty. Table 4.9 shows that, at the national level a decrease in import tariffs of soybeans by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent will be followed by a decrease in the headcount index by 0.022 per cent, 0.036 per cent, 0.041 per cent, 0.047 per cent and 0.059 per cent, respectively, which is equal to a decrease in the number of poor by 46,218, 75,430, 84,943, 98,930 and 123,275, respectively. Moreover, if the government imposes zero import tariffs (i.e., a decrease in import tariffs from 10 per cent to 0 per cent) on soybeans, the poverty incidence in all household categories will decrease significantly. In addition, households working in the utilities and construction sectors and industrial sectors also acquire significant benefit from this policy since the poverty index in both household categories significantly decreases by 0.170 per cent (24,365) and 0.105 per cent (20,814), respectively.

On the other hand, an increase in import tariffs at any level will adversely affect all household categories. The headcount index increases by 0.041 per cent, 0.047 per cent, 0.062 per cent, 0.068 per cent and 0.077 per cent responding to a decrease in import tariffs of soybeans by 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent, respectively. The numbers are equivalent to an increase in the number of poor by 85,826, 98,284, 130,733, 143,200 and 161,131, respectively. Measures in the agriculture sector such as doubling the import tariff, i.e., from 5 per cent to 10 per cent, intended to help agricultural producers, will result in a move in the opposite direction. The poverty in this category rises by 0.070 per cent (40,374). The households to suffer most as a consequence of doubling tariffs are those working in the trade-hotel-restaurant-transportation and telecommunications sectors.

Table 4.9 shows three important findings: first, the zero import tariffs implemented by the government through regulation 01/PMK.011/2008 in response to high world prices from 2007 to 2009 could not perfectly absorb the negative impact of rising world soybean prices on poverty in Indonesia. Second, high import tariffs on soybeans, intended to help agricultural producers, does not have strong empirical support. Third, a surprising finding was that agricultural households, whether they own land or not, will benefit from decreasing import tariffs and suffer from increasing import tariffs. This appears to contradict a common belief that a decrease in import tariffs would cause suffering for agricultural households while an increase in import tariffs would be advantageous for agricultural households.

Theoretically, increases in import tariffs have two effects: an income effect from an increase in incomes of those who sell either soybeans or agricultural labor, and the price effect which results from an increase in the price of soybeans and soybean-based commodities. It is observed that the price effect is more dominant than the income effect when import tariffs either increase or decrease. Similar to the earlier finding, this is due to the high budget share of food and rigidities in domestic production of soybeans in response to an increase in price. Therefore, both landless agricultural households and landowner agricultural households are worse off in the presence of high import tariffs on soybeans.

Table 4.9 Simulated Changes in the Headcount Index under Various Changes in Import Tariffs of Soybeans

Sector	Population	Initial Poverty 2005	Decrease in the Import Tariff of Soybeans					Increase in the Import Tariff of Soybeans				
			-20%	-40%	-60%	-80%	-100%	20%	40%	60%	80%	100%
Agriculture (with Land)	57,332,312	23.81	-0.004	-0.039	-0.027	-0.040	-0.058	0.055	0.045	0.059	0.055	0.070
Agriculture (without Land)	20,448,294	25.73	-0.039	-0.039	-0.039	-0.013	-0.018	0.005	0.016	0.051	0.051	0.022
Industry	19,916,155	11.25	-0.021	-0.021	-0.021	-0.063	-0.105	0.045	0.045	0.052	0.096	0.096
Electricity, Water, Gas and Constructions	14,312,875	17.66	-0.120	-0.120	-0.170	-0.170	-0.170	0.032	0.032	0.079	0.079	0.079
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	-0.019	-0.019	-0.034	-0.042	-0.042	0.056	0.075	0.089	0.089	0.103
Banking, Financial Int., Government and Private Services	26,863,587	6.94	-0.021	-0.021	-0.029	-0.029	-0.029	0.031	0.031	0.031	0.054	0.077
Others	23,201,581	15.81	0.000	-0.039	-0.039	-0.039	-0.058	0.020	0.051	0.061	0.061	0.071
Total	**209,309,307**	**16.40**	**-0.022**	**-0.036**	**-0.041**	**-0.047**	**-0.059**	**0.041**	**0.047**	**0.062**	**0.068**	**0.077**

Source: Authors' calculation.
Note: Nanggroe Aceh Darussalam was not included in the calculation since this province was not surveyed in 2005.

Table 4.10 shows changes in the poverty gap index under various changes in the import tariffs of soybeans. A 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent decrease in the import tariffs reduce the poverty gap index by 0.003 per cent, 0.004 per cent, 0.005 per cent, 0.011 per cent and 0.013 per cent, respectively. The poverty gap index of some groups, such as industry and service employees, does not change in response to a decrease in import tariffs of soybeans up to 60 per cent. This shows that the poverty gap index is insensitive to a change in the import tariffs of soybeans because adjustments in the import tariffs have little effect on changing prices and factor incomes in the economy.

Table 4.10 Simulated Changes in the Poverty Gap Index under Various Changes in the Import Tariffs of Soybeans

Sector	Population	Poverty Gap Index 2005	Decrease in the Import Tariff of Soybeans					Increase in the Import Tariff of Soybeans				
			-20%	-40%	-60%	-80%	-100%	20%	40%	60%	80%	100%
Agriculture (with Land)	57,332,312	4.71	-0.004	-0.007	-0.007	-0.011	-0.014	0.013	0.014	0.018	0.018	0.020
Agriculture (without Land)	20,448,294	5.52	-0.010	-0.010	-0.010	-0.010	-0.010	0.010	0.010	0.010	0.010	0.010
Industry	19,916,155	2.10	0.000	0.000	-0.010	-0.010	-0.010	0.010	0.010	0.020	0.020	0.020
Electricity, Water, Gas and Constructions	14,312,875	3.01	-0.010	-0.010	-0.020	-0.020	-0.030	0.010	0.010	0.020	0.020	0.030
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	2.01	0.000	0.000	0.000	-0.010	-0.010	0.010	0.010	0.013	0.013	0.013
Banking, Financial Int., Government and Private Services	26,863,587	1.36	0.000	0.000	0.000	-0.009	-0.010	0.001	0.010	0.010	0.010	0.010
Others	23,201,581	3.40	-0.001	-0.001	-0.001	-0.011	-0.011	0.010	0.010	0.020	0.020	0.020
Total	**209,309,307**	**3.24**	**-0.003**	**-0.004**	**-0.005**	**-0.011**	**-0.013**	**0.010**	**0.011**	**0.016**	**0.016**	**0.017**

Source: Authors' calculation.
Note: Nanggroe Aceh Darussalam was not included in the calculation since this province was not surveyed in 2005.

4.2.5 Sensitivity Analysis

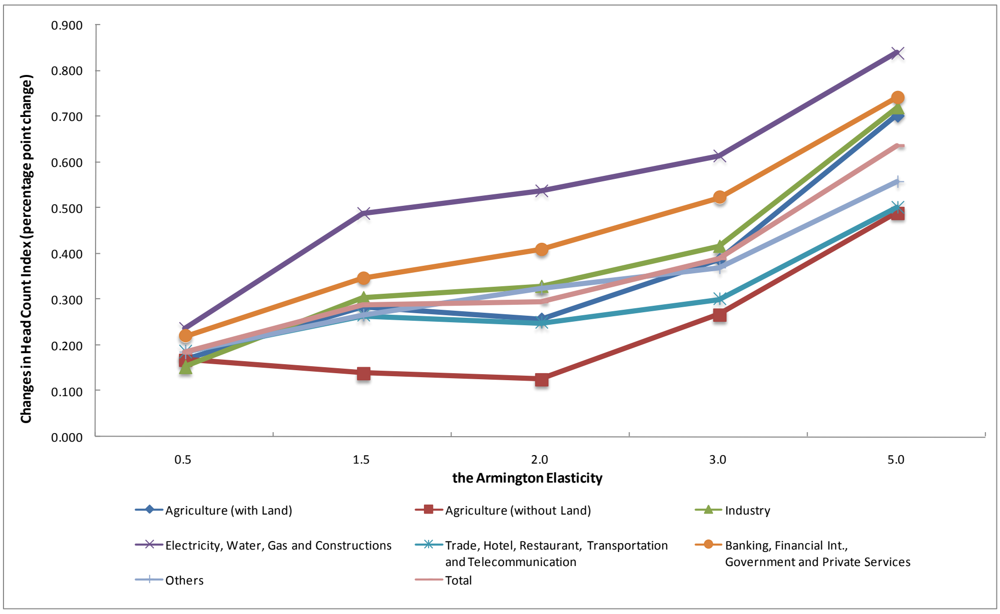
The CGE estimation results are known to be sensitive to the values of Armington elasticities. However, there have been few empirical studies on estimating these elasticities, and in the few studies that do exist, the estimates of these elasticities varied widely. McDaniel and Balistreri (2003) confirmed that the wide range of estimates of Armington elasticities depends on the data used, disaggregated sectors and methodology applied. Many CGE studies in Indonesia have applied a wide range of Armington elasticities on the agricultural food sector, which includes soybeans. The Indonesia IFPRI CCE model[17], Warr (2005), Warr and Yusuf (2009) assumed that the Armington elasticity is 10, 6, and 2, respectively.

Figure 4.4 shows that the impacts of a 60 per cent increase in world soybean prices on poverty are quite sensitive to the variation of Armington elasticity of soybeans. An increase (decrease) in the Armington elasticity will be followed by an increase (decrease) in the poverty incidence. At the national level, changing elasticity from 2 to 3 will increase the

[17] Presentation Material of CGE Training at Department of Economics, University of Indonesia in 2002

headcount index from 0.296 per cent to 0.390 per cent, equivalent to an increase in the number of poor from 619,134 to 815,846. Similarly, changing the elasticity from 2 to 0.5 will decrease the number of poor from 619,134 to 386,185. According to the sensitivity analysis in CGE, it is found that the direction of poverty trends is similar when the same Armington elasticities are applied to conduct a sensitivity analysis of the poverty impact of import tariffs and a decrease in world soybean prices. This paper only shows the sensitivity analysis of increasing in the world soybeans price.

Figure 4.4 The Headcount Index under Varying Armington Elasticities of Substitution in Soybeans



Source: Authors' calculations.

The crucial question is, what is the appropriate Armington elasticity of substitution of soybeans? Answering this question is very difficult since there is no empirical study to estimate this elasticity. One way to find out the appropriate Armington elasticity of substitution is to observe the simulated change in domestic soybean prices resulting from CGE model and comparing it either with real conditions or with results from another method. According to a simple regression[18], the coefficient of the world price is 0.47 which means that

[18] The regression of the relationship between the domestic price and the world price in soybeans is shown

a one point change in world price will raise the domestic price by 0.47. However, under the 95 per cent confidence interval, the coefficient ranges from 0.27 to 0.66. Therefore, a 60 per cent increase in world price will raise the domestic price by approximately 28 per cent, but ranging from 16.2 per cent to 39.6 per cent. On the other hand, the simulation results from the CGE model showed that, under various Armington elasticity of substitution, a 0.5, 1.5, 2, 3 and 5, a 60 per cent increase in the world soybeans price will raise the domestic soybeans price by 23.9 per cent, 29.7 per cent, 31.8 per cent, 35.2 per cent and 40 per cent, respectively. Comparing both the CGE result and the econometric result, it can be concluded that the results are fairly similar and that the Armington elasticity of substitution could be set as 2, as the moderate value.

4.3 Complementing Zero Import Tariff Policies with Other Policies in Protecting the Poor: A Case of Soybeans[Θ]

The zero import tariffs implemented by government through regulation 01/PMK.011/2008 responding to the high world soybean price during 2007 to 2009 costs around USD 35 million resulted from the government revenue lost. This policy could not perfectly absorb the negative impact of increasing world soybean price on poverty in Indonesia. It is shown that the zero import tariffs could only protect 197.44 thousand people from a poverty trap. However, it is observed that during 2007-2009 the average increase in the world soybean price was approximately 48 per cent which had impoverished roughly 600

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as follow:

$$\Delta\left(domestic\_price_t\right) = 1.695 + 0.470 \cdot \Delta\left(world\_price_t\right)$$

t-statistic 0.921 4.760

N=215, F-statistic: 22.66, R-square= 0.096, DW=1.522

Transforming the original price value into difference value is done in order to eliminate serial correlation.

[Θ] This part is drawn from the article of "Dartanto, T (2011a), Should Government Complement Zero Import Tariffs with Other Policies to Protect the Poor from Increase in the World Soybean Price in Indonesia?, *The Empirical Economics Letters*, Vol. 10 No. 6 pp. 551-559".

thousand people. Hence, the zero import tariffs might not enough to protect the poor from a dramatic increase in the world price.

Table 4.11 Simulated Changes in the Headcount Index (per cent) under Various World Soybean Prices, Zero Import Tariffs and Various Alternative Policies

Sector	Population	Initial Poverty 2005	Increase in World Soybean Price		Zero Import Tariffs on Soybeans (0%)	Increase in Production Subsidies on Soybeans		Increase in Government Exp. on Infrastructure	
			40%	60%		100%	200%	1%	2%
Agriculture (with Land)	57,332,312	23.81	0.179	0.216	-0.082	0.000	-0.005	0.000	0.000
Agriculture (without Land)	20,448,294	25.73	0.078	0.135	-0.111	-0.039	-0.039	-0.039	-0.039
Industry	19,916,155	11.25	0.361	0.402	-0.148	-0.011	-0.011	-0.011	-0.021
Electricity, Water, Gas and Constructions	14,312,875	17.66	0.563	0.719	-0.218	-0.033	-0.033	-0.057	-0.120
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	0.230	0.278	-0.091	-0.019	-0.019	-0.019	-0.019
Banking, Financial Int., Government and Private Services	26,863,587	6.94	0.418	0.509	-0.039	0.000	-0.021	-0.021	-0.021
Others	23,201,581	15.81	0.289	0.308	-0.058	0.000	0.000	0.000	0.000
Total	**209,309,307**	**16.40**	**0.267**	**0.322**	**-0.094**	**-0.011**	**-0.016**	**-0.016**	**-0.021**

Source: Author's calculation.

Note: Not included Nanggroe Aceh Darussalam. This simulation used the different Armington elasticities, therefore, the poverty impacts of increases in the world soybean prices and zero import tariffs are different with the figure in Table 4.7 and Table 4.9. The different elasticities are used to confirm the consistency and stability of the results of CGE model.

In order to protect the poor from increase in the world soybean price, by considering budget constraints, effectiveness of results and time-frames, government should complement zero import tariffs with other policies. Table 4.11 showed that increase in public infrastructure expenditure by 1 per cent and 2 per cent that cost around USD 9.24 million and USD 18.5 million will reduce the poverty index by 0.016 per cent and 0.021 per cent respectively. These figures equal to 33.2 thousand and 44.12 thousand people. An infrastructure development will create a job opportunity and increase income immediately particularly for unskilled labor. In the short run, government, therefore, can combine zero import tariffs with infrastructure projects to deal with the adverse impacts of increase in the world soybean prices.

However, in the long run, government should increase a self sufficiency of soybeans, for instance by giving soybean production subsidies, in order to reduce the vulnerability resulted from the volatility of world soybean prices. Doubling or tripling production subsidies on soybeans that cost around 1.55 million and USD 2.3 million will reduce the poverty index by 0.011 per cent and 0.016 per cent respectively. Combining zero import tariffs and production subsidies will solve two problems of protecting the poor and providing an incentive for farmer to produce more at once.

4.4 Concluding Remarks

In Indonesia, rice is always a sensitive and controversial issue since rice expenditure accounts for a larger share of household expenditure and also many households depend on rice activities as their income source. The fluctuations of the world price of rice during 2007 to 2010 significantly increased (decreased) the poverty incidence in Indonesia. The simulation results showed that a 60 per cent increase in the world price of rice raises the headcount index by 0.81 per cent which is equivalent to an increase in the number of poor by 1,687,270 persons, while a decline in the world price at the same rate decreases poverty by 1.39 per cent equal to 2,910,403 persons. In contrast to what many theories predict, households working in the agricultural sectors do not benefit from an increase in world prices due to their spending a high proportion of their budgets on food and lack of flexibility in the domestic production of rice in response to price increases.

On the contrary, government policies involving both a 40 per cent decrease in the effective import tariffs of rice in response to high world prices of rice during 2007 to 2009 and the zero import tariffs in response to high world prices in 2010 could not perfectly absorb the negative impact of rising world rice prices on poverty in Indonesia. The decrease in import tariffs of rice from IDR 750 per kg to IDR 450 per kg (40 per cent decrease in import tariffs) decreased the headcount index by 0.08 per cent, which equals a decrease in the number of poor by 161,546 persons. The zero import tariff of rice reduced the headcount index by 0.19 per cent which equals 390,160 persons. This policy might be not enough to absorb the negative impact of an increase in world rice prices from 2007 to 2010 because, during this period, world rice prices increased on average by almost 71 per cent which had impoverished approximately 2 million people. On the contrary, protection of the agricultural sector, such as raising import tariffs which is actually intended to help agricultural producers, will yield the opposite. The simulations clearly showed that the agricultural households - that would theoretically be worse off in the presence of low import tariffs on rice - are in fact better off.

On the other hand, the fluctuations in the global price of soybeans during 2007-09 also significantly increased the poverty incidence in Indonesia. The simulation result showed that a 40 per cent increase in world price raises the headcount index by 0.204 per cent which is equivalent to an increase in the number of poor by 427,971 while a decline in the world price at the same rate decreases poverty by 0.201 per cent. Households working in the agricultural sectors do not benefit from an increase in world soybean prices. This is due to spending a high proportion of their budgets on food, a high dependency on imported soybeans and lack of flexibility in domestic production of soybean in respond to price increases.

Zero import tariffs implemented by the government through regulation 01/PMK.011/2008 responding to the high world price could not perfectly absorb the negative impact of increasing world soybean price on poverty in Indonesia. The decrease in import tariffs of soybeans from 10 per cent to 0 per cent (zero import tariffs) decreased the headcount index by 0.059 per cent, which equals a decrease in the number of poor by 123,275. This policy might be also not enough to absorb the negative impact of an increase in world soybean prices from 2007-09. This is because, during this period, world soybean prices increased on average by almost 48 per cent which had impoverished approximately 500,000 people. The zero import tariffs would be effective in protecting the poor in Indonesia if the world soybean price increased by not more than 10 per cent.

The government should complement zero import tariffs with either public infrastructure projects or soybean production subsidies. However, production subsidies are preferable to implement due to supporting to achieve a self-sufficiency of soybeans. In the long run, an increase in self-sufficiency will reduce a volatility of the domestic soybean prices. Doubling or tripling production subsidies on soybeans that cost around 1.55 million and USD 2.3 million will reduce the poverty index by 0.011 per cent and 0.016 per cent respectively. Combining zero import tariffs and production subsidies will solve two problems of protecting the poor and providing an incentive for farmer to produce more at once.

Moreover, this study does not support 100 per cent self-sufficiency in soybeans because it will be biased in favor of producers and unfair to consumers, many of whom are also relatively poor. With self-sufficiency less than 100 per cent, Indonesia will be able to reduce uncertainty and vulnerability resulting from high fluctuation in world soybeans price and still enjoy benefits from international trade through lowering prices and creating competition in the domestic market. Further, this study suggests that in order to precisely estimate the poverty impact of changes in the world prices and import tariffs on rice and soybeans, the used elasticities in CGE model should be also precisely estimated.

Chapter 5

Reallocation Fuel Subsidies, Fiscal Balance and Poverty in Indonesia♣

5.1 Introduction

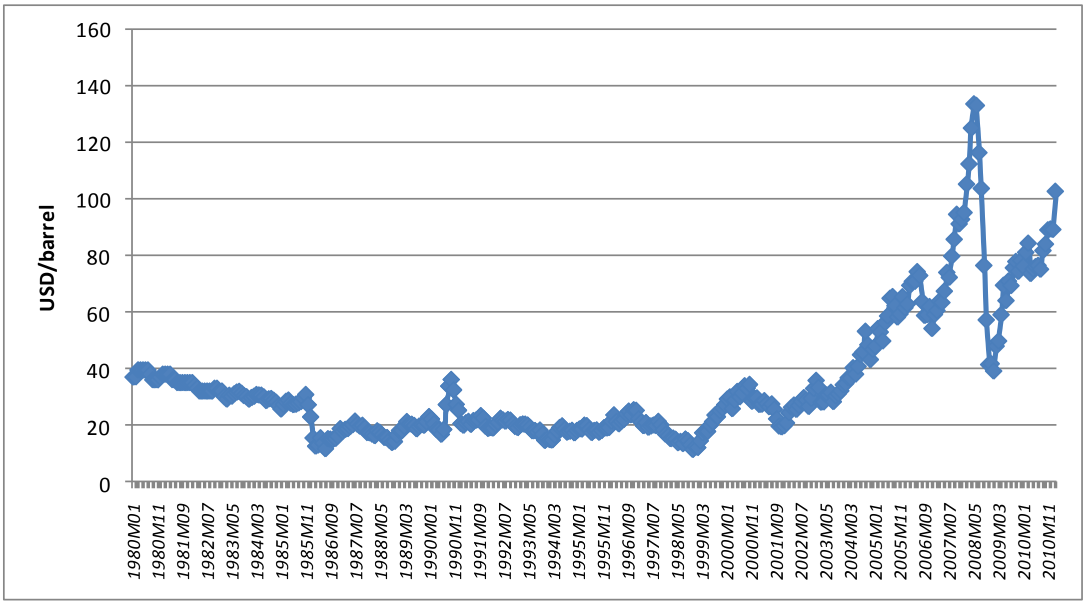
Indonesia has not been an oil-exporting country and has had decreasing oil production and increasing consumption since 2003. Its crude oil production decreases by roughly 4 per cent per year while fuel consumption increases by roughly 2 per cent per year. Indonesia is suffering fiscal pressures due to the decrease in oil revenue and rapid increase in fuel subsidies. This is because fuel prices in Indonesia are not determined by market mechanisms but administratively by the government. Therefore, oil revenues and fuel subsidies, therefore, always dominate the nation's economic policy agenda when the world oil prices sharply fluctuate.

The world oil prices were unpredictable during the last 10 years. Figure 5.1 shows the price was 29.52 USD/Barrel (January 2001), 46.82 USD/Barrel (January 2005), 133.93 USD/Barrel (June 2008), 64.14 USD/Barrel (July 2009) and 108.58 USD/Barrel (March 2011). In 2008, Agustina et al. (2008) confirmed that the Indonesian government was forced to spend around 27.93 per cent of its total budget on energy subsidies and 80 per cent of this was allocated for fuel subsidies. Son (2008) remarked that Indonesia spent 5 per cent of its gross domestic product (GDP) on energy subsidies. Other developing and emerging economies, where governments have significant influence over domestic prices, had increased fiscal costs, responding to the large increase in world fuel prices during 2003-2006. Baig et al. (2007) observed that, in 2005, fuel subsidies (as a percentage of GDP) cost around 5.8 per

♣ This chapter is currently under review in Energy Policy with the title "Reducing Fuel Subsidies and the Implication on Fiscal Balance and Poverty in Indonesia: A Simulation Analysis".

cent in Jordan, 9.2 per cent in Yemen, 13.9 per cent in Azerbaijan and 4.1 per cent in Egypt. This condition forced governments to pass the world fuel prices onto the domestic markets to reduce fiscal burdens.

Figure 5.1 The Monthly World Crude Oil Price (1980-2010)



Source: Plot based on the IMF Primary Commodity Statistics.

Massive fuel subsidies reduce fiscal space so governments have fewer sources to promote economic growth through investment in infrastructure or human capital. It would also worsen income distribution in Indonesia because most of the fuel subsidies are enjoyed by the non-poor groups, rather than by poor groups. Table 5.1 shows, in 2008, more than 41 per cent of gasoline subsidies benefitted the top richest income groups in Indonesia. The 30 per cent of the richest income groups enjoyed almost 72 per cent of gasoline subsidies. In the other hand, kerosene subsidies were distributed more equal to all households compared to gasoline subsidies. The 30 per cent of the lowest income groups consumed 16 per cent of kerosene subsidies and only 4 per cent of gasoline subsidies. Generally, the richest income group received fuel subsidies approximately IDR 111,533/month/capita while the lowest income group received fuel subsidies approximately IDR 10,787/month/capita. The richest income group enjoyed fuel subsidies more than 10 times larger than that of the lowest income group.

Table 5.1 Share of Fuel Subsidies Received by Households in 2008

Household Group by Consumption Deciles	Share of Fuel Subsidies (%)			Household Expenditure (IDR/Month/Capita)	Fuel Subsidies Received by Households (IDR/Month/Capita)
	Kerosene	Gasoline	Diesel Fuel		
1	3.70	0.55	0.05	123,256	10,787
2	5.28	1.32	0.49	164,925	16,410
3	7.00	2.19	0.84	196,632	22,573
4	8.15	3.39	1.24	229,225	27,802
5	9.73	4.70	1.93	265,084	34,436
6	11.59	6.78	2.17	308,761	43,114
7	13.56	9.10	2.35	363,421	52,581
8	15.03	12.56	5.02	440,198	62,975
9	14.60	17.63	16.95	571,048	72,031
10	11.36	41.77	68.95	1,090,754	111,533

Source: Author's calculation based on SUSENAS 2008.
*Note: Fuel Subsidies received by households=(Market Fuel Prices-Subsidized Fuel Prices)*Quantity of Fuel Consumptions.*

The Indonesian government will continually attempt to change the subsidy system from product subsidies, such as fuel and electricity, to direct subsidies, such as cash transfer and productive activities such as education, health, infrastructure and entrepreneurship. Moreover, starting from 2003, the Indonesian government deregulated fuel prices for industries, particularly for the mining, quarrying, cement and steel industries, in which the domestic price is delivered to the market following the world price. This policy was regulated with No.31K/20/MEM/2003 and 31/KMK.01/2003. These changes aim to reduce the budget deficit and improve the allocation of appropriate budgetary targets for the poor. Nevertheless, the Indonesian government still regulated the retail prices of fuels; it therefore has to spend a significant amount of money to subsidize the disparity between world and domestic prices when there is a big gap between the two. The government is forced to adjust domestic fuel prices following the fluctuation of world oil prices to reduce the fiscal deficit.

The drastic reduction of fuel subsidies in 2005 resulted in misery for the poor. In addition to increasing the cost of energy, it also indirectly increased non-fuel prices (e.g. increasing the cost of living, food, transportation, etc.). The Central Statistical Agency (BPS) showed the number of poor people increased by around 3.95 million people during 2005-2006. One reason for the massive increase in poverty was the massive reduction in fuel subsidies in 2005. On the other hand, in order to mitigate the negative impact of the removal of fuel subsidies, the government implemented the *Program Kompensasi Pengurangan Subsidi-BBM* (compensation programme for fuel subsidy reduction) in 2005 and 2008. This programme included cash transfer, health insurance, education subsidies and also rural infrastructures development.

Many studies have shown that cutting subsidies has adverse impacts on poverty and inequality. Ikhsan et al. (2005a) found that decreasing the fuel subsidies in 2005, without compensation, increased the Indonesian poverty index from 16.3 per cent to 16.7 per cent. Yusuf and Resosudarmo (2008) stated that the price reform could have been progressive in reducing inequality if it only increased vehicle fuel prices but that it actually tended to increase inequality, especially in urban areas where the price of kerosene also increased. A uniform cash transfer to poor households that disregards poor households' heterogeneity tends to over-compensate the rural poor but under-compensate the urban poor. Azis (2006) showed that the drastic and massive reduction in fuel subsidies in 2005 was not unnecessary, especially considering the adverse socio-economic, poverty and political repercussions of it. The reduction in fuel subsidies could have been substituted by reducing subsidies for the banking sector; providing that the saved money were spent on agricultural-related infrastructures, it could have produced a favourable outcome in terms of income distribution and poverty conditions without deteriorating macro-economic stability or injuring investors' confidence.

Removing fuel subsidies, of course, affects low income groups as it decreases their purchasing power. On the other hand, an increase in infrastructure spending can remove infrastructure bottlenecks and create job opportunities. In addition, an increase in both education and health spending can equip the poor to be more competitive and creative. Many studies, such as Fan et al. (2000), Jung and Thorbecke (2001), Davis et al. (2001) and Roberts (2003), have confirmed that spending on education, health and infrastructure effectively reduces poverty all over the world. Clements et al. (2006) found that the 2005 Indonesian reduction in fuel subsidies, in the short run, will increase price levels and reduce household consumption, particularly for the poor. However, in the long-term, given the contribution of subsidy reduction to fiscal sustainability (a precondition for durable economic growth and poverty reduction), the subsidy reduction will be beneficial to the poor.

Massive fuel subsidies reduce the fiscal spaces used to promote economic growth and create job opportunities; reducing fuel subsidies significantly increases the number of poor. Reallocating fuel subsidies into either infrastructure developments or human capital investments might increase poverty in the short run but might decrease poverty in the long run, due to improvements in infrastructures and increases in human capital. There are, however, three main questions that must be asked in relation to this: firstly, what is the relationship between fuel subsidies and fiscal balance? Secondly, how large is the impact on poverty when removing fuel subsidies? Thirdly, how effective are reallocation policies in protecting low income groups from the adverse impacts of removing fuel subsidies? This chapter deals with these three issues and will provide an objective and comprehensive picture of fuel price policy in Indonesia, considering both fiscal and poverty issues. Unlike previous research, this study applies comprehensive methodologies in order to calculate the poverty impacts of removing subsidies and reallocation budget policies. The methodologies are a combination of a macro model (a computable general equilibrium (CGE)), a micro model (household data) and also the endogenous poverty line. Combining the macro and micro models will result in a robust outcome with regards to calculating the poverty impact of policy reforms.

In the following section, this chapter briefly reviews the current condition of the supply and demand of fuels in the domestic market, government fiscal balance and adjustment of fuel prices. Section 5.3 reviews simulation scenarios and Section 5.4 analyses the poverty impact of removing fuel subsidies and reallocating the saved money to protect the poor from the adverse impacts. Finally, this chapter will conclude with the key findings of the study and policy suggestions for possible reallocation policies to reduce adverse impacts.

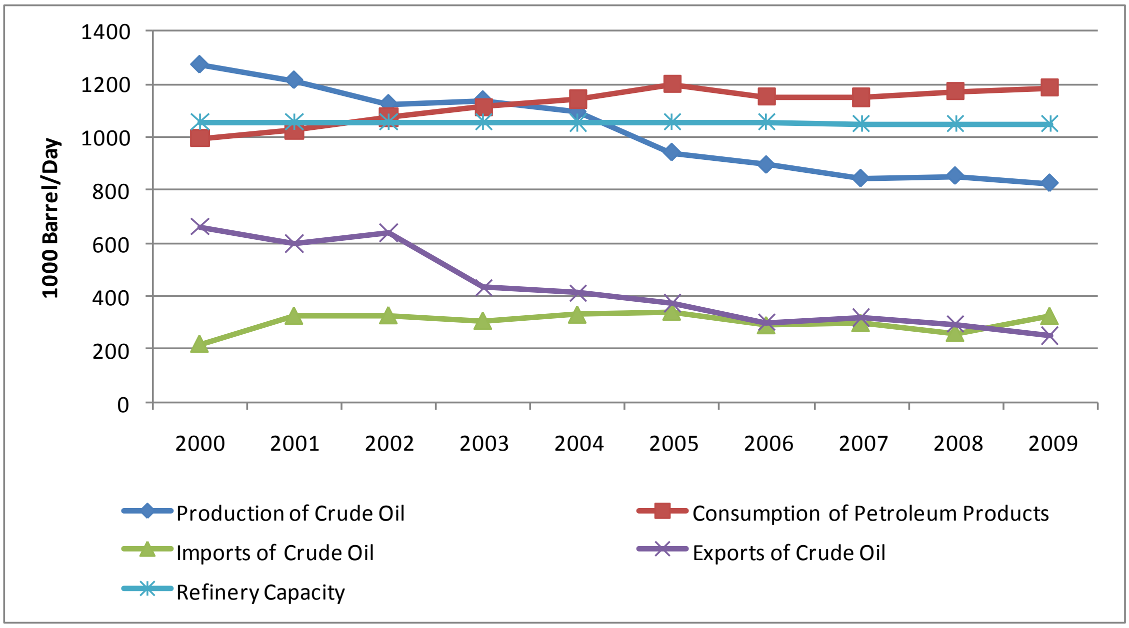
5.2 Oil Production and Consumption, Fiscal Balance and Fuel Price Regimes

5.2.1 Oil Production and Fuel Consumption

Since 2003, Indonesia has become a net fuel and oil importer country, as production and refinery capacity have stagnated while consumption has grown rapidly. The ratio between crude oil production and fuel consumption has been continuously decreasing (it decreased from 127.7 per cent in 2000 to 69.58 per cent in 2009), mainly due to lack of investment in exploring new oilfields and declining production from maturing fields. In addition, an increase in the middle class population also put pressure on fuel demands. These figures imply that even if all the domestic crude oil were refined in Indonesia, it would not be enough to fulfil the domestic demand.

Figure 5.2 shows that Indonesia’s crude oil production decreased from 1,272.5 thousand barrel per day (bpd) in 2000 to 826.1 thousand bpd in 2009, while fuel consumption grew rapidly from 996.4 thousand bpd in 2000 to 1,187.3 thousand bpd in 2009. The export trend of crude oil has continuously declined at almost 7 per cent per year, while the import trend of crude oil grew rapidly at 5.4 per cent per year during 2000-2009. The ratio between refinery capacity and total consumption substantially decreased from 106 per cent in 2000 to 89 per cent in 2009. Since 2002, domestic refineries have not been able to satisfy domestic fuel demands. Meanwhile, for technical reasons, the domestic refineries have not been able to process the domestic crude oil. Therefore, Indonesia has to import both petroleum products and crude oil products to fill the gap. On the other hand, proven oil reserves decreased from 5,123 million barrels in 2000 to 3,990 million barrels in 2009, mainly due to the level of exploitation without any significant investment into exploring new oilfields.

Figure 5.2 Oil and Petroleum Products in Indonesia, 2000-2009



Source: OPEC Annual Statistical Bulletin 2009 (OPEC, 2010).

5.2.2 Fiscal Balance of Oil and Gas Products

Oil and gas revenues contribute a significant share to Indonesia's central government budget. Table 5.2 shows the highest share was in 2000; in this year, almost 43 per cent of central government revenue came from oil and gas revenues. The contribution of oil and gas on budget has tended to decrease, mainly due to a shrink in lifting capacity and increases in other government revenues. Indonesia's budget, therefore, is becoming less dependent on oil and gas revenues.

An increase in oil and gas prices increases not only oil revenues but also expenditures. This is because the Indonesian government has to share oil and gas revenues with sub-national governments through the oil-gas revenue sharing and general allocation fund (DAU), as a consequence of the “big bang” fiscal decentralisation in 2001. The government has to allocate a larger share of revenues to subsidize fuel and electricity as a result of administered retail energy prices. Historically, oil and gas revenues have exceeded fuel subsidy expenditures and sub-national government transfers, the exception being those years with large increases in world oil prices. Until 2004, oil and gas were black gold to Indonesia’s central government budget balance. However, when the world oil price significantly increases, oil and gas would be a black hole to the government’s budget balance. The government could still enjoy the net benefit of oil and gas revenues in the period of high price oil price 2006 and 2009, mainly due to the effect of the adjustment of retail fuel prices in 2005 and 2008.

Table 5.2 shows the magnitude of oil and gas revenues and how these resources flow out of the Indonesian central government’s budget: first, in the form of fuel and electricity subsidies; second, via sub-national government transfers as revenue sharing distributed to some producing regions; third, 26 per cent of the projected net oil and gas revenue budget is transferred to sub-national governments as part of a general allocation fund (DAU). The main black hole of oil and gas revenues is the fuel and electricity subsidies. During 2000-2011, Indonesia burnt and threw away an average of 61.2 per cent of oil and gas revenues a year on unproductive allocation. If the government had been able to cut fuel and electricity subsidies by 86 per cent, there would be no budget deficit in 2011.

Table 5.2 Indonesian Central Government Oil and Gas Revenue and Expenditure Cash Flow 2000-2011 (Billion USD)

Revenue and Expenditure	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*	2011**
Oil and Gas Revenue	10.3	10.2	8.6	9.4	12.2	14.3	22.0	18.5	26.0	16.9	22.8	22.7
less:												
Fuel Subsidies	6.5	6.7	3.5	3.5	7.8	9.9	7.0	9.2	13.9	5.1	9.8	10.6
Electricity Subsidies					0.3	0.4	3.3	3.6	6.6	4.8	6.1	4.7
National Budget Balance	3.8	3.5	5.1	5.9	4.1	4.0	11.7	5.7	5.5	7.1	6.9	7.5
less:												
DAU (26% of APBN	0.6	0.9	2.0	1.9	1.9	1.3	1.5	4.4	4.4	4.4	5.9	5.9
Oil & Gas Revenue Sharing	1.5	1.5	1.2	1.5	1.7	2.8	3.1	2.6	3.6	2.4	3.2	3.2
Central Government	1.7	1.1	1.9	2.5	0.5	-0.1	7.1	-1.3	-2.5	0.3	-2.2	-1.6
Fuel and Eletricity Subsidies	63.1%	65.7%	40.7%	37.2%	66.4%	72.0%	46.8%	69.2%	78.8%	58.3%	69.5%	67.1%
Oil and Gas Revenue	42.8%	34.8%	26.7%	23.6%	27.2%	28.0%	31.5%	23.8%	29.4%	20.7%	20.9%	18.4%
Budget Deficit	-3.89	-3.95	-2.55	-4.10	-2.65	-1.48	-3.19	-5.44	-0.42	-8.52	-14.72	-13.18
Note:												
Crude Oil Price (USD/barrel)	29	25	22	29	34	53	64	70	95	62	80	80
Oil Lifting (thousand bpd)	1,405	1,273	1,320	1,092	1,072	999	1,000	899	927	944	965	970

Source: Author's calculation based on data from Agustina et al. (2008) and the Ministry of Finance publications.
Note: is based on the 2010 Revised Budget; **is based on the 2011 proposed budget*

The government of Indonesia subsidises the retail prices of various energy products, including gasoline, kerosene, diesel, Liquefied Petroleum Gas (LPG) and electricity. The share of subsidies to total expenditure has varied widely following movements in international oil prices, the exchange rate and adjustment to the subsidy regime (Table 5.3). They peaked in 2000, accounting for 22.6 per cent of total government expenditure. Fuel subsidies decreased sharply in 2002 following the adjustment of retail fuel prices in February 2000 and in June 2001. In early 2003, the Indonesian government tried to close the gap between domestic and world oil prices by deregulating fuel prices for industries; however, the retail fuel prices for households, small business and transportation remained regulated. Fuel subsidies then sharply increased in 2004 and 2005 following increases in world oil prices, but then decreased again in 2006 and 2007 after the government adjusted retail fuel prices in March and October 2005. However, responding to a high increase in world oil prices in 2008, the government was forced to allocate 15.1 per cent of its total spending to fuel subsidies; again, the government increased retail fuel prices in June 2008 to reduce fiscal pressure.

Table 5.3 shows that, during 2004-2011, Indonesia's share of development expenditures in relation to total spending is lower than that of the share of fuel and energy subsidies. Even during 2005-2010, the share of development expenditure was lower than 10 per cent. Low development expenditure might only be enough to replace existing capital, but not increase capital formation in the economy. The high share of fuel subsidies eliminates the opportunity of investing more in infrastructures, which is one of the necessary conditions to promote economic growth. Further, fuel subsidies consumed an average of 68.4 per cent of the total subsidies during 1995-2011 and peaked in 2000, accounting for 88.3 per cent of total subsidies. However, as mentioned before, most fuel subsidies are not enjoyed by low income groups. Transferring subsidies from middle income to poor households would improve income distribution and encourage more equal economic growth. In other words, continuing the current price system in which subsidies are enjoyed by the middle class is the same as creating structural poverty and crippling income distribution.

Table 5.3 Indonesian Central Government Expenditure and Subsidy Trend 1995-2011 (Billion USD)

Expenditure	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total Subsidies	0.1	1.0	7.2	3.6	8.4	7.4	7.5	4.7	5.1
Fuel Energy Subsidies	-	0.6	3.3	2.9	5.2	6.3	6.7	3.4	3.5
Non-Fuel Subsidies	0.1	0.4	3.8	0.7	3.2	1.1	0.9	1.3	1.6
Development Expenditure	9.5	11.5	9.4	4.2	5.8	5.0	4.1	4.0	8.1
Total Expenditure	29.0	34.5	37.0	17.5	29.7	28.0	33.3	34.8	43.9
Fuel Energy Subsidies as % of Total Subsidies	-	60.0%	46.5%	79.9%	62.1%	85.6%	88.3%	71.4%	68.5%
Fuel Energy Subsidies as % of Total Expenditure	-	1.8%	9.0%	16.6%	17.6%	22.6%	20.0%	9.7%	8.0%
Development Expenditure as % of Total Expenditure	32.8%	33.2%	25.4%	24.1%	19.5%	17.9%	12.2%	11.6%	18.4%

Continued

Expenditure	2004	2005	2006	2007	2008	2009	2010*	2011**
Total Subsidies	10.2	12.4	11.8	16.4	28.2	15.4	22.2	21.0
Fuel Energy Subsidies	7.7	9.8	7.0	9.1	15.3	9.9	15.9	15.2
Non-Fuel Subsidies	2.5	2.6	4.7	7.2	12.9	5.6	6.3	5.8
Development Expenditure	6.8	3.4	6.5	7.0	7.5	7.2	10.5	13.9
Total Expenditure	47.5	52.5	73.3	82.7	101.0	97.1	124.0	136.9
Fuel Energy Subsidies as % of Total Subsidies	75.3%	79.2%	59.8%	55.8%	54.1%	64.1%	71.5%	72.4%
Fuel Energy Subsidies as % of Total Expenditure	16.1%	18.7%	9.6%	11.1%	15.1%	10.2%	12.8%	11.1%
Development Expenditure as % of Total Expenditure	14.4%	6.4%	8.9%	8.5%	7.4%	7.4%	8.4%	10.1%

Source: Author's calculation based on Ministry of Finance publications

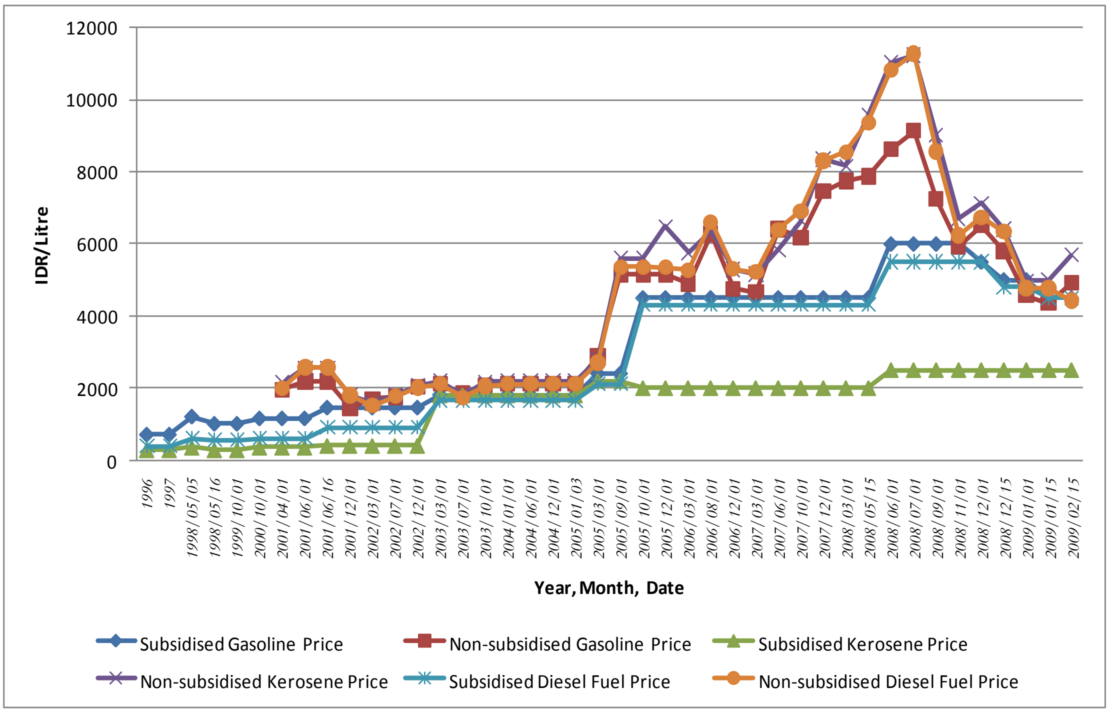
Source: Author's calculation based on the Ministry of Finance publications.

Note: is based on the 2010 Revised Budget; **is based on the 2011 proposed budget.*

5.2.3 Adjustment of Retail Fuel Prices in Indonesia

Retail fuel prices have been irregularly adjusted in Indonesia following increases in world oil prices to reduce fiscal pressure. However, in contrast to the adjustment of industrial fuel prices, the government performs an ad-hoc adjustment of retail fuel prices. Figure 5.3 shows the domestic price trend of subsidized and unsubsidized fuel prices. The gasoline price was corrected by IDR 700/litre (1996), IDR 1,150/litre (Oct. 2000), IDR 1,450/litre (June 2001), IDR 1,810/litre (Mar. 2003), IDR 2,400/litre (Mar. 2005), IDR 4,500/litre (Oct. 2010), 6,000/litre (Jun. 2008), IDR 5,500/litre (1 Dec. 2008), IDR 5,000/litre (15 Dec. 2008) and IDR 4,500/litre (Jan. 2009). The highest adjustment price occurred in 2005, when gasoline prices rose by 148 per cent from IDR 1,810/litre in January to IDR 4,500/litre in October.

Figure 5.3 Indonesian Subsidized (Consumer) and Unsubsidized (Industry) Domestic Fuel Prices 1996-2009



Source: Author's Compilation based on Data from Department of Energy and Mineral Resources, Republic of Indonesia.

During 2001-2009, the largest gap between the subsidized price and the market price of gasoline was observed in May 2008, reaching IDR 3,370/litre. This pushed the government to adjust domestic fuel prices, i.e. the price of gasoline rose from IDR 4,500/litre to IDR

6,000/litre. Under the administered price system, the government is always forced to make a price adjustment when the budget allocation for fuel subsidies does not sufficiently cover the price gap. The adjustment, however, always creates political and social instability because of rejections from politicians and societies.

Fuel subsidies in Indonesia tend to be highly regressive to the rich, a far from ideal social safety net and not environmentally friendly. This is due to reducing the fiscal space to invest in infrastructure or in humans capital; inefficiencies in targeting the poor; creating disincentives for households to consume fuels in an efficient way; undermining macro-economic stability (given the pro-cyclical trend of world oil prices); distorting price signals to industry and households; and creating opportunities for corruption and smuggling (Agustina et al., 2008). So, there are strong economic arguments to deregulate retail fuel prices or to remove fuel subsidies in Indonesia.

In the long-term, there are three main reasons for deregulating retailed fuel prices or removing fuel subsidies. Firstly, without the discovery of new oil reserves, Indonesian oil reserves would only last a further 15-20 years. Thus, the deregulation of retail fuel prices would prepare households for the condition when there is 100 per cent pass-through into the domestic market. Secondly, a fuel price adjustment or deregulation policy would give an incentive to use cheaper and more abundant domestic energy sources, such as coal and gas. Thirdly, on the environmental side, fossil fuels are a relatively “dirty” energy. Fuel price corrections would decrease fuel consumption and support the use of environmentally friendly energies, like natural gas or thermal energy.

Deregulation might not be easy to carry out due to strong objections, but the government should continuously attempt to allocate fuel subsidies in a more proper way. The key elements of a successful strategy to contain subsidies should comprise: making subsidies explicit; making pricing mechanisms more robust; combining reductions in subsidies with measures to protect the poorest; using the resulting savings well; and transparency and consultation (Baig et al., 2007).

5.3 Research Methodology and Simulation Scenarios

This research use the CGE micro-simulation approach (CGE-MS) in order to calculate how reducing fuel subsidies and reallocating the money saved influences poverty in Indonesia. The detailed methodology that follows Dartanto (2010b), Dartanto and Usman (2011) is already explained in the Chapter 3[19]. The model then is used to simulate several scenarios of reducing fuel subsidies and reallocation of saved money. The strategy of reallocation policies is reducing fuel subsidies and compensating the low income groups by distributing direct transfers. The rest of saved money is used to finance development expenditures.

The aim of simulations is to find out how much changes in poverty occur under various scenarios of government fuel subsidies and reallocation budget policies. The base data for the simulations, including subsidy, government consumption and transfer, is drawn from the 2005 Social Accounting Matrix. The simulations are performed under several scenarios, which are basically divided into four categories (Table 5.4): firstly, simulating a reduction in fuel subsidies of 25 per cent (SIM1), 50 per cent (SIM2), 75 per cent (SIM3) and 100 per cent

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[19] The elasticity data used in this CGE refers to sources such as the elasticity in the Indonesian IFPRI CGE Model, *Wayang* Model and other estimations on elasticity. The Armington elasticities, the elasticity of substitution between imports and domestic output in domestic demand, are 0.5 for all commodities except soybeans (2.5), rice (2.5), food crops (2.5), non-food of agricultural products (2.5), livestock (2.5), food-beverage industry (2.5) and textile and garments (2.5), and fuel and chemical products (1.5). Constant elasticity of transformation (CET) for domestic marketed output between exports and domestic supplies is set equal 0.5 for all commodities except rice (2.0), soybeans (1.5), food crops (1.5), and food-beverage industry (1.5). Elasticity of substitution (CES) between factors of production is 0.25 for all activities. Elasticity of substitution between aggregate factors and intermediate input is 0.5 and elasticity of output aggregation for commodities is 3. Furthermore, household consumption is modeled under the Linear Expenditure System (LES), whereby the elasticities vary between commodities, and the elasticity is less than 1 for food products and more than 1 for industrial products and services.

(zero subsidies) (SIM4). Secondly, set of scenarios simulates cuts of 25 per cent to fuel subsidies and the reallocation of all money to government consumption and government transfers to households (SIM 5 and SIM 6). Thirdly, government cuts of 50 per cent to fuel subsidies and the reallocation of 50 per cent of the money to government spending and government transfers to households is simulated (SIM 7 and SIM 8). The final set of scenarios simulates government cuts of 100 per cent to fuel subsidies and the reallocation of 50 per cent of the money to government spending, government transfers to households and government subsidies (SIM 9 and SIM 10).

Table 5.4 Simulation Scenarios (Billion USD)

Description	SIM1	SIM2	SIM3	SIM4	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10
a. Cutting Fuel Subsidies	25%	50%	75%	100%	25%	25%	50%	50%	100%	100%
b. Value of Fuel Subsidies	2.52	5.03	7.55	10.07	2.52	2.52	5.03	5.03	10.07	10.07
c. Reallocation of Fuel Subsidies	-	-	-	-	2.52	2.52	2.52	2.52	5.03	5.03
1. Government Consumption (% of c)	-	-	-	-	**60%**	**80%**	**60%**	**80%**	**60%**	**70%**
Education, Health and Government Services	-	-	-	-	0.75	1.01	0.75	1.01	1.51	1.76
Machinery and Metal Products	-	-	-	-	0.23	0.30	0.23	0.30	0.45	0.53
Constructions and Infrastructures	-	-	-	-	0.53	0.70	0.53	0.70	1.06	1.23
Subtotal	-	-	-	-	*1.51*	*2.01*	*1.51*	*2.01*	*3.02*	*3.52*
2. Government Transfers to Households (HH) (% of c)	-	-	-	-	**40%**	**20%**	**40%**	**20%**	**37%**	**28%**
Agricultural Labor HH	-	-	-	-	0.28	0.14	0.28	0.14	0.52	0.39
Agricultural HH with Land <0.5 ha	-	-	-	-	0.23	0.11	0.23	0.11	0.42	0.32
Agricultural HH with 0.5 < land <1 ha	-	-	-	-	0.05	0.03	0.05	0.03	0.09	0.07
Rural Non-Agr. Low Income HH	-	-	-	-	0.30	0.20	0.30	0.20	0.37	0.28
Rural Non-Labour force HH	-	-	-	-	0.10	0.07	0.10	0.07	0.12	0.09
Urban Non-Agr. Low Income HH	-	-	-	-	0.21	0.14	0.21	0.14	0.26	0.20
Urban Non-Labour force HH	-	-	-	-	0.07	0.04	0.07	0.04	0.08	0.06
Subtotal	-	-	-	-	*1.23*	*0.73*	*1.23*	*0.73*	*1.86*	*1.41*
3. Subsidies (% of c)	-	-	-	-	-	-	-	-	**3%**	**2%**
Agricultural Subsidies on Food Productions	-	-	-	-	-	-	-	-	0.05	0.03
Land Transportation	-	-	-	-	-	-	-	-	0.04	0.03
Water and Air Transportation	-	-	-	-	-	-	-	-	0.03	0.02
Government Services: Education and Health	-	-	-	-	-	-	-	-	0.04	0.03
Subtotal	-	-	-	-	-	-	-	-	*0.15*	*0.10*
d. Government Saving to Finance Deficit	**2.52**	**5.03**	**7.55**	**10.07**	**0**	**0**	**2.52**	**2.52**	**5.03**	**5.03**

Source: Author

This study also performs other simulations: SIM1a, SIM2a, SIM3a, SIM4a, SIM5a, SIM6a, SIM7a, SIM8a, SIM9a and SIM10a. These simulations are basically the same as the simulations in Table 5.4 but the main difference is that the price changes derived from the CGE model as results of the removal of fuel subsidies are marked up by two times. These simulations are conducted to ascertain how large the poverty impact of the removal of fuel subsidies would be if price changes in the economy were larger than the price changes generated by the CGE model. This is because the CGE model does not calculate for increases in inflation caused by other factors, like the tendency of businesses to shift the burden of fuel price hikes to consumers by exorbitant increases in product prices.

Various simulations are conducted in order to ascertain the sensitivity of poverty in respect to changes in subsidies and reallocation policies. Furthermore, the simulations are conducted under the following conditions: flexible government saving and fixed direct tax rates, flexible exchange rates and fixed foreign savings, fixed capital formation, labour fully employed and mobile across activities, capital fully employed and activity-specific and fixed domestic producer price (price numeraire).

5.4 The Poverty Impact of Reducing Fuel Subsidies and Reallocation Policies

5.4.1 CGE Results of Macroeconomic Variables

Generally, a decrease in fuel subsidies will be followed by a decrease in macro-economic indicators, such as private consumption, imports and gross domestic product (GDP), while other indicators, net indirect tax and the consumer price index (CPI) will increase (see Appendix 5.1). The simulation results show that a 100 per cent decrease in fuel subsidies increases the CPI by 0.77 per cent. An increase in CPI depletes household welfare, which ultimately decreases household (private) consumption as well as GDP. Moreover, a 100 per cent decrease in fuel subsidies leads to a decline in the domestic supply of fuel and chemical products of 1.10 per cent. Theoretically, a decrease in fuel subsidies increases the price of fuels and other products that use fuels as production inputs, reducing the demand for those goods and signalling domestic producers to lower their production.

Turning to changes in consumer prices and factor incomes, the CGE simulation shows that a decrease in fuel subsidies of 100 per cent increases the domestic consumer price of fuel and chemical products by 5.80 per cent (see Appendix 5.2). An increase in the domestic consumer price of fuel and chemical products will directly increase the price of other products and services, such as transportation, electricity and industrial products, which utilise fuels as a production input. This figure seems very small compared to real price increases in the economy. There are two main reasons: firstly, fuel prices had already been adjusted two times by 148 per cent in 2005; secondly, this CGE model does not capture the mark-up pricing behaviour of economic agents.

Ikhsan et al. (2005a) found that, responding to the adjustment of fuel prices in Indonesia, economic agents usually adjusted the price more than necessary. One example of this was the demand from public transportation drivers and Organda (the Association of Public Ground Transportations) to increase fares by 30 per cent to respond to the 29 per cent increase in fuel prices in 2005. Transportation fares are made up not only of operational costs but also of large capital costs. Fuels accounted for an average of 13 per cent of land transportation costs in Indonesia at the end of 2001. After fuel price hikes in 2002, it was estimated that fuel expenditure did not exceed 20 per cent of total production costs. Thus, the proper fare increase should have only been 4.8 per cent.

Furthermore, a decrease in fuel subsidies is disadvantageous to all labour categories except agricultural labour (see Appendix 5.3). The wage rate of agricultural labour rises approximately 0.47 per cent when fuel subsidies are cut by 100 per cent but the wage rate of other labour categories declines by between 0.28 and 2.97 per cent. The reason is that an increase in fuel prices and other products reduces the demand for those products and gives price signal to domestic producers to decrease the production of goods and services, decreasing the demand for non-agricultural labour, lowering up the wage of non-agricultural labour.

5.4.2 Poverty Impacts of Reducing Fuel Subsidies

In the CGE-microsimulation analysis, the poverty impacts of reducing fuel subsidies and reallocating the budget to government spending, government transfers to households and other subsidies depend solely on how large the effects of these shocks are on changing price levels and factor incomes in the economy. The extent to which price and factor income changes can influence the incidence of poverty depends on consumption patterns and the income sources of the poor. It also depends on how sensitive the poverty line is to price changes.

Table 5.5 summarizes the impact of various subsidy regimes on poverty in Indonesia. Reducing fuel subsidies theoretically intensifies poverty, since the purchasing power of the poor decreases due to increases in the price of fuel products and other products using fuels as production inputs. Decreases in fuel subsidies of 25 per cent, 50 per cent, 75 per cent and 100 per cent increase the poverty headcount index by 0.259 per cent, 0.392 per cent, 0.670 per cent and 1.057 per cent, respectively. However, economic agents usually mark-up product prices to shift the burden of fuel price hikes to consumers; they sometimes seek to gain by exorbitant increases in product prices. Doubling consumer prices generated from the CGE model largely increases the poverty incidence by 0.476 per cent, 0.723 per cent, 1.338 per cent and 2.341 per cent. These figures equal 997 thousand, 1,514 thousand, 2,800 thousand and 4,900 thousand people in terms of Indonesia’s population.

At the disaggregate level, all household categories suffer from the removal of fuel subsidies to any degree. Households that are working in the electricity, water, gas and construction sectors suffer the most from the removal of fuel subsidies. If the subsidy decreases by 100 per cent, the poverty headcount index rises by 1.325 per cent. In the case of mark-up pricing, the poverty incidence of this category rises by 3.231 per cent. The second largest adverse impacts of removing subsidies are observed in households working in the industrial sectors. If the subsidy decreases by 100 per cent, the poverty headcount index rises by 1.255 per cent (3.098 per cent in the case of mark-up pricing). Most households in both groups, particularly sub-groups working in construction and industry, are basically low income groups characterised as living in urban areas, unskilled and semi-skilled labour. Hence, an adjustment in fuel prices adversely affects these groups in terms of both expenditure and income. This is due to a sudden increase in the domestic price of fuel prices and related products to an unaffordable level, also to a decline in the wages of non-agricultural labour.

In terms of absolute numbers, poverty increases are more frequently observed in households working in the agricultural sectors. In Indonesia, the 100 per cent removal of fuel subsidies increases the number of poor in the agricultural household category (with and without land holdings) by 833,127 people (1,802,085 people in the case of mark-up pricing). Moreover, even though agricultural households benefit through a gradual increase in labour wages, this can only partially compensate for the household's increase in expenditure as a result of price increases. Therefore, decreases in fuel subsidies hurt agricultural households rather than benefit them.

Table 5.6 shows the poverty index represents the gap between poor people's standard of living and the poverty line, showing the shortfall in the poor's expenditure from the poverty line expressed as an average of the population of Indonesia. It can be interpreted as how far the poor are below the poverty line. The pattern of change in the poverty gap index in responding to decreases in fuel subsidies is no different from the changes in the headcount index. The lower the fuel subsidies, the wider the poverty gap index. An increase in the world fuel price of 25 per cent, 50 per cent, 75 per cent and 100 per cent increases the poverty gap index by 0.053 per cent, 0.086 per cent, 0.157 per cent and 0.255 per cent, respectively. This is because the negative impact of domestic price decreases the expenditure (welfare) of low income households that were previously above the poverty line so they drop below the poverty line; the expenditure of the poor that were already below the line falls further away from the poverty line. The poverty gap index worsens when economic agents increase prices disproportionately.

5.4.3 Poverty Impacts of Reallocation Budget Policies

Tables 5.7 and 5.8 show changes to the Headcount Index and the Poverty Gap Index under various budget reallocation schemes. Simulation 5 (SIM5), cutting 25 per cent of fuel subsidies and reallocating it to government spending (60 per cent) and government transfers to households (40 per cent), can perfectly absorb the adverse effects of reducing fuel subsidies and the number of poor decreases by 565,770 people (0.270 per cent). Increases in government spending on health, education, infrastructures and machinery/metal products generate job opportunities and gradually increase the factor incomes of unskilled, semi-skilled and skilled non-agricultural labours. A gradual increase in wage rates over-compensates the increase in expenditure as a result of price increases. Thus, the 100 per cent reallocation of the cut 25 per cent fuel subsidies benefits the poor.

Table 5.5 Simulated Changes in the Headcount Index (per cent) of Indonesia under Various Fuel Subsidy Systems

Sector	Population	Initial Poverty 2005	Cutting Fuel Subsidies				Cutting Fuel Subsidies (Mark-up Pricing (Doubles than the CGE's			
			SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a
Agriculture (with Land)	57,332,312	23.81	0.201	0.291	0.617	1.046	0.423	0.567	1.193	2.331
Agriculture (without Land)	20,448,294	25.73	0.241	0.346	0.693	1.143	0.549	0.731	1.262	2.276
Industry	19,916,155	11.25	0.293	0.578	0.870	1.255	0.621	1.048	1.776	3.098
Electricity, Water, Gas and Constructions	14,312,875	17.66	0.490	0.808	1.053	1.325	0.808	1.237	2.196	3.231
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	0.214	0.317	0.504	0.923	0.358	0.550	1.110	2.042
Banking, Financial Int., Government and Private Services	26,863,587	6.94	0.294	0.408	0.657	0.910	0.437	0.745	1.225	1.816
Others	23,201,581	15.81	0.296	0.400	0.723	1.118	0.501	0.834	1.450	2.441
Total	**209,309,307**	**16.40**	**0.259**	**0.392**	**0.670**	**1.057**	**0.476**	**0.723**	**1.338**	**2.341**
Number of Poor		**34,320,060**	**541,379**	**820,638**	**1,401,467**	**2,212,590**	**996,852**	**1,513,984**	**2,799,658**	**4,900,292**

Source: Author's calculation.

Table 5.6 Simulated Changes in the Poverty Gap Index (per cent) of Indonesia under Various Fuel Subsidy Systems

Sector	Population	Initial Poverty 2005	Cutting Fuel Subsidies				Cutting Fuel Subsidies (Mark-up Pricing (Doubles than the CGE's Result))			
			SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a
Agriculture (with Land)	57,332,312	4.71	0.048	0.068	0.140	0.252	0.100	0.139	0.286	0.520
Agriculture (without Land)	20,448,294	5.52	0.060	0.090	0.170	0.300	0.120	0.180	0.350	0.610
Industry	19,916,155	2.10	0.070	0.120	0.200	0.300	0.130	0.250	0.420	0.660
Electricity, Water, Gas and Constructions	14,312,875	3.01	0.108	0.207	0.335	0.501	0.216	0.423	0.698	1.071
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	2.01	0.039	0.066	0.122	0.194	0.086	0.141	0.250	0.415
Banking, Financial Int., Government and Private Services	26,863,587	1.36	0.030	0.060	0.109	0.158	0.070	0.129	0.227	0.352
Others	23,201,581	3.40	0.062	0.096	0.169	0.271	0.116	0.192	0.349	0.585
Total	**209,309,307**	**3.24**	**0.053**	**0.086**	**0.157**	**0.255**	**0.107**	**0.178**	**0.325**	**0.542**

Source: Author's calculation.

Table 5.7 Simulated Changes in the Headcount Index (per cent) under Various Budget Reallocations

Sector	Population	Initial Poverty 2005	25% Cut Subsidies and Reallocated 100%		50% Cut Subsidies and Reallocated 50%		100% Cut Subsidies and Reallocated 50%		25% Cut Subsidies and Reallocated 100%		50% Cut Subsidies and Reallocated 50%		100% Cut Subsidies and Reallocated 50%	
			SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Agriculture (with Land)	57,332,312	23.81	-0.266	-0.613	-0.214	-0.542	-0.214	-0.469	-0.102	-0.386	-0.274	-0.115	0.940	0.587
Agriculture (without Land)	20,448,294	25.73	-0.349	-0.751	-0.165	-0.636	-0.020	-0.225	0.033	-0.339	-0.125	-0.148	1.127	0.993
Industry	19,916,155	11.25	-0.319	-0.496	0.015	-0.235	0.186	0.041	0.108	-0.120	0.291	0.000	1.481	1.302
Electricity, Water, Gas and Constructions	14,312,875	17.66	-0.339	-0.772	0.011	-0.360	0.305	-0.007	0.091	-0.273	0.434	-0.105	1.764	1.365
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	-0.191	-0.397	-0.096	-0.314	-0.031	-0.274	-0.014	-0.219	-0.022	-0.007	1.028	0.719
Banking, Financial Int., Government and Private Services	26,863,587	6.94	-0.312	-0.479	-0.263	-0.377	-0.286	-0.395	-0.263	-0.369	-0.105	-0.132	0.536	0.385
Others	23,201,581	15.81	-0.239	-0.378	-0.098	-0.295	-0.051	-0.163	-0.089	-0.255	-0.003	-0.062	1.188	0.874
Total	**209,309,307**	**16.40**	-0.270	-0.534	-0.139	-0.410	-0.071	-0.277	-0.055	-0.294	-0.048	-0.079	1.062	0.784
Number of Poor		**34,320,060**	**-565,770**	**-1,118,120**	**-290,281**	**-857,412**	**-149,381**	**-580,657**	**-114,901**	**-614,962**	**-101,511**	**-164,797**	**2,222,013**	**1,640,115**

Source: Author's calculation.

Table 5.8 Simulated Changes in the Poverty Gap Index (per cent) under Various Budget Reallocations

Sector	Population	Initial Poverty 2005	25% Cut Subsidies and Reallocated 100%		50% Cut Subsidies and Reallocated 50%		100% Cut Subsidies and Reallocated 50%		25% Cut Subsidies and Reallocated 100%		50% Cut Subsidies and Reallocated 50%		100% Cut Subsidies and Reallocated 50%	
			SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Agriculture (with Land)	57,332,312	4.71	-0.072	-0.149	-0.053	-0.132	-0.043	-0.107	-0.025	-0.083	-0.065	-0.028	0.221	0.139
Agriculture (without Land)	20,448,294	5.52	-0.070	-0.150	-0.040	-0.120	-0.020	-0.080	-0.010	-0.070	-0.030	-0.040	0.300	0.220
Industry	19,916,155	2.10	-0.040	-0.100	0.010	-0.050	0.040	0.000	0.020	-0.030	0.070	0.010	0.360	0.290
Electricity, Water, Gas and Constructions	14,312,875	3.01	-0.069	-0.157	0.020	-0.069	0.079	0.010	0.039	-0.040	0.137	0.021	0.609	0.520
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	2.01	-0.033	-0.079	-0.007	-0.053	0.016	-0.020	0.003	-0.030	0.013	0.000	0.214	0.168
Banking, Financial Int., Government and Private Services	26,863,587	1.36	-0.072	-0.111	-0.052	-0.090	-0.068	-0.106	-0.042	-0.081	-0.039	-0.042	0.090	0.043
Others	23,201,581	3.40	-0.051	-0.112	-0.018	-0.080	0.003	-0.047	0.001	-0.050	0.007	-0.010	0.286	0.216
Total	**209,309,307**	**3.24**	**-0.058**	**-0.120**	**-0.026**	**-0.090**	**-0.009**	**-0.060**	**-0.008**	**-0.058**	**-0.006**	**-0.016**	**0.257**	**0.190**

Source: Author's calculation.

Moreover, if the budget reallocation composition is changed to 80 per cent for government expenditures and 20 per cent for government transfers, the poverty incidence largely decreases by 1,118,120 people (0.534 per cent) (SIM6). This is because a larger government transfer to households, particularly to low income groups, increases the demand for food and processed food commodities and increases the prices of these products. This price increase reduces the welfare of households, particularly those of low income groups that spend a large proportion of their budget on food. However, the impact of reallocating fuel subsidies on reducing poverty will become smaller if economic agents extensively mark-up price products over the increased production costs in response to a reduction in fuel subsidies. SIM5a and SIM6a show that, even though in the mark-up condition a full reallocation of the 25 per cent cut in fuel subsidies still reduces poverty, the number of poor decreases only by 114,901 (SIM5a) and 614,962 (SIM6a)

SIM7 shows that if the government cuts 50 per cent of fuel subsidies (USD 5.03 billion) and reallocates 50 per cent of the money (USD 2.52 billion) to government expenditures (60 per cent) and government transfers to households (40 per cent), the number of poor still decreases by 290,281. In addition, shifting government transfers to government expenditures improves the effectiveness of budget reallocation in terms of reducing poverty, as shown by SIM8: the poverty incidence decreases by 857,412. As shown in the results of SIM5a and SIM6a, the mark-up in prices performed by economic agents in order to seek gains reduces the effectiveness of budget reallocation policies in reducing poverty in Indonesia. Under the mark-up condition, SIM7a and SIM8a are only able to reduce the number of poor by 101,511 and 164,797, respectively.

The 100 per cent removal of fuel subsidies and reallocating 50 per cent of the money saved to government expenditures, transfers and other subsidies does not have adverse impacts on household welfare. The poverty incidence even slightly decreases by 0.071 per cent (SIM9) and 0.277 per cent (SIM10). However, policy makers should carefully interpret these results since it is assumed that all economic agents are well-behaved and do not increase the price of products larger than the increases in production costs. This is necessary to carry out credible price surveillances when the government implements policies that influence general price levels. With price surveillance, the government can control the price to avoid unnecessary inflation and the public can be protected from undue margins.

On the other hand, as is the case in most developing countries, it is difficult to guarantee that the government has a credible price surveillance system that can be used to determine how much prices should be increased in response to removing fuel subsidies. It is also necessary to have a strong institution to control and supervise the behaviour of economic agents that, by their nature, always try to seek benefits. If economic agents mark-up the price, a 100 per cent of removing fuel subsidies and 50 per cent reallocating of them to government expenditures, transfers and other subsidies, the number of poor will increase by 2,222,013 (SIM9a) and 1,640,115 (SIM10a). Thus, controlling inflation should be a top national concern. Easterly and Fischer (2001), observing many countries' experiences, found that the poor suffer more from inflation than the rich since high inflation tends to lower the income share and the real minimum wage of the bottom quintile that both of them tend to increase poverty

At the disaggregate level, all household categories benefit from the reallocation of fuel subsidies into government expenditures and transfers, as shown by SIM5, SIM6 and SIM8. Landless agricultural households benefit the most from the removal of 25 per cent of fuel subsidies and full reallocation. The headcount index of this group decreases by 0.349 per cent (SIM5) and 0.751 (SIM6). Government spending, particularly on infrastructures, increases the demand for unskilled labour, while government transfers to low income groups increases the demand for agricultural products, pushing up the wage rate for agricultural labour. Both increases raise the incomes of landless agricultural households. However, agricultural households with land will benefit most under SIM8, while households working in the banking/financial sector and in government services will benefit most under SIM7. However, households working in the industrial and utility sectors are worst off under SIM7 and SIM9.

Households working in the utility and construction sector and the industrial sector suffer most under the mark-up pricing condition (SIM9a). The poverty incidence of these groups rises by 1.76 per cent and 1.48 per cent, respectively. Compensation policies on government transfers and government spending do not sufficiently cancel out the adverse impacts of reducing fuel subsidies. Most households in both groups, particularly sub-groups working in construction and industry, are basically low income groups characterised as living in urban areas performing unskilled and semi-skilled labour. Most of them, particularly those working in the construction sector, are cyclical migrant workers from rural area and they are not registered as urban residents. Thus, they are excluded from cash transfers from government assistance due to being an unregistered resident.

5.5 Sensitivity Analysis

CGE estimation results are known to be sensitive to the values of Armington elasticities. However, there have been few empirical studies on estimating these elasticities. Many studies show that the resulting estimates of these elasticities vary widely. McDaniel and Balistreri (2003) confirmed that the wide-ranging estimates of Armington elasticities depends on the data used, the disaggregating sector and the methodology applied. Table 5.9 shows that the impact of a 50 per cent decrease in fuel subsidies is slightly sensitive to the variation of Armington elasticity. An increase (or decrease) in the Armington elasticity will be followed by an increase (or decrease) in the poverty incidence. At the national level, when fuel subsidies are reduced by 50 per cent, changing the elasticity from 1.5 to 2.5 will increase the headcount index from 0.392 per cent to 0.511 per cent, which is equivalent to an increase from 820,638 poor people to 1,069,123. Conversely, changing the elasticity from 1.5 to 0.75 will decrease the number of people in poverty from 820,638 to 795,270. The crucial question is: what is the appropriate Armington elasticity for the substitution of fuel and chemical products? In order to precisely estimate the poverty impact of removing fuel subsidies, the elasticities used in the CGE model should also be precisely estimated.

Table 5.9 The Headcount Index under Varying Armington Elasticities of Substitution in Fuel and Chemical Products

Sector	Population	Initial Poverty	Armington Elasticity		
			0.75	**1.50**	**2.50**
Agriculture (with Land)	57,332,312	23.81	0.272	0.291	0.501
Agriculture (without Land)	20,448,294	25.73	0.338	0.346	0.579
Industry	19,916,155	11.25	0.578	0.578	0.638
Electricity, Water, Gas and Constructions	14,312,875	17.66	0.808	0.808	0.853
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	0.290	0.317	0.362
Banking, Financial Int., Government and Private Services	26,863,587	6.94	0.408	0.408	0.446
Others	23,201,581	15.81	0.400	0.400	0.534
Total	**209,309,307**	**16.40**	**0.380**	**0.392**	**0.511**
Number of Poor		**34,320,060**	**795,270**	**820,638**	**1,069,123**

Source: Author's Estimation.

5.6 Concluding Remarks

An increase in world oil prices forced the Indonesian government to run a larger budget deficit to finance fuel subsidies, since Indonesia is a net oil importing country and retail fuel prices are still administered. During 2000-2011, Indonesia burnt and threw away an average of 61.2 per cent of its oil and gas revenues each year on fuel and electricity subsidies. Moreover, massive fuel subsidies reduce the fiscal space to promote economic growth as a prerequisite of poverty reduction. Since 2004, the share of development expenditures to total spending in Indonesia has been lower than the share of fuel and energy subsidies. Fuel subsidies, mostly enjoyed by middle and upper class, consumed an average of 68.4 per cent of the total subsidies during 1995-2011. Transferring subsidies from middle income to poor households would improve income distribution and accelerate more equal economic growth. Since Indonesian oil reserves would only last a further 15-20 years, a reduction in fuel subsidies is needed to prepare households for the condition when international fuel prices have 100 per cent pass-through into the domestic market.

The CGE micro-simulation results show that reducing fuel subsidies by 25 per cent increases poverty incidence by 0.253 per cent. However, if the saved money is fully allocated to government spending and transfers, the adverse impact can be cancelled out; even the poverty incidence will be reduced by 0.270. In addition, 100 removing per cent of fuel subsidies and then reallocating 50 per cent to government expenditures, government transfers and other subsidies does not have adverse impacts on household welfare; the poverty incidence even slightly decreases by 0.071 per cent (SIM9) and 0.277 per cent (SIM10). However, this reallocation budget might not effectively compensate the adverse impacts of the 100 per cent removal of fuel subsidies if the economic agents try to seek gains through mark-up pricing surpassing the increase in production costs. Hence, the government should perform price surveillance that can be used to determine how much prices should be increased to respond to removing fuel subsidies. Moreover, the budget reallocation should focus on government spending rather than on government transfers due to its effectiveness in reducing poverty.

Chapter 6
The 2008 Corporate Income Tax Reform and Its Contribution to Poverty Reduction in Indonesia[θ]

6.1 Introduction

In the integrated world economy, foreign capital has become more significant as a financial source of economic development. Broadway (2005) suggested countries that are industrialized, or becoming so, must adopt tax systems that are capable of raising considerable amounts of revenue efficiently, equitably, and with administrative simplicity, while at the same time coping with the competitive features of a globalized world economy. A tax system, therefore, is one of the main tools to attract more investors, both domestic and foreign, to invest more. This condition has intensified a tax competition among countries, particularly developing countries, during the past years.

In the case of ASEAN, Table 6.1 shows the tax competition identified by the decline in corporate income tax (CIT henceforth) has been observed during the last five years. The average decline of the CIT rate in ASEAN-6 was 5.17 percentage points during 1998 to 2010. All countries except Thailand have reduced CIT rates, ranging from 3 per cent (Malaysia) and 10 per cent (Vietnam), while the CIT rate in Thailand remains unchanged during this period. The lowest CIT rate is in Singapore while the highest is Philippines and Thailand. Most of the countries give additional CIT discount for listed companies and small-medium enterprises (SMEs henceforth).

Indonesia continuously reforms the taxation system by considering changes in both internal factors, i.e. changes in incomes, prices and economic structure, and external factors,

[θ] This chapter is submitted and currently under review in ASEAN Economic Bulletin.

i.e. tax competition among countries to attract investment. The first modern income tax reform in Indonesia was enacted by Law No. 7 of 1983. This law was amended four times by Law No.7 of 1991, Law No. 10 of 1994, Law No. 17 of 200, and Law No.36 of 2008. In many respects, the Indonesian income tax known as *Pajak Penghasilan (PPh)* is progressive and applied to both individual and enterprises. Law No.36/2008 introduces a flat CIT rate but still remains the progressiveness of personal income tax.

Table 6.1 The Corporate Income Tax Rates in ASEAN-6, 1998-2010 (in per cent)

Country	1998	2000	2002	2004	2006	2008	2010	Percentage Change
Indonesia	30	30	30	30	30	30	25	-5.00
Malaysia	28	28	28	28	28	26	25	-3.00
Philippines	34	32	32	32	35	35	30	-4.00
Singapore	26	26	24.5	22	20	18	17	-9.00
Thailand	30	30	30	30	30	30	30	0.00
Vietnam	35	32.5	32	28	28	28	25	-10.00
Average ASEAN-6	**30.50**	**29.75**	**29.42**	**28.33**	**28.50**	**27.83**	**25.33**	**-5.17**

Source: Author's compilation from many sources

This law cut maximum tax rates from 30 per cent (2008) to 25 per cent (2010) and offered more incentives to listed companies and SMEs. A 50 per cent discount on the normal rate is granted to SMEs with the turnover up to IDR 50 billion. This discount is imposed on taxable income of IDR 4.8 billion. While listed companies with minimum 40 per cent of shares owned by the public are granted 5 per cent discount of the normal rate. These incentives may encourage large companies to expand their business and SMEs to register their business as a legal entity. The legal entity would benefit SMEs to access capital from financial institutions and to make a contract with other parties, so they would easily expand their business. The expansion of SMEs and large enterprises would create job opportunities, increase household incomes, and support the poverty alleviation in Indonesia.

Many literatures showed that CIT reforms promote higher investments and expanding businesses for SMEs. Djankov et al. (2010) analyzing 85 countries in 2004 found that a 10 per cent decrease in the effective CIT rate increases aggregate investment to GDP ratio by 2 percentage points. Furthermore, a decrease in CIT rates negatively correlated with the size of an informal economy. De Mooij and Ederveen (2005) found that most studies reporting a negative relationship between taxation and foreign direct investment (FDI). One per cent decrease in the CIT will increase 3.72 per cent of FDI. Further, Zariyawati et al. (2010) found that SMEs' performance has improved significantly when CIT charges are decreasing in Malaysia. Fazzari (1987) and Diamond (2005) confirmed that firms' investment would increase if the cost of capital is taxed deductible. Chang and Doina (2005) conducting a study on corporate tax reform in European Union (EU) countries found that that SMEs appear to be directly affected by the national CIT rather than multinational firms. The CIT reforms create a large number of jobs and enhanced the level of entrepreneurship.

Other literatures, however, showed that the international tax competition not only drives a reduction of CIT rates but also affects negatively the stock of public capital. Lower CIT rates may raise a budget deficit as governments are unable to cover the cost of providing public services (Sinn, 1994). Gomes and Pouget (2008) applying the general equilibrium analysis found that a decrease in the statutory CIT rate from 45 per cent to 30 per cent will reduce public investment by 0.4 per cent of output. More precisely, the econometric estimation of 21 OECD countries confirmed that a decline of 15 per cent of CIT reduces public investment by 0.6 per cent to 1.1 per cent of GDP.

On the contrary, in the case of developing countries like Ghana, the tax reform succeeded in improving revenue generation, enhancing the efficiency of the tax administration, and improving equity in the tax system. This also removed market distortions and strengthened economic incentives (Kusi, 1998). Rao (2000) observed that in spite of significant reductions in the rates of both individual and corporate income taxes in India in the early 1990s the revenues have shown a significant increase. The share of revenue from direct taxes showed a significant increase as a proportion of GDP as well as total tax revenue. Further, Nguyen (2011) showed that tax reforms through a unified taxation system and an introducing of VAT and CIT had substantially increased. Tax revenues in 1996 to 2000 increased by 2.3 times compared with the revenue collected in 1991 to 1995.

In the case of tax reforms and poverty, the poverty impacts of taxation and revenue systems more generally, have remained peripheral topics of research, even though the poverty impacts of social expenditures have received much attention. There are two likely reasons. First, the belief that any effects of taxes on the poor are likely to be small, as in practice the poor pay few taxes directly. Secondly, it has commonly been believed that public social expenditures provide a better means to target the poor and reduce poverty, with taxes viewed as essentially an instrument for revenue raising (van de Walle and Nead, 1995 (in Gemmell and Morrisey, 2005)). However, few studies have actually locked at the impact of specific tax on poverty. Llambi et al. (2009) found that tax reform has a significant effect on reducing poverty in Uruguay. On the contrary, Bird and Zolt (2005) stated that personal income tax has done little to reduce inequality in many developing countries. Bettendorf et al. (2007) analyzing CIT and unemployment in Europe found that the magnitude of the effects depended on the broadness of a tax rate of the country and the strength of international spillover effects through foreign direct investment. The effect on unemployment is smaller if the substitution elasticity between labor and capital is large.

According to the facts and the previous researches, there are two important questions related to the 2008 CIT reform: first, what is the implication of the 2008 CIT reform on the government tax revenue? Second, does the 2008 CIT reform support the poverty reduction? This chapter, therefore, aims to answer both questions above and also contributes to increase an empirical work addressing an issue on taxation policy and poverty in Indonesia. The discussion of the 2008 CIT reform focuses only on the rate reform.

This chapter then briefly explains the history of CIT reforms, the administrative tax reforms in Indonesia, and surveys the impact of the 2008 CIT reform on the tax revenue. The next part describes the research methodology and simulations used to analyze the poverty impacts of the 2008 CIT reform and then subsequently analyze the findings. This chapter will then end with some important findings and policy suggestions.

6.2 The Corporate Tax Reform in Indonesia and Its Effects on the Government Tax Revenue

6.2.1 The History of Corporate Tax Reform in Indonesia

Taxes and levies as financing sources of state are enacted on the article 23A of the 1945 Indonesian Constitution. The history of CIT in Indonesia, however, began in the Dutch colonial. The CIT was enacted with the corporate tax ordinance in 1925 *(Ordonantie op deVennootschapsblasting 1925)* that regulated the imposition of material and the procedures for imposing tax on agencies' income. This ordinance was amended by Law No.8 of 1970.

The modern income tax reform in Indonesia was enacted by Law No. 7 of 1983. This law incorporated the corporate income tax (CIT) and the personal income taxes (PIT) that were previously enacted with separated regulations. The major reforms were changing the tax collection system that previously the official assessment system was changed in to the self assessment system. In the new system, taxpayers have an obligation to the process of tax calculation, tax payment, and tax reporting. Further, this reform aimed to: 1) simplify a tax rate and system, a tax collection and a tax calculation; 2) improve fairness and equitable tax burden among tax payers; 3) increase tax compliances; 4) reduce transfer pricings and transfer incomes from a corporate to an individual.

Law No. 7 of 1983 has been changed and amended by Law No. 7 of 1991, Law No.10 of 1994, Law No.17 of 2000, and Law No.36 of 2008 (Table 6.2). Before the 2008 income tax reform, the income tax rate followed the progressive tax rate by which the tax rate increases as the taxable income increases. According to Law No.7 of 1983, those taxable incomes up to IDR 10 million have to pay 15 per cent; those taxable incomes ranging from IDR 10 million up to IDR 50 million have to pay 25 per cent; while those taxable incomes more than IDR 50 million have to pay 35 per cent. The tariffs remained the same in Law No.7 of 1991. Law No.10 of 1994, however, reduced the tariff rates and increased the taxable incomes. The new tariffs were 10 per cent for taxable income up to 25 million, 15 per cent for taxable income between 25 million to 50 million, and 30 per cent for taxable income more than 50 million. Further, Law No.17 of 2000 again increased the taxable income but the rate remained same.

Even though, the CIT rate has three brackets, 10 per cent, 15 per cent, and 30 per cent, virtually all tax is paid by the highest rate. Ikhsan et al. (2005b) showed, in 2001, 88.38 per cent of tax payers paid the lowest tax rate while only 7.37 per cent of tax payers paid the highest rate. The 7.37 per cent of tax payers, however, contributed almost 99.49 per cent of the CIT revenue. In addition, more than 60 per cent of tax returns reported no net income and paid nothing in 2000. These have influenced changing the progressive CIT rate to the flat CIT rate and also granting SMEs with a discount tax rate based on turnovers rather than net income.

Table 6.2 The History of Corporate Income Tax Rate in Indonesia

Law No.7 of 1983	Law No.7 of 1991	Law No.10 of 1994	Law No.17 of 2000	Law No.36 of 2008
Progressive Tax Rate: • *15 %: taxable income >= IDR 10 million* • *25 %: IDR. 10 million <taxable income <= IDR 50 million* • *35 %: taxable income > IDR 50 million*	*Progressive Tax Rate:* • *15 %: taxable income >= IDR 10 million* • *25 %: IDR. 10 million <taxable income <= IDR 50 million* • *35 %: taxable income > IDR 50 million*	*Progressive Tax Rate:* • *10 %: taxable income >= IDR 25 million* • *15 %: IDR. 25 million <taxable income <= IDR 50 million* • *30 %: taxable income > IDR 50 million* • *the highest rate of 30% could be reduced to 25% with a government regulation*	*Progressive Tax Rate:* • *10 %: taxable income >= IDR 50 million* • *15 %: IDR. 50 million <taxable income <= IDR 100 million* • *30 %: taxable income > IDR 100 million* • *the highest rate of 30% could be reduced to 25% with a government regulation*	*Flat rate:* • *28% in 2009* • *25% in 2010 and hereafter* • *Listed companies with 40% shares owned by public can receive 5% discount lower than the normal tax rate* • *Companies with turnover up to IDR 50 billion will receive an incentive of 50% discount of the normal rate that is imposed on taxable income of the gross income of IDR 4.8 billion.*

Source: Author's Compilation

Law No. 36 of 2008, the Fourth Amendment on Law No. 7 of 1983, has significantly changed the CIT system in Indonesia. The CIT moves from the progressive tax rate into the flat tax rate and also provides more fiscal incentives to develop both listed companies and SMEs. The CIT had been decreased from a maximum 30 per cent at the end of 2008 to 28 per cent in 2009 and then reduced again to 25 per cent in 2010. Listed companies with minimum 40 per cent of shares owned by public could receive the 5 per cent discount of the normal rate. This incentive encourages companies to list its shares in the stock exchange. Listed companies are forced to provide an accountable and transparent financial report to the public; the government, therefore, easily performs tax audits and collects income taxes.

Different to the previous CIT system where there was no specific tariff treatment for SMEs; the new CIT system gives a fiscal incentive to expand and promote SMEs, as mentioned in Article 31E. SMEs with a gross turnover up to IDR 50 billion will receive the 50 per cent discount of the normal rate that is imposed on taxable income of a gross income of IDR 4.8 billion. For instance, SME A with a gross turnover of IDR 4.5 billion and a taxable income of IDR 500 million has to pay an income tax of IDR 62.5 million (50 per cent x 25 per cent x IDR 500 million). While, SME B with a gross turnover of IDR 40 billion and a taxable income of IDR 4 billion has to pay an income tax of IDR 940 million. This value is calculated from IDR 60 million (50 per cent x 25 per cent x (IDR 4.8 billion: IDR 40 billion) x IDR 4 billion) plus IDR 880 million (25 per cent x (IDR 4 billion – IDR 480 million)).

The flat tax rate system with the discount tariff granted to SMEs is more beneficial to small businesses compared to the progressive tariff rate. Under the progressive tax rate, SME A should pay the corporate income tax of IDR 147.5 million while SME B should pay the corporate income tax of IDR 1.17 billion. The progressive rate appears less supportive to the development of SMEs since the taxable income is less suited to the definition of SMEs in

Law No. 20 of 2008. Regarding the current economic conditions, the progressive rate is beneficial to microenterprises but not to SMEs. The discount tariff will encourage SMEs to expand their business through investing more of the saved money as a result of the reduction in tax payments. The discount tariff might also be able to prevent SMEs from illegal activities of tax evasion.

6.2.2 The Administrative Tax Reforms in Indonesia

The tax reforms in Indonesia cover both tax rate reforms and administrative reforms. The administrative tax reform began in late 2001 in the Directorate General of Taxation (henceforth DGT). The main reasons for administrative tax reforms are a low yield of the tax system comparing to other countries, a complexity of some features of the tax system, poor legal and government frameworks, outdated information systems, and ineffective taxpayer services and weakness in organizational and staffing arrangements (Brondolo et al., 2008).

The DGT administrative reforms were divided into the short term strategies and the medium term strategies. Three initiatives of short term strategies implemented during 2001 to 2002 are: (i) the revenue generation program through widening the tax base and tightening the enforcement of tax laws; (ii) the establishment of a special tax office within the DGT to administer the largest taxpayers; (iii) the introduction of an electronic system for processing tax payments to replace the existing system, which was slow, costly, and vulnerable to leakage. In early 2003, the DGT designed the ten initiatives of medium-term reforms: (1) increasing the number of taxpayers administered by the large taxpayer office (LTO); (2) establishing model tax offices for administering small and medium-sized taxpayers; (3) continuing the revenue generation initiative; (4) simplifying each major tax, beginning with the value-added tax; (5) revising the legal framework for tax administration; (6) enhancing the capacity of the DGT's audit function; (7) developing a balanced set of performance measures for the DGT's core tax administration processes; (8) introducing new human-resource management policies; (9) designing a comprehensive information technology master plan; (10) creating an internal investigation unit to investigate misconduct by the tax officers.

Brondolo et al. (2008) observed that tax administration improvements had a strong positive impact on the tax yield and a positive effect on the investment climate. The DGT revenues increased from 8.2 per cent of GDP in 2001 to 8.7 per cent of GDP in 2002 and the DGT revenues have been continuously increasing up to 9.6 per cent of GDP. Further, the investment climate, as assessed by the International Country Risk Guide's overall country ranking, showed a marked improvement over the past few years. Indonesia ranked at 118 in 2000 and then jumped to 77 in 2007. The DGT reforms have a large contribution to this improvement.

Table 6.3 The Number of Taxpayers during 2001-2011 (in thousands)

Category	2001	2002	2003	2004	2005	2006	2007 (June)	2008	2009 (Aug)	2010 (Sept)	2011 (Feb)
Individual Tax Payer	1,690	2,020	2,328	2,622	3,289	3,718	5,503	9,220	13,480	17,053	17,528
Growth Rate (per cent)		*19.53*	*15.21*	*12.66*	*25.44*	*13.02*	*48.03*	*67.54*	*46.20*	*26.51*	*2.78*
Corporate Tax Payer	795	879	967	1,048	1,061	1,082	1,296	1,460	1,570	1,721	1,882
Growth Rate (per cent)		*10.56*	*9.94*	*8.39*	*1.22*	*2.06*	*19.72*	*12.66*	*7.53*	*9.62*	*9.37*
Total	**2,486**	**2,900**	**3,294**	**3,670**	**4,350**	**4,800**	**6,799**	**10,680**	**15,050**	**18,774**	**19,410**

Source: data collected from Sakti (2006, 2007) and many sources[20]

Complementing the administrative tax reforms, in 2008, the DGT implemented the sunset policy of taxation, a tax amnesty policy. Tax payers are given the full trust and right to

[20] The 2008 data collected from http://digilib.unimus.ac.id/files/disk1/105/jtptunimus-gdl-salisiinti-5244-1-bab1.pdf;
The 2009 data collected from http://kpskr09.wordpress.com/2009/09/29/jumlah-npwp-lampaui-target/;
The 2010 data collected from the DGT press release, accessed on 25 October 2011 at http://www.republika.co.id/berita/breaking-news/ekonomi/10/10/09/139081-tahun-ini-pemiliknpwp-bertambah-2-8-juta;
The 2011 data collected from the DGT press release, accessed on 25 October 2011 at http://us.finance.detik.com/read/2011/04/08/123756/1611721/4/pemegang-npwp-capai-19-juta?nd9911043;
The 2005 and 2006 data collected from the DGT press release, accessed on 26 October 2011 http://www.ikpi.or.id/content/jumlah-npwp-kuartal-i2010-tembus-17-juta
The 2007 data collected from the DGT press release, accessed on 26 October 2011 http://www.ortax.org/ortax/?mod=berita&page=show&id=2489&q=&hlm=850

obtain a tax number (NPWP-*Nomor Pokok Wajib Pajak*), calculate a generated income and a payable tax, deposit the payable tax to the state treasury. There are no sanction and interest charged to unpaid payable tax. The administrative tax reforms had successfully increased almost 173.54 per cent of new tax payers both personal and corporate tax payers during 2001 to 2007. Table 6.3 shows that the number of tax payers was 4.35 million (2005), 4.80 million (2006), 6.80 million (June 2007), 10.68 million (2008), and 15.05 million (August 2009). The sunset policy implemented in 2008 contributed most to increasing the tax payers in 2009. By February 2011, the number of tax payers was 19,410,178 divided into 17,527,771 (individual tax payers) and 1,882,407 (corporate tax payers). The 2008 sunset policy and the 2008 income tax reforms implemented effectively in 2009 have extensively increased the number of tax payers by almost 8.8 million during 2008 to 2011.

6.2.3 The Impact of 2008 Corporate Tax Reform on the Government Tax Revenues

Reducing the CIT rate, theoretically, will decrease government tax revenues, particularly on developed countries where the tax base and tax potential are optimally collected. Nonetheless, as in most developing countries where the tax base and tax potential are optimally unexplored, CIT reforms supported with administrative reforms might not deteriorate tax revenues. This is because reducing the CIT rate might encourage unregistered taxpayers to be registered taxpayers. As a result, the tax base and tax potential becomes more extensive. This also encourages corporate registered tax payers to report the tax returns actively.

In the case of Indonesia, the 2008 corporate tax reform does not necessarily reduce tax revenues, tax revenues may even increase. Table 6.4 shows that the CIT revenue grows by 21.7 per cent annually during 2005 to 2011 and the implementation of the new flat tax since 2009 did not shrink the corporate income tax revenues in 2009 and beyond. The corporate income tax revenue increased from IDR 106.4 trillion (2008) to IDR 120.3 trillion (2009) and IDR 126.7 trillion (2010). The increase of CIT revenue in 2009 and beyond, therefore, was mainly collected from new tax payers and also was caused by an improvement of the compliance rate.

There are four main arguments regarding the facts that the CIT revenue did not decrease following a reduction in the tax rate. First, there are significantly increases in the tax base during 2008 to 2011. In 2008, the number of corporate tax payers was 1.46 million while at the end of February 2011 the corporate tax payers are 1.88 million. There are approximately 0.42 million new corporate tax payers. The decrease in the CIT revenue as a consequence of cutting the CIT rate, therefore, could be covered by additional revenue collected from new corporate tax payers.

Table 6.4 Trend of Government Tax Revenues 2005-2011 (in trillion Rupiah)

Description	2005	2006	2007	2008	2009	2010*	2011**
Revenues and Grants	**495.2**	**638.0**	**707.8**	**981.6**	**848.8**	**992.4**	**1,086.3**
1. Domestic Revenues	493.2	636.2	706.1	979.3	847.1	990.5	1,082.6
I. Tax Revenues	347.0	409.2	491.0	658.7	619.9	743.3	839.5
1. Domestic Tax	331.8	396.0	470.1	622.4	601.3	720.8	816.4
i. Income Tax	175.5	208.8	238.4	327.5	317.6	362.2	414.5
a. Oil and Gas	35.1	43.2	44.0	77.0	50.0	55.4	54.2
b. Non-Oil and Gas	140.4	165.6	194.4	250.5	267.6	306.8	360.3
1. Corporate Income Tax	*51.4*	*65.1*	*80.8*	*106.4*	*120.3*	*126.7*	*163.8*
2. Non-Corporate Income	*89.0*	*100.5*	*113.6*	*144.1*	*147.3*	*180.1*	*196.5*
ii. Value Added Tax	101.3	123.0	154.5	209.6	193.1	263.0	309.3
iii. Other taxes	55.0	64.2	77.2	85.3	90.6	95.6	92.6
II. Non-Tax Revenues	146.2	227.0	215.1	320.6	227.2	247.2	243.1
2. International Taxes	15.2	13.2	20.9	36.3	18.6	22.5	23.1

Source: Ministry of Finance, 2011

*Note: the figures of 2005, 2006, 2007, 2008, and 2009 are the realized budget; * is based on the 2010 revised budget; ** is based on the 2011 proposed budget.*

Second, tax potential in Indonesia is large enough and still unexplored optimally. Only 30 per cent of registered corporate taxpayers actively reported notice of tax returns. Ikhsan et al. (2005b) found that the government can still optimize their tax revenue without any changes in a tax rate. Improving tax administrations such as tax audits, supervisions, and expansion of registered tax payers will significantly increase tax revenues. Third, the discount tax rate for SMEs and the reducing tariff rate for large businesses increase tax compliances and reduce illegal activities of tax evasion. Fourth, improvements in tax policy and administrations through several reforms in administrations, regulations and supervision, and potential exploration have increased tax revenues collecting from not only corporate income tax but also personal income tax as well as value-added tax.

The 2008 CIT reform supported with the DGT administrative reforms and the sunset policy did not necessary decline the government tax revenue, so it is not a necessary to worry that there is a fiscal tightening as a response to the decrease in the CIT rate. The Government, therefore, still has enough resources to finance poverty alleviation programs. Further, there is still enough space to continuously increase CIT revenue through optimizing tax administrations. This finding is similar to the India, Ghana, and Vietnam experiences that tax reforms did not deteriorate fiscal balance and even promoted revenue generation (Kusi, 1998; Rao, 2000; Nguyen, 2011).

6.3 Research Methodology

6.3.1 The Incidence of Corporate Income Tax and Poverty: A Simple General Equilibrium Framework

There is a belief that any effects of CIT on the poor are likely to be small, as in practice the poor almost do not pay CIT since most of them are not business owners. The poor might affect CIT indirectly through changes in factor incomes and prices in the economy. In order to evaluate the effect of CIT on the economy, this study utilizes the framework of the general equilibrium of the Harberger Model (Harberger, 1962), shown as below:

$$dp_K = \frac{E\theta_{KX}\left(\frac{K_X}{K_Y} - \frac{L_X}{L_Y}\right) + S_X\left(\frac{\theta_{LX}K_X}{K_Y} + \frac{\theta_{KX}L_X}{L_Y}\right)}{E(\theta_{KY} - \theta_{KX})\left(\frac{K_X}{K_Y} - \frac{L_X}{L_Y}\right) - S_Y - S_X\left(\frac{\theta_{LX}K_X}{K_Y} + \frac{\theta_{KX}L_X}{L_Y}\right)} dT_{KX} \quad (6.1)$$

where, dp_K is a change in the price of capital; E is an elasticity of demand; θ_{KX} is a share of capital in the production of X; θ_{KY} is a share of capital in the production of Y; θ_{LY} is a share of labor in the production of Y; θ_{LX} is a share of labor in the production of X; K_X is a capital used in the production of X; K_Y is a capital used in the production of Y; L_X is a labor used in the production of X; L_Y is a labor used in the production of Y; S_X is an elasticity of substitution between labor and capital in the production of X; S_Y is an elasticity of substitution between labor and capital in the production of Y; dT_{KX} is a change in corporate income tax in the production of X.

The fact of the denominator of Eq.6.1 is necessary positive. S_X, S_Y and E have a negative sign. However, if $(\theta_{KY} - \theta_{KX})$ is positive meaning the sector Y is capital intensive compared to the sector X, $(K_X/K_Y - L_X/L_Y)$ will be always negative. The sign of dp_K, therefore, will be determined by the sign of the numerator of Eq. 6.1. According to Eq.6.1, the CIT has an effect on the economy through two channels, termed the output effect (the first part) and the substitution effect (the second part). The output effect refers to change in production while the factor substitution effect refers to changes in demand for labor and capital.

A decrease in the CIT rate of X means a negative value of dT_{KX}. dp_K, therefore, can be negative if the numerator is positive. The numerator will be positive if the first term is positive and greater in absolute magnitude than the second term. Since the elasticity of substitution between labor and capital (*S*) is always negative, then the second term is also always negative. Further, since E is negative, the first term can be positive only if $\left(K_X / K_Y - L_X / L_Y\right)$ is negative, and this only occurs only if sector X is relatively more labor intensive than industry Y. Further, the value of dp_K will decrease as the value of S is increased.

Moreover, dp_K, therefore, can be positive if the numerator is negative. The numerator will be negative in the following conditions: first, if the first term is positive and lower in absolute magnitude than the second term; second, if the first term is also negative. The first condition occurs only if sector X is relatively more labor intensive than industry Y and the output effect is lower than the substitution effect. While, the second condition occurs only if sector X is relatively more capital intensive than industry Y.

Using the framework of Eq. 6.1, therefore, the effect of 2008 CIT reform on a change in the price of capital could be positive and negative depending on the structure of industry, the output, and substitution effect. In the short run, when the elasticity of substitution between capital and labor is limited, the 2008 CIT reform has a negative relation with the capital rate of return. Whereas, in the long run, when the elasticity of substitution between capital and labor occurs, the 2008 CIT reform might increase the capital rate of return.

6.3.2 A CGE-Microsimulation

This research will use the CGE microsimulation approach (CGE-MS) in order to evaluate how the 2008 CIT reform influences poverty in Indonesia. This research use the CGE micro-simulation approach (CGE-MS) in order to calculate the poverty impacts of the 2008 CIT reform. The methodology following Dartanto (2010b), and Dartanto and Usman (2011) has been explained in the Chapter 3[21]. The model then is used to simulate several

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21 The elasticity data used in this CGE refers to sources such as the elasticity in the Indonesian IFPRI CGE Model, *Wayang* Model, and other estimations on elasticity. The Armington elasticities, the elasticity of substitution between imports and domestic output in domestic demand, are 1.5 for all commodities. Constant elasticity of transformation (CET) for domestic marketed output between exports and domestic

scenarios of decreasing the 2008 CIT rate.

The aim of simulations is to find out how much change in poverty there is under the two scenarios of reducing CIT rates. SIM1 is reducing the CIT rate from 30 per cent to 25 per cent as the condition from 2010 onwards; SIM2 is reducing the CIT rate from 30 per cent to 23.5 per cent due to considering the tax incentives granted to SMEs and listed companies[22]. The basis of the CIT rate refers to the effective CIT rate in SAM 2005 that is 30 per cent. Considering that the 2008 CIT reform did not reduce the CIT revenue, the simulation of decreases in the CIT rate is not followed by decreasing government consumptions. Moreover, following the Harberger (1962)'s findings that the effect of CIT on factor incomes depends on the elasticity substitution between capital and labor, then simulations are done under two difference elasticities of substitution. Regarding Dissanayake and Sim (2010), this study chooses 0.250 and 0.375 as the elasticity of substitution between capital and labor.

The simulations are conducted under the following closure rules: 1) labor and capital are unemployed (fully employed) and mobile cross sectors; 2) the value of adjustment adjusts saving (savings-driven); 3) flexible government saving and fixed direct tax rate; 4) flexible exchange rate and fixed foreign savings; 5) producer price numeraire. The closure of saving-driven investment means fixed marginal saving propensities, flexible investment demand quantity adjustment factors, flexible absorption shares for investment demand, and

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supplies is set equal to 1.5 for all commodities. Elasticity of substitution (CES) between factors of production is 0.25 for all activities. Elasticity of substitution between aggregate factors and intermediate input is 0.5 and elasticity of output aggregation for commodities is 3. Furthermore, household consumption is modeled under the Linear Expenditure System (LES), whereby the elasticities vary between commodities, and the elasticity is less than 1 for food products and more than 1 for industrial products and services.

[22] Listed companies in the Indonesian Stock Exchanges by January 2011 are 426 companies. Registered company tax payers are around 1.7 millions but only 30 per cent of them are actively reporting the annual tax returns. Further, five hundred large tax payers contributed more than 80-82 per cent of CIT revenue in 2008. Due to limited data availability, let us assume that 10 per cent of listed companies with 40 per cent shares owned by public and 8-10 per cent of CIT revenue are collected from SMEs. Thus, the effective CIT rate considering incentives of CIT rate to listed companies and SMEs is approximately 23.5 per cent.

fixed government demand quantity adjustment factors.

The simulations are done under two situations of the short run (SR henceforth) and long run (LR henceforth) condition. The SR and LR refer to the definition of microeconomic theory that the short run is a period of time in which the quantity of at least one input is fixed and the quantities of the other inputs can be varied. The long run is a period of time in which the quantities of all inputs can be varied. The difference of both conditions lies in the closure rules applied, either capital fully employed (fixed supply) or capital unemployed (flexible supply). The SR condition refers to the closure of labor unemployed (flexible supply) and fixed supply of capital. This is because an unemployment rate is high while a stock of capital is limited in Indonesia. The labor is variable in the amount that is easily adjusted responding to a change in the CIT rate while the capital is fixed in the amount that needs time to adjust. On the contrary, the LR condition refers to the closure of labor unemployed and flexible capital supply. Both capital and labor are mobile across activities. Both capital and labor are variable in the amount that is easily altered responding to a change in the CIT rate. Thus, the 2008 CIT reform should attract both foreign and domestic investors to invest more in Indonesia.

Therefore, there are eight simulation scenarios: SRSIM1a, SRSIM1b, SRSIM2a, SRSIM2b, LRSIM1a, LRSIM1b, LRSIM2a and LRSIM2b. SR refers to the short-run condition; LR refers to the long-run condition; SIM1 refers to SIM1 of decrease in the CIT rate from 30 per cent to 25 per cent; *a* refers to the elasticity of substitution of 0.250; and *b* refers the elasticity of substitution of 0.375.

6.4 The 2008 Corporate Tax Reform and Its Implication to Poverty in Indonesia

6.4.1 The Macroeconomic Impacts of the 2008 CIT Reform: CGE Results

The cut of the CIT rate theoretically decreases the costs of productions that will be reflected on decreases in the price of goods and services in the economy. Appendix 6.1 shows clearly that all prices of goods and services drop off responding to the 2008 CIT rate. Capital intensive sectors enjoy the highest decrease in prices both in the SR and the LR. However, simulation results show that in the LR price decreases are larger than in the SR condition. This is because in the LR supplies of capital and labor are flexible and enterprises have a flexibility to substitute a relatively expensive factor to a cheaper one, therefore, the decrease of production costs in the LR is larger than in the SR.

CGE simulations generally show that in the short run the 2008 CIT reform appears to favor laborers compared to capital owners. The wage rate for all labor categories except for the unskilled labor increases while the rate of capital return decreases (Table 6.5). On the contrary, in the long run the 2008 CIT reform is beneficial to both labor suppliers and capital owners. Wage rates of all labor categories increase around 0.6 to 2 per cent while non-labor factor (capital) increases roughly 1 to 1.5 per cent. The largest increase of wage rates is found in the semi-skilled labors while the lowest increase of wage rates is in the skilled labors.

Eq. 6.1 of the Harberger model and the applied closure rules could be used to explain different impacts of decreasing the CIT rate on the SR and LR changing in factor incomes and demand for factor productions. Intuitively the cut of the CIT rate decreases costs to both SMEs and large enterprises. However, the decreased costs of SMEs are larger than those of large enterprises because SMEs are charged with a lower tax rate. The decrease in costs forces down the price of goods particularly on SMEs, increases the quantity of goods, and increases the returns to wage rates and capital.

Table 6.5 Simulated Changes in Factor Incomes and Demand for Factor Productions under the Short Run and Long Run Condition

Factor Productions	The Short Run Condition				The Long Run Condition			
	SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%		SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%	
	SRSIM1a	SRSIM1b	SRSIM2a	SRSIM2b	LRSIM1a	LRSIM1b	LRSIM2a	LRSIM2b
Changes in Return of Factor Incomes (in per cent)								
Rural Agricultural Labor	0.224	0.245	0.306	0.322	1.282	0.837	1.338	0.891
Urban Agricultural Labor	0.204	0.227	0.282	0.298	1.274	0.833	1.330	0.887
Rural Production-Operator-Unskilled Labor	-0.242	-0.192	-0.287	-0.245	1.486	0.992	1.568	1.071
Urban Production-Operator-Unskilled Labor	-0.192	-0.148	-0.224	-0.187	1.511	1.009	1.595	1.091
Rural sales and administration (semi-skilled) Labor	0.145	0.167	0.206	0.221	2.076	1.372	2.178	1.471
Urban sales and administration (semi-skilled) Labor	0.103	0.127	0.153	0.169	1.958	1.298	2.059	1.395
Rural skilled Labor	0.099	0.127	0.147	0.169	0.990	0.653	1.044	0.705
Urban skilled Labor	0.030	0.060	0.059	0.082	1.072	0.710	1.133	0.768
Non Labor Factor (Capital)	-0.295	-0.123	-0.307	-0.149	1.472	0.989	1.560	1.075
Changes in Supply (Demand) of Factor Productions (thousand of labor)								
Rural Agricultural Labor	111.28	122.63	151.10	160.64	232.91	151.26	243.09	161.04
Urban Agricultural Labor	12.44	13.74	16.92	18.00	26.39	17.15	27.55	18.27
Rural Production-Operator-Unskilled Labor	-31.53	-24.50	-36.72	-31.06	38.53	25.42	40.54	27.36
Urban Production-Operator-Unskilled Labor	-26.50	-19.54	-30.10	-24.57	48.63	32.09	51.17	34.53
Rural sales and administration (semi-skilled) Labor	4.73	5.53	6.63	7.29	13.55	8.86	14.21	9.49
Urban sales and administration (semi-skilled) Labor	12.71	15.56	18.28	20.59	43.61	28.59	45.80	30.69
Rural skilled Labor	2.24	2.79	3.22	3.68	6.01	3.94	6.33	4.25
Urban skilled Labor	2.62	3.86	4.14	5.16	12.58	8.26	13.26	8.92
Non Labor Factor (Capital) (in IDR trilion)	0.00	0.00	0.00	0.00	41.77	27.89	44.29	30.31

Source: CGE Simulation Results

In the SR, the increase in wage rates absorbs unemployed labor in the economy, again forcing down wage rates. The decrease in wage rates as a consequence of entering new labor is not enough to cancel out the previous increase of wage rates. The growth of wage rates, therefore, remains positive. On the contrary, an increase in the capital rate of return pushes an existing capital moving limitedly from big business to SMEs due to an assumption of the fixed capital supply and limited mobility of capital across sector. However, since the share of SMEs on the economy is smaller than of large enterprises, the limited capital flow from large enterprises to SMEs forces down the capital rate of returns.

In the LR, when capital and labor are flexible in the amount, the decrease in the CIT rate decreases the costs of productions to both SMEs and large enterprises. This will force down the price of goods, increase the demand of goods, and rise up returns to wage rates and capital. Increases in demands of goods provided incentives for enterprises to produce more through utilizing unemployed labor and attracting both domestic and foreign investors to invest more. Increases in both labor and capital supplies in the economy depress the returns of factor incomes. These, however, would not be enough to cancel out the previous increases of returns so the growth of returns on factor incomes remains positive. Further, Table 6.5 shows that in the LR the lower elasticity of substitution between labor and capital is associated with the lower change in returns of factor incomes. In the LR enterprises have a flexibility to substitute a relatively expensive factor with a cheaper one. Thus, enterprises will substitute labor for capital responding to the decrease of the CIT rate in which demands for labors decrease, forcing down wage rates.

The 2008 CIT reform increases demands for factor productions as well (Table 6.5). Similar to the changes in the returns of wage rates, in the SR the 2008 CIT reform appears to favor labor (except unskilled labor) compared to capital owners. In the LR, however, demands for both labor and capital increase significantly. The 2008 CIT reform creates new job opportunities, roughly 88,010 to 159,730 (SR condition) and roughly 275,580 to 441,910 (LR condition). Further, there is no change in a demand of capital in the SR since the SR condition's assumed the supply of capital is already fixed. Whereas, in the LR the 2008 CIT reform can attract new investments around IDR 28 trillion to IDR 44.3 trillion (USD 5 billion). Further, in the LR, a low elasticity of substitution between capital and labor is associated with a higher demand for factor productions. When the elasticity of substitution is 0.250, the demand for labors is 422,210 (LRSIM1a). However, when the elasticity of substitution is 0.375, the demand for labors is 275,580 (LRSIM1b). This is because returns of factor incomes are lower in a higher elasticity of substitution, making disincentives to factors absorbed in the economy.

Table 6.6 Simulated Changes in Real Value of Macroeconomic Indicators under the Short Run and Long Run Condition (in per cent)

Description	The Short Run Condition				The Long Run Condition			
	SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%		SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%	
	SRSIM1a	SRSIM1b	SRSIM2a	SRSIM2b	LRSIM1a	LRSIM1b	LRSIM2a	LRSIM2b
Private Consumption	0.396	0.380	0.515	0.495	2.072	1.382	2.184	1.491
Fixed Investment	-0.705	-0.641	-0.888	-0.829	0.771	0.506	0.812	0.545
Export	-0.044	-0.025	-0.047	-0.031	1.151	0.780	1.227	0.853
Import	-0.048	-0.027	-0.050	-0.033	1.677	1.139	1.787	1.246
Net Inderect Taxes	0.023	0.049	0.045	0.066	2.420	1.584	2.519	1.680
Gross Domestic Product	0.000	0.014	0.009	0.020	1.455	0.968	1.534	1.045
Consumer Price Index	-0.152	-0.062	-0.159	-0.076	-1.006	-0.611	-1.006	-0.610

Source: CGE Simulation Results
Note: Government consumption does not appear in Table 6.6 since the real value of changes in government consumption is fixed. This is related to the closure rule of flexible government saving and fixed direct tax rate.

Turning to macroeconomic indicators, the 2008 CIT rate boosts some macroeconomic indicators such as private consumption, investment, exports, and gross domestic product, especially in the LR (Table 6.6). The private consumption grows around 1.38 to 2.07 per cent responding to a decrease in the CIT rate. The significant growth of private consumption is caused by decreases in commodity prices and increases in returns of factor productions. A decrease in the CIT rate will be followed by an increase in investment and export as well. The combination of increases in the private consumption, investment, and exports boost the growth of GDP by almost 1 to 1.5 per cent.

6.4.2 The Poverty Impacts of the 2008 CIT Reform: Microsimulation Results

In the CGE-Microsimulation analysis, the poverty impacts of the 2008 CIT reforms solely depend on how large the effects of this shock are on changing price level and factors' income in the economy. However, the extent to which the price and factor income changes can influence the poverty incidence depends on the consumption patterns and source of income of the poor. It also depends on how sensitive the poverty line is in responding to the price change.

Table 6.7 summarizes the poverty impact of the CIT reform in Indonesia. Generally, the 2008 CIT reform is beneficial to support the poverty reduction in Indonesia. A decrease in the CIT rate reduces goods prices, increases wage rates and return on capital, attracts new investments, and creates new job opportunities. A decreasing of goods' prices raises the purchasing power of low-income groups and also maintains the poverty line at a low level, while increases in factor incomes raise an ability of low-income groups to consume more. New job opportunities offer income to unemployed laborers so they have enough resources to support their consumption. All of them significantly support the poverty reduction in Indonesia. LRSIM1a shows cutting five percentage points of the CIT rate can support the poverty reduction by 1,879,868 (0.898 per cent). While considering to discount rates for listed companies and SMEs, LRSIM2a shows cutting five percentage points of the CIT rate can intensively support the poverty reduction by 1,922,462 (0.919 per cent). Generally the 2008 CIT rate contributes to reducing the poverty incidence in agricultural, industrial, and utilities-construction sectors, three sectors that contribute almost 70 per cent of the national poverty.

In the disaggregate level, landless agricultural households benefit most from a decrease in the CIT rate. LRSIM1a shows that decreasing the CIT rate by five percentage points can reduce the poverty incidence by 1.5 per cent (roughly 300 thousand). This is because the 2008 CIT reform increases demands for agricultural labor, approximately 243 thousand (LRSIM2a), and raises the rural agricultural wage rate by 1.34 per cent. The increasing demand for rural agricultural labor takes almost 55 per cent of the total labor demands resulting from the 2008 CIT reform. On the other hand, it is commonly observed in Indonesia that most landless agricultural households rely on their income of selling labors and that most of them are underemployed as well. Therefore, new job creations and increases of wage rates as results of the CIT rate decrease can absorb underemployed laborers of landless agricultural households and increase household incomes. Both can contribute extensively the poverty reduction of this household category.

Moreover, households working in utilities (electricity, water, and gas) and construction and industrial sectors acquire the second largest benefit of the 2008 CIT reform while households working in industrial sectors obtain the third largest benefit of the CIT reform. The poverty rate of both household categories declines by 1.54 per cent (LRSIM2a) and 0.99 per cent (LRSIM2a) respectively. The 2008 CIT reform would attract new investments on manufacturers and constructions, demanding more unskilled laborers and forcing up their wage rates. Table 6.5 shows a decrease in the CIT rate from 30 per cent to 23.5 per cent increases demands roughly 40.540 of rural unskilled labors and 51.180 of urban unskilled labors (LRSIM2a). Increases in labor demands push up the wage rates of unskilled labor by almost 1.6 per cent in an urban area and 1.57 per cent in a rural area. Both new job creations and increases in wage rates contribute greatly to reducing the poverty rate of households working in industrial and construction sectors.

In order to complement the headcount index analysis, this study provides the poverty gap index in Table 6.8. This index represents the gap between poor peoples' standard of living and the poverty line, which shows the shortfall of the poor's expenditure from the poverty line expressed as an average of all people in the population. The pattern of changes in the poverty gap index responding to the decrease in the CIT rate is not different from the changes in the headcount index. The higher decrease in the CIT rate narrowed in the poverty gap index. LRSIM1a and LRSIM2a decrease the poverty gap index by 0.203 per cent and 0.205 per cent respectively. This is because both increases in factor incomes and decreases in goods' prices significantly increase household welfares, so that the expenditure of low income households initially below the poverty line jumps above the line and the expenditure of the poor that has previously been far below the line increases narrowly to the poverty line.

6.5 Sensitivity Analysis

The CGE estimation results are known to be sensitive to the values of the Armington elasticities. However, there have been few empirical studies on estimating these elasticities. According to several studies, the resulting estimates of these elasticities varied widely. McDaniel and Balistreri (2003) confirmed that the wide-range estimates of Armington elasticities depend on the data used, disaggregating sector, and methodology applied.

The sensitivity analysis, therefore, is important to be conducted in order to ascertain the sensitivity of poverty in respect to changes in the elasticity of substitution between labor and capital. Table 6.9 consistently confirms Table 6.7, that the poverty impacts of the 2008 CIT reform increases as the elasticity substitution between labor and capital decreases. Further, the lower the CIT rate the greater the poverty impacts. According to Table 6.9, the 2008 CIT reform appears to be insignificantly reducing the poverty incidence in Indonesia. This is because the applied closure rules in Table 6.9 are absolutely different from those applied in Table 6.7. Table 6.9 assumed that both the supply of labor and capital are fixed (labor and capital are fully employed), thus the decreasing CIT rate could not create job opportunities and attract new investments; as such, both of them are main factors of the poverty reduction.

Table 6.7 Simulated Changes in the Headcount Index (per cent) under the Short Run and Long Run Condition

Sector	Population	Initial Poverty 2005	The Short Run Condition				The Long Run Condition			
			SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%		SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%	
			SRSIM1a	SRSIM1b	SRSIM2a	SRSIM2b	LRSIM1a	LRSIM1b	LRSIM2a	LRSIM2b
Agriculture (with Land)	57,332,312	23.81	-0.129	-0.061	-0.132	-0.077	-0.969	-0.580	-0.972	-0.584
Agriculture (without Land)	20,443,674	25.71	-0.207	-0.097	-0.252	-0.154	-1.500	-0.877	-1.535	-0.877
Industry	19,916,155	11.25	0.004	0.026	0.004	0.033	-0.949	-0.560	-0.989	-0.590
Electricity, Water, Gas and Constructions	14,312,875	17.66	-0.050	-0.001	-0.031	-0.001	-1.430	-0.936	-1.536	-0.936
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	-0.091	-0.031	-0.091	-0.043	-0.747	-0.363	-0.757	-0.374
Banking, Financial Int., Government and Private Services	26,863,587	6.94	-0.051	-0.029	-0.061	-0.008	-0.540	-0.328	-0.540	-0.367
Others	23,190,493	15.77	-0.036	0.000	-0.047	-0.019	-0.544	-0.350	-0.569	-0.365
Total	**209,293,599**	**16.39**	**-0.090**	**-0.035**	**-0.096**	**-0.046**	**-0.898**	**-0.525**	**-0.919**	**-0.538**
Number of Poor		**34,304,352**	**-187,635**	**-72,265**	**-200,852**	**-95,969**	**-1,879,868**	**-1,098,336**	**-1,922,462**	**-1,125,173**

Source: Author's calculation

Table 6.8 Simulated Changes in the Poverty Gap Index (per cent) under the Short Run and Long Run Condition

Sector	Population	Initial Poverty Gap Index 2005	The Short Run Condition				The Long Run Condition			
			SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%		SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%	
			SRSIM1a	SRSIM1b	SRSIM2a	SRSIM2b	LRSIM1a	LRSIM1b	LRSIM2a	LRSIM2b
Agriculture (with Land)	57,332,312	4.713	-0.035	-0.014	-0.036	-0.017	-0.231	-0.142	-0.231	-0.142
Agriculture (without Land)	20,443,674	5.510	-0.040	-0.020	-0.040	-0.030	-0.300	-0.190	-0.300	-0.190
Industry	19,916,155	2.100	0.000	0.000	0.000	0.000	-0.190	-0.120	-0.190	-0.120
Electricity, Water, Gas and Constructions	14,312,875	3.013	-0.010	0.000	-0.010	0.000	-0.305	-0.197	-0.315	-0.207
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	2.008	-0.010	-0.007	-0.010	-0.007	-0.146	-0.089	-0.149	-0.093
Banking, Financial Int., Government and Private Services	26,863,587	1.358	-0.009	-0.009	-0.009	-0.009	-0.127	-0.079	-0.128	-0.088
Others	23,190,493	3.369	-0.019	-0.009	-0.019	-0.009	-0.203	-0.122	-0.203	-0.132
Total	**209,293,599**	**3.24**	**-0.020**	**-0.010**	**-0.020**	**-0.011**	**-0.203**	**-0.126**	**-0.205**	**-0.130**

Source: Author's calculation

Table 6.9 The Sensitivity Analysis of Simulated Changes in the Headcount Index (per cent) of Indonesia under Various Decreases in CIT Rates and Various Elasticity of Substitution between Labour and Capital

Sector	Population	Initial Poverty 2005	SIM1 CIT Decreases from 30% to 25%				SIM2 CIT Decreases from 30% to 23.5%			
			0.200	**0.250**	**0.325**	**0.425**	**0.200**	**0.250**	**0.325**	**0.425**
Agriculture (with Land)	57,332,312	23.81	-0.034	-0.014	-0.011	0.000	-0.046	-0.034	-0.014	-0.01
Agriculture (without Land)	20,448,294	25.73	-0.039	-0.039	-0.039	-0.039	-0.039	-0.039	-0.039	-0.04
Industry	19,916,155	11.25	-0.021	-0.021	-0.011	-0.011	-0.021	-0.021	-0.021	-0.02
Electricity, Water, Gas and Constructions	14,312,875	17.66	-0.120	-0.120	-0.057	-0.057	-0.120	-0.120	-0.120	-0.12
Trade, Hotel, Restaurant, Transportation and Telecommunication	47,234,503	10.81	-0.031	-0.031	-0.019	-0.019	-0.031	-0.031	-0.031	-0.02
Banking, Financial Int., Government and Private Services	26,863,587	6.94	-0.021	-0.021	-0.021	-0.021	-0.021	-0.021	-0.021	-0.02
Others	23,201,581	15.81	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
Total	**209,309,307**	**16.40**	**-0.033**	**-0.028**	**-0.019**	**-0.016**	**-0.036**	**-0.033**	**-0.028**	**-0.02**
Number of Poor		**34,320,060**	**-69,246**	**-57,634**	**-39,652**	**-33,184**	**-75,908**	**-69,246**	**-57,634**	**-50,590**

Source: Author's calculation

Note: The sensitivity analysis is conducted under the following closure rules: 1) labor fully employed and mobile cross sectors; 2) capital fully employed and activity specifics; 3) investment driven saving and fixed capital formation; 4) flexible government saving and fixed direct tax rate; 5) flexible exchange rate and fixed foreign savings; 6) producer price numeraire.

BOX 6.1

The Simulation of Decrease in the CIT Rate under the Balance Budget Scenario

All simulations are conducted under the deficit budget scenario since the decrease in the CIT rate did not reduce the CIT tax revenue, so that the government still have enough resources to finance poverty alleviation programs. Therefore, the poverty impacts of the 2008 CIT reform are extensively reducing the poverty incidence by almost 0.898 per cent in Indonesia. However, as in cases of most developed countries where an economy is already in the steady state level and the tax base is already explored optimally, the reduce CIT rate might decrease the government tax revenue. Thus, the decrease of the CIT rate would be followed by adjustments in the government expenditure. Therefore, the impacts of CIT reforms on the economy of developed countries might not be as large as that on the economy of developing countries.

Table 6.7 shows that cutting 30 per cent to 25 per cent will reduce poverty by 1.88 million (0.898). This decrease of CIT rate is equal to 50 per cent of reducing fuel subsidies. The CGE-Simulation shows that the 50 per cent of reducing fuel subsidies will increase the poverty incidence by 820,000 (see Chapter 5). However, if the price impacts of the 50 per cent of reducing fuel subsidies in the economy are double that of CGE results, the poverty incidence will increase by 1.51 million. Although the simulation of the CIT rate is done under the balance budget scenario, the 2008 CIT reform still contributes to the poverty reduction by almost 370,000 in Indonesia.

Source: Author

6.6 Concluding Remarks

The CIT tax reform enacted by Law No.36 of 2008 cuts maximum tax rates from 30 per cent to 25 per cent and offers some incentives for business. A 50 per cent discount tax rate is granted to SMEs while listed companies with minimum 40 per cent shares owned by public are also granted a 5 per cent discount of normal rate. These incentives will encourage SMEs and large enterprises to expand their business, create job opportunities, and reduce in the poverty.

The 2008 CIT reform supported by the administrative reforms and the 2008 sunset policy (a tax amnesty policy) has significantly increased new individual tax payers by 8.3 million and corporate tax payers by 422,407 during 2009 to 2011. Expanding the tax base and administrative reforms are able to cover the decrease of CIT revenue as a consequence of cutting the CIT rate. Even the CIT revenue increased averagely 16 per cent during 2009 to 2011. The 2008 CIT reform did not reduce the CIT revenue, so there is no concern that the government will cut poverty reduction programs.

In terms of the poverty impacts, CGE-Microsimulation shows that cutting five percentage point of the CIT rate will attract IDR 41.77 trillion of new investments, create 441,910 new job opportunities, boost 1.46 per cent of economic growth, decline 1 per cent of consumer price index, and raise 1.5 per cent of wage rates. These macroeconomic changes contribute significantly to lift 1.88 million people (0.898 per cent) out of poverty. Moreover, reducing poverty was observed mainly in households working in agricultural, industrial, and construction sectors, three sectors that contribute almost 70 per cent of the national poverty.

Chapter 7

Poverty Dynamics and the Role of Government Assistance on Changing Poverty Status and Protecting the Poor in Indonesia[♦]

The previous three chapters have analyzed the poverty impacts of macro fiscal policies and external shocks using A CGE-Microsimulation. There are, however, many micro fiscal policies such as micro credit programs, poor targeted health insurances, and cheap subsidized rice that could directly change the conditions of poor households. Further, the poor households are also vulnerable to individual economic risks or shocks such as a death of a family member, crop loss, sickness and bankruptcy. Thus, analyzing the poverty impact of micro fiscal policies, economic risks and shocks needs to be conducted in Indonesia in order to obtain a comprehensive picture of how fiscal policy is influencing poverty in Indonesia. Evaluating micro fiscal policies, individual risks and shocks using A CGE-Microsimulation might be inappropriate since the impacts of these policies directly influence household's conditions. Therefore, this chapter has a makes considerable contribution to examine specifically a change in the poverty status of households responding to economic risks, shocks, and micro fiscal policies.

7.1 Background

Indonesia's record at economic growth and combating poverty over the past 20 years is recognized internationally. Continuous economic growth and improving income distribution are the main factors for decreasing poverty in Indonesia (Suryahadi et al., 2009;

[♦] This chapter is the modification of the collaborative paper written with Nurkholis. This article is submitted and currently under review in Bulletin of Indonesian Economic Studies (submitted on 27 September 2011). The original title of this paper is "Finding out the Determinants of Poverty Dynamics in Indonesia: Evidence from Panel Data". The earliest version of this chapter had been presented at the Singapore Economic Review Conference, 2011.

Balisacan et al., 2002; Miranti, 2010). The incidence of poverty has continuously decreased from 40.10 per cent to 15.40 per cent during the period from 1976 to 2009. Unfortunately, when the economic crisis hit and the economic growth decreased drastically, poverty figures increased sharply from 17.47 per cent (34.01 millions) in 1996 to 23.43 per cent (47.97 millions) in 1999.

Poverty in Indonesia has been an area much researched by policy makers, international donors and scholars. However, most of the poverty research in Indonesia, for example, Suryahadi et al. (2009), Suryahadi et al. (2003), Balisacan et al. (2002) and Bidani and Ravallion (1993) essentially focus on static poverty that analyzes the proportion of the population falling below a given income threshold at a given time. However, it is generally acknowledged that poverty is not a pure static phenomenon since the poor is a human being that is growing and changing overtime. There is always a chance that at some point in the future households who are currently not poor may fall below the poverty line because of events such as crop loss, job loss, death and other shocks. However, there are also possibilities for households who are currently poor to escape from poverty due to gaining employment or a better job, increasing educational attainment and improving infrastructure.

On the other hand, the government of Indonesia itself has changed the poverty alleviation policies from a macro top-down approach into a community or household participatory approach. In the last 10 years, the government has innovated and implemented several policies to alleviate chronic poverty such as educational subsidy *(Bantuan Operasional Sekolah)*, scholarships, conditional cash transfers, community empowerment programs *(Program Nasional Pemberdayaan Masyarakat)*, credits for small-medium enterprises (micro finance) and infrastructure development projects *(Program Pengembangan Kecamatan)*. In addition, Government also provides social safety nets to protect the poor from some external shocks through distributing subsidized rice (RASKIN), cash transfers *(Bantuan Langsung Tunai*) and poor targeted health insurance (ASKESKIN). Those policies are deliberated to cope with transient poverty.

However, the effectiveness of these policies in alleviating poverty is still questionable. Evaluating the impact of poverty alleviation policies in the static term or short period can be difficult since for some policies there is a lag between policy implementation and the results of the policy emerging. For instance, to impact of micro credit on small-medium enterprises often only becomes apparent after two or more years; therefore longer and continuous observation is required. Further, it is generally acknowledged that the impact of human capital investment such as education and health on household welfare cannot be investigated immediately.

Since the poverty incidence can change overtime, it is important to conduct the dynamic analysis in order to distinguish between chronic, transient poverty and never poor, to find out the important factors differentiating among groups and also to evaluate the effectiveness of government policies on changing poverty status in Indonesia. This study using recent data contributes to a deeper understanding of the recent situation of poverty in Indonesia and proposes an efficacious poverty alleviation policy.

This chapter first briefly explains the concepts of chronic and transient poverty and how they are measured, and also describe changing of household poverty status in Indonesia during 2005 to 2007. The next part will review the research methods of the ordered logit model and will subsequently analyze the estimation results. The analysis focuses on the determinants of poverty dynamics and the important factors of changing poverty status. The paper will then end with some important findings and policy suggestions.

7.2 Theoretical Framework

7.2.1 Concepts and Measures of Chronic and Transient Poverty Based on Panel Data

There are two main methods commonly adopted to identify and measure chronic and transient poverty (income and consumption based poverty) based on panel data: the “spell” and “components” approaches (Yaqub, 2000; McKay and Lawson, 2003). The spell approach identifies the chronic and transient poverty based on the number or length of spells of poverty they experience. The defining feature of chronic or transient poverty is its extended duration (Hulme, Moore and Shepherd, 2001; Hulme and Shepherd, 2003). Chronic poor refers to the condition that consumption expenditure or income of household in each period is always below the poverty line. Transient poor means that consumption expenditure or household income is not always below the poverty line sometime over the line. Non poor (never poor) indicates that the consumption expenditure or household income in all periods is always above the poverty line (Hulme, Moore and Shepherd, 2001).

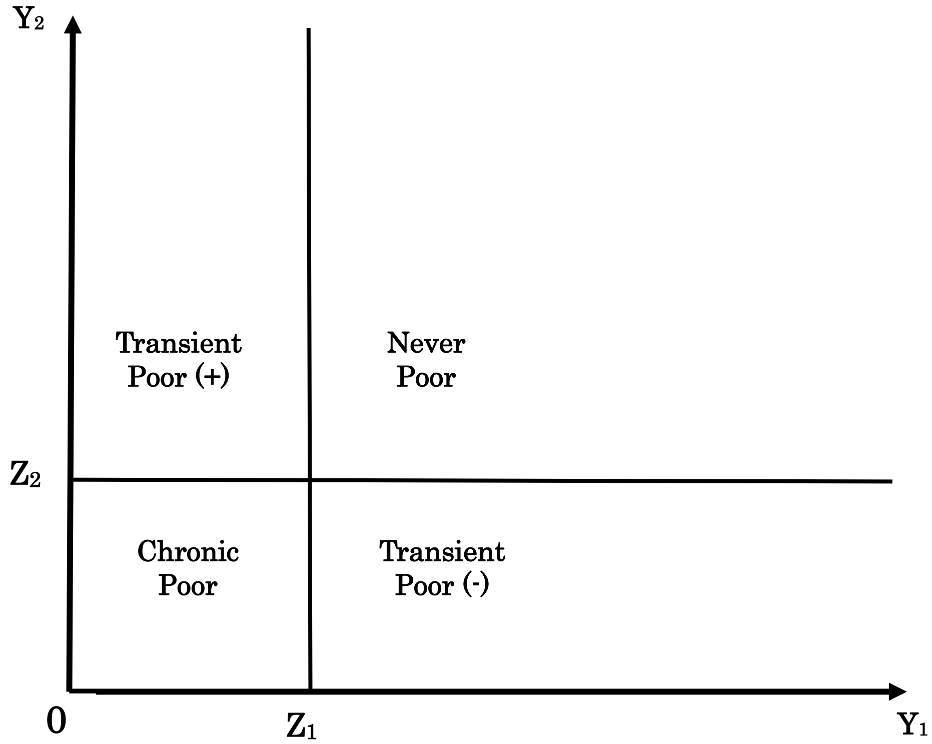
The difference between chronic and transient poverty is typically based on longitudinal or panel data, which observes the living conditions of the same individual or households at several points in time. McKay and Lawson (2002) explain that the main difference between chronic and transient poverty is the need for either longitudinal or panel data or life history survey. The longitudinal or panel data provides information about individuals or households during an observed period or in some consecutive periods. Meanwhile a life history survey captures the dynamic aspect of living conditions from a list of retrospective questions.

Figure 7.1 shows a simple illustration of the spell approach. Let Y_1 and Y_2 is the individual or household income or consumption in period-1 and period-2 respectively. It assumed that both Y_1 and Y_2 are classified by increasing order. Z_1 and Z_2 are the poverty line in period-1 and period-2. An individual is defined as being **chronic poor**, if his/her consumption (Y_1 and Y_2) overtime is below the poverty line (Z_1 and Z_2) in both periods. An individual is defined as being **transient poor**, if his/her consumption (Y_1 and Y_2) over a time is below a poverty line either in period-1 or period-2 of time span and above the poverty line in another period. However, in Figure 7.1, we distinguish between **transient poor (+)** and **transient poor (-)**. Transient poor (+) refers to an individual or household whose income or consumption is below the poverty line in period-1 but above the poverty line in period-2. Transient poor (-), on the other hand, refers to an individual or household whose income or consumption is above the poverty line in period-1 but below the poverty line in period-2. The plus (+) sign indicates improving living conditions while the negative (-) shows the impoverished condition. Further, an individual is defined as being **never poor,** if his/her consumption (Y_1 and Y_2) in both periods is never below the poverty line (Z_1 and Z_2).

The second approach is the "components" approach that distinguishes the permanent component of a household income or consumption from its transitory variations. This approach classifies the chronic poor as those whose permanent component is below the poverty line (McKay and Lawson, 2003). The most common approach to identify the permanent component is based on the inter-temporal average of household income or consumption. The regression model capturing the relationship between a household's income or consumption and its characteristics is commonly applied in order to distinguish between the permanent component and the transitory component (Jalan and Ravallion, 1998; McCulloch and Baulch, 1999).

The household relevant characteristics will be used in predicting the permanent income or consumption level. The accuracy and reliability of using this in identifying permanent and transitory components will depend on how well the household characteristics are able to explain the variations in income or consumption. A household may fluctuate in and out of poverty, but where the permanent component of its living standard is below the poverty line it is considered chronically poor (McKay and Lawson, 2003).

Figure 7.1 The Distinction between Chronic Poor, Transient Poor (-), Transient Poor (+) and Never Poor



Source: adapted from Grab and Grimm (2006)

7.2.2 Previous Researches on Poverty Dynamics

Studies on the determinants of poverty dynamics often classify the poverty status of households into three groups: chronic poor, transient poor, and non-poor or never poor. The distinction between chronic and transient poverty is not only important for the point of view of poverty measurement accuracy, but also has policy implication purposes. Either chronic or transient poverty would call for different alleviation strategies. In a country or region where the poverty problem is characterized by the chronically poor, then the appropriate strategy would be to redistribute assets, providing basic physical and human capital infrastructure. If the predominant poverty problems relate to transient poverty, the strategy would be geared towards providing safety nets and coping mechanisms to reduce their vulnerability and help them return to a non-poor situation (Hulme and Shepherd, 2003; McCulloch and Calandrino, 2003).

Many studies have found the important factors of determining poverty status are human capital, demographic factors, geographical location, physical assets and occupational status. Alisjahbana and Yusuf (2003) and Widyanti et al. (2009) in Indonesia, Adam and Jane (1995) in Pakistan, Jalan and Ravallion (1998) in Rural China and Mango et al. (2004) in Kenya have clearly shown that an increase in human capital indicated by educational attainment decreases the probability of being chronically poor and improves the ability of a household to respond to transitory shocks.

That changes in demographic factors such as increased household size is positively related to chronic poverty has been confirmed by Widyanti et al. (2009) in Indonesia, McCulloch and Baulch (2000) in Pakistan, Mango et al. (2004) in Kenya, Jalan and Ravallion (1998) in Rural China. McCulloch (2003) in Rural Shincuan confirmed that chronic poverty is commonly found in rural areas, especially remote areas. Lack of physical assets is another important factor often associated with chronic poverty (McCulloch and Baulch, 2000; Adam and Jane, 1995; Jalan and Ravallion, 1998). Lastly, occupation status is frequently found as one of the important factors determining the household poverty status. Okidi and Kempaka (2002) in Uganda found that self-employed farming households are more likely to be chronic poor.

In the case of poverty dynamics in Indonesia, Grab and Grimm (2006), using the Indonesian Fertility Life Survey (IFLS) data set, compared chronic and transient poverty over two time-spans, and showed that absolute comparisons point out a significant decline in chronic poverty from 1993-1997 to 1997-2000. Both the decline in chronic and in transient poverty was largely driven by a substantial poverty decline in rural Indonesia. Alisjahbana and Yusuf (2003) using the IFLS data set from 1993 and 1997 observed that of the 84.8 percentage point non-poor in 1993, 11.6 percentage points had fallen into poverty in 1997. Likewise of the 15.2 percentage points poor in 1993, 7.8 percentage points remained poor whereas the other 7.4 percentage points had escaped poverty. Suryahadi and Sumarto (2001) found that the chronic poor, who made up only 20 per cent of the total poor before the crisis, by 1999 constituted 35 per cent of the total poor.

7.3 Overview of Poverty Dynamics in Indonesia during 2005-2007

We use the 2005 and 2007 National Socio-Economic Survey (SUSENAS) collected by Central Statistic Agency of Indonesia (henceforth BPS). From 64,407 households surveyed in 2005, we found 8,726 households that were surveyed again in 2007. We intended to utilize a longer period of SUSENAS data set, for instance, from 2002 to 2007, in order to capture the longer dynamic changes in the poverty status. Unfortunately, the database of 2002 and 2007 did not match in terms of code because BPS surveyed only the same sampled households in three years. We would also like to include the 2006 SUSENAS data in the analysis but we found many inconsistencies of the 2006 data compared to the 2005 and 2007 data. Analyzing the poverty dynamics by utilizing a short period of panel data (three years) might not reflect 100 per cent long run changes of poverty in Indonesia. Due to the data limitation and availability, however, analyzing a short period of poverty dynamics in Indonesia by using SUSENAS dataset that provides the rich information of household socio-economic conditions and covers all provinces in Indonesia will contribute to a deeper understanding of the recent situation of poverty in Indonesia.

This study applies the spell approach as mentioned in Figure 7.1, the poverty line of 2005 and 2007 and the poverty measures of FGT formula (Foster, Greer and Thorbecke, 1984)[23]. We then categorize households based on poverty consumption measures into four groups: chronic poor, transient poor (-), transient poor (+) and never poor. This study also applies three different poverty lines: the official poverty line published by BPS, the lower poverty line (75 per cent of the official poverty line) and the upper poverty line (1.25 per cent of the official poverty line). Applying three different poverty lines is intended to examine the sensitivity of poverty incidence to changes in the poverty line.

Table 7.1 shows that by 2005, nationally (urban and rural), the number of poor is 1,061 households or 12.61 per cent (under the official poverty line), 283 households or 3.24 per cent (under the lower poverty line) and 2,317 households or 26.55 per cent (under the upper poverty line). Most of the poor households (around 73.52 per cent) are in rural areas. These figures show that poverty in Indonesia is a rural phenomenon and is quite sensitive to changes in the poverty line. A 25 per cent increase in the poverty line causes more than a double increase in the poverty.

During 2005-2007, we observe by using the official poverty line that the number of poor declined from 1,061 households to 801 households. Roughly 769 households of 1,061

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[23] The FGT class of poverty measures follows:

$$\pi_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^\alpha$$

Where π is the poverty index, n is the total population size, z is the poverty line, y_i is the income of the i^{th} individual (or household), q represents the number of individuals just below or at the poverty line, and α is a parameter for the FGT class.

households (72 per cent) could be able to move out of a poverty trap while the other 292 poor households (27.2 per cent) remained in the poor group (see Figure 7.2). The remaining poor households are considered as the chronic poor group while the households that escaped from poverty is considered as the transient poor (+). Unfortunately, 509 households (6.7 per cent) of previously non poor households fell into a poverty trap. This group could be categorized as transient poor (-) indicating they had been impoverished during 2005-2007. Lastly, 7,156 households that maintained non-poor household status both in 2005 and 2007 could be categorized as never poor. In addition, urban households contribute more on transient poor (+) and never poor while rural households contribute more on transient poor (-) and chronic poor.

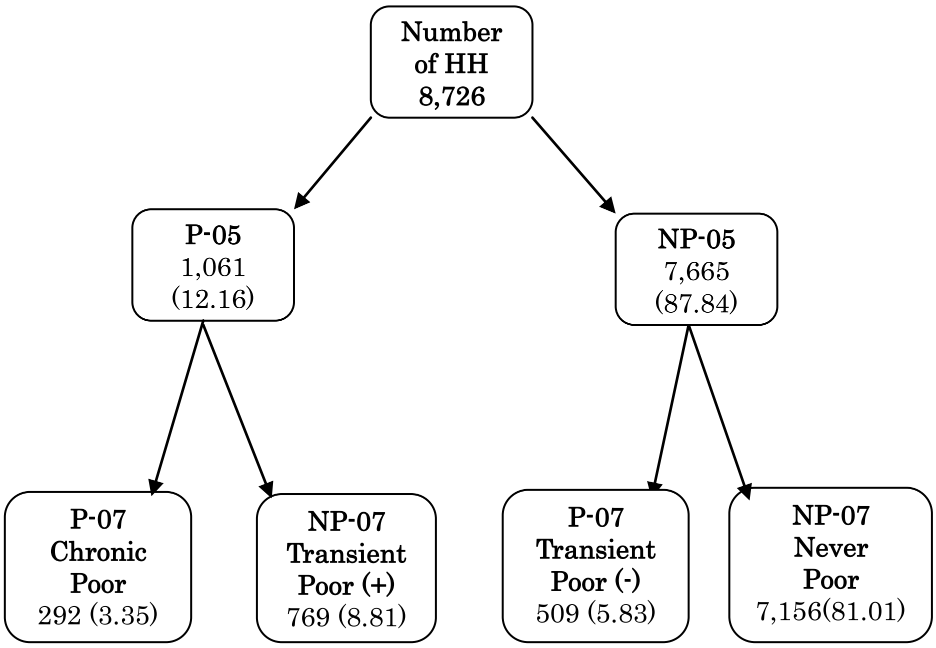
Table 7.1 Overview of Poverty Status during 2005 and 2007

Description			Condition in 2007								
			Lower Poverty Line			**Official Poverty Line**			**Upper Poverty Line**		
			Total	**Poor**	**Non Poor**	**Total**	**Poor**	**Non Poor**	**Total**	**Poor**	**Non Poor**
Condition in 2005	**Rural-Urban Classification**	**Urban**									
		Poor	**74**	2	72	**281**	13	268	**690**	171	519
		Non-Poor	**3,552**	2	3,550	**3,345**	32	3,313	**2,936**	220	2,716
		Rural									
		Poor	**209**	35	174	**780**	279	501	**1,627**	832	795
		Non-Poor	**4,891**	153	4,738	**4,320**	477	3,843	**3,473**	783	2,690
	Regional Classification	**Java-Bali**									
		Poor	**108**	16	92	**475**	143	332	**1,088**	472	616
		Non-Poor	**4,518**	16	4,502	**4,151**	243	3,908	**3,538**	513	3,025
		Outside Java-Bali									
		Poor	**175**	21	154	**586**	149	437	**1,229**	531	698
		Non-Poor	**3,925**	139	3,786	**3,514**	266	3,248	**2,871**	490	2,381
	National										
	Poor		**283**	37	246	**1,061**	292	769	**2,317**	1,003	1,314
	Non-Poor		**8,443**	155	8,288	**7,665**	509	7,156	**6,409**	1,003	5,406
	Total		**8,726**	**192**	**8,534**	**8,726**	**801**	**7,925**	**8,726**	**2,006**	**6,720**

Sources: Authors' calculation based on SUSENAS 2005 and 2007

Interesting findings can be found in the disaggregate level where 268 households (95.4 per cent) of 2005 urban poor households are able to climb out of poverty during 2005-2007 while only 501 households (64.23 per cent) of 2005 rural poor households who are able to move out of poverty in the same period. Moreover, during the period from 2005-2007, around 11 per cent or 477 households of 2005 rural non-poor households fell into poverty while only 1 per cent of 2005 urban non-poor households fell into poverty. This indicates that the rural households are more vulnerable to poverty than that of the urban households since income sources of rural households mostly rely on agriculture activities, which are relatively unstable compared to industrial or service sectors in the urban area. Therefore, some negative shocks such as crop loss, price falls of agricultural products, or death and illness can easily send the rural households falling into a poverty trap.

Figure 7.2 Poverty Dynamics during 2005-2007



Source: Authors' calculation
Note: P and NP refer to poor and non-poor; Figures in the parenthesis are the percentage value.

Moreover, other interesting findings are in the disaggregate regional level where 332 households (69.9 per cent) of 2005 Java-Bali poor households are able to climb out of poverty during 2005-2007 while 437 households (74.57 per cent) of 2005 rural poor households who are able to move out of poverty in the same period. Moreover, during the period from

2005-2007, 5.9 per cent of 2005 Java-Bali non-poor households fell into poverty while 7.6 per cent of 2005 non-poor households living in outside Java-Bali fell into poverty. Further, around 30 per cent of poor households in Java-Bali and around 25 per cent of poor households living in outside Java-Bali are categorized as chronic poor households. Non-poor households in outside Java-Bali seem more vulnerable to become transient poor (-) than non-poor households in Java-Bali while poor households in outside Java-Bali are more easily out of poverty than poor households in Java-Bali.

7.4 Research Methodology

7.4.1 Model Specification

The spell approach based on the length of spells of poverty experienced has divided households in Indonesia into four groups: chronic poor, transient poor (-), transient poor (+) and never poor. This study believes that the poverty status of households has an order in which one status might be more favorable than others. In order to assign an order of the poverty status, let us assign that chronic poor as (P_{05}, P_{07}), transient poor (-) as (NP_{05}, P_{07}), transient poor (+) as (P_{05}, NP_{07}) and never poor as (NP_{05}, NP_{07}). P_{05} and P_{07} are a poor condition in 2005 and 2007 while NP_{05} and NP_{07} are non-poor condition in 2005 and 2007 respectively. (NP_{05}, NP_{07}) is most preferred condition while (P_{05}, P_{07}) is least preferred among the four conditions. The order of (NP_{05}, P_{07}) and (P_{05}, NP_{07}) is in between (NP_{05}, NP_{07}) and (P_{05}, P_{07}). There is a difficulty to determine which one is preferred between the two options of (NP_{05}, P_{07}) and (P_{05}, NP_{07}). This study, however, assumed that the improvement condition like (P_{05}, NP_{07}) is more favorable than the degradation condition of (NP_{05}, P_{07}). Thus, the order of the poverty status is $(NP_{05}, NP_{07}) > (P_{05}, NP_{07}) > (NP_{05}, P_{07}) > (P_{05}, P_{07})$.

We then propose an Ordered Logit Model to examine the determinant factors which can affect a poverty status of households. We also ascertain the important factors that enable the poor in escape from poverty. Independent variables in the model basically divided into two groups: the 2005 initial variables and change variables during 2005-2007. The initial variables represent the initial condition and position of households that will affect the future poverty status of households. For instance, poor agricultural households with a small land in the initial year might continuously be poor in the future because a small land could not produce more than a subsistence level. They, however, does not have enough resources to invest in a modern agricultural technology or to buy a good seed for the next production. Households experienced health shocks without any insurance in the initial years might become a poor in the future since they could not do jobs; or they have to allocate all resources for medical treatments. They, sometimes, were forced to sell land for medical treatments that this might impoverish them in the next period after selling a land. In the term of changes in variable, non-poor households in the initial period might become a poor household in the next period due to changing in a marital status or losing jobs.

Independent variables included in the model considers to the data availability in the 2005 and 2007 USENAS and also variables used in the previous researches done by Alisjahbana and Yusuf (2003), Jalan and Ravallion (1998), Cruces and Wodon (2003), McCulloch (2003), McKay and Lawson (2003), Widyanti et al. (2009), Mango et al. (2004) and Okidi and Kempaka (2002). The ordered logit model is shown as below:

$$y_i = HHC_i^0\beta + SECO_i^0\chi + ShockGov_i^0\phi + \Delta VAR_i^{05-07}\varphi + e_i \qquad (7.1)$$

where,

- y_i = a household poverty status: 0 = chronic poor, 1 = transient poor (-), 2 = transient poor (+), 3 = never poor;

- HHC_i^0 = a vector of family characteristics in 2005 including marital status, age, education attainment, number of household members, dummy of location and dummy of an island;

- $SECO_i^0$ = a vector of socio-economic characteristics in 2005 including dummy of working sector, employment status, land ownership (in hectare), size of house (in square meter), access to electricity for illuminating energy and dummy of household with a family member working as migrant workers;

- $ShockGov_i^0$ = a vector of shocks, risks and policy variables received by a household in 2005. The negative shocks and risks include economic risks and health shocks. The positive shocks are an improvement of public facilities surrounding living area and a gaining of new jobs. Economic risks include crop loss, job loss, price fall, bankruptcy and an increase in production costs. This vector also includes saving and policy variables of cheap rice (RASKIN) and poor targeted health insurance (ASKESKIN). These are intended to examine the effectiveness of saving and government policies to cope with the negative shocks.

- ΔVAR_i^{05-07} = a vector of changes in variables during 2005-2007 including change in marital status and size of a household member; working sector, employment status, access to electricity for illuminating energy and micro credits;

- e = error term;

- i = household-i, i=1,…, 8,726.

7.4.2 Ordered Response Model

Eq.7.1 is ordered response models with four outcomes $\{y = 0,1,...,3\}$. In order to explain an ordered response model, we follow the general form of Wooldridge (2002). This study first explains the **ordered probit model** as a standard model. The ordered probit model for ***y*** (conditional on explanatory variables ***x)*** can be derived from a latent variable model. Assume that a latent variable *y** is determined by,

$$y^* = x\beta + e, \quad e|x \sim Normal\ (0,1) \tag{7.2}$$

Where β is *K x 1* and, for reasons to be seen, ***x*** does not contain a constant. Let $\alpha_1 < \alpha_1 < ... < \alpha_J$ be unknown **cut points** (or **threshold parameters**), and define

$$\begin{aligned} y &= 0 \ \text{ if } \ y^* \le \alpha_1 \\ y &= 1 \ \text{ if } \ \alpha_1 < y^* \le \alpha_2 \\ y &= J \ \text{ if } \ y^* > \alpha_J \end{aligned} \tag{7.3}$$

Given the standard normal assumption for *e*, the conditional distribution of *y* given *x* is derived straightforward. The computation of each response probability is as below:

$$\begin{aligned} &P(y = 0|x) = P(y^* \le \alpha_1|x) = P(x\beta + e \le \alpha_1|x) = \Phi(\alpha_1 - x\beta) \\ &P(y = 1|x) = P(\alpha_1 < y^* \le \alpha_2|x) = \Phi(\alpha_2 - x\beta) - \Phi(\alpha_1 - x\beta) \\ &. \\ &. \\ &. \\ &P(y = J-1|x) = P(\alpha_{J-1} < y^* \le \alpha_J|x) = \Phi(\alpha_J - x\beta) - \Phi(\alpha_{J-1} - x\beta) \\ &P(y = J|x) = P(y^* > \alpha_J|x) = 1 - \Phi(\alpha_J - x\beta) \end{aligned} \tag{7.4}$$

When *J=1* we get the binary model: $P(y=1|x)=1-P(y=0|x)=1-\Phi(\alpha_1 - x\beta)=\Phi(x\beta-\alpha_1)$, and so $-\alpha_1$ is the intercept inside Φ. It is for reason that *x* does not contain an intercept in the formulation of the ordered probit model. The parameters α and β can be estimated by using Maximum Likelihood Estimation procedure. For each *i*, the lod-likelihood function is

$$\ell_i(\alpha,\beta)=1[y=0]\log[\Phi(\alpha_1 - x_i\beta)]+1[y=1]\log[\Phi(\alpha_2 - x_i\beta)-\Phi(\alpha_1 - x_i\beta)]$$

$$+\ldots+1[y_i = J]\log[1-\Phi(\alpha_J - x_i\beta)] \qquad (7.5)$$

Replacing Φ with the logit function, Λ, will give the **ordered logit model**. The sign of estimates coefficients from the ordered probit (logit) models have the exact meaning with the result of OLS estimations. The negative sign tells whether the choice probabilities shift to lower categories when the independent variable increases. The result of estimate coefficients particularly on a partial effect of independent variables, however, cannot be interpreted directly as the result of Ordinary Least Square (OLS) estimation. In most cases, we are interested in the response probabilities or partial effects $P(y=j|x)$ of the ordered probit model.

$$\partial p_0(x)/\partial x_k = -\beta_k\phi(\alpha_1 - x\beta);$$

$$\partial p_j(x)/\partial x_k = \beta_k[\phi(\alpha_{j-1} - x\beta)-\phi(\alpha_j - x\beta)]; \qquad (7.6)$$

$$\partial p_J(x)/\partial x_k = \beta_k\phi(\alpha_J - x\beta), \qquad 0 < j < J$$

The formula for the response probabilities of the ordered logit model is similar to the ordered probit model.

This study intended to apply the ordered logit model instead of the ordered probit model since the distribution of error is assumed following the standard logistic. The logistic distribution function is similar to the normal distribution function but has a much simple form. The ordered logit model in Eq. 7.1 is estimated using three sample groups: Java-Bali, outside Java-Bali and National (All Sample). Separating the sample helps to show the consistency and robustness of estimation results. This also checks whether there are significant differences of poverty characteristics between Java-Bali and outside Java-Bali.

7.4.3 Descriptive Data Analysis

Table 7.2 shows that households, based on their poverty experience, are divided into four groups: chronic (292 households), transient poor (-) (509 households), transient poor (+) (769 households) and never poor (7.156 households). We observed that the chronic poor group has the following characteristics: they are uneducated or have attained a low educational attainment; they are living in the rural area of Java-Bali, highly dependent on the agricultural sector (around 80 per cent) and in the informal sector (around 84 per cent); and they either owning a small area of small land or are landless households. Compared with the other groups, the chronic poor group is excluded from modern utility sources. Nearby, 40 per cent of this group does not connect to electricity.

Around 28 per cent of households experienced the negative economic risks, and a few of them has been saving instrument to cope with these shocks. Daily activities of chronic poor households are disrupted around 6.4 days/month due to health problems. However, only few of them who are experienced the negative shocks either economic risks or health shocks received the government assistance such as the cheap rice (RASKIN) and poor targeted health insurance (ASKESKIN). In this group, 13 per cent of households experienced positive shocks of improvement of public facilities in their surrounding living area. In additional, during 2005-2007, the number household members decreased by 0.065 people. Households who are changing in working sectors from agricultural sectors to non-agricultural sectors and changing in employment status from formal sectors to informal sectors are both 11.3 per cent on average. Interestingly no one of households in this group received micro credit either from government or from other sources. They are totally excluded from access to financial services.

In the case of transient poor (-), the demographic characteristics and socio-economic variables are slightly better than that of a chronic poor group. This group has higher educational attainment, better access to electricity and owns larger areas of land ownership (0.86 hectare). Households experiencing economic risks and health shocks are lower than that of chronic poor households. Daily activities disrupted by health shocks are two days lower than that of chronic poor group. This study found that the major variable changes faced by this group during 2005-2007 was an increasing increase in the number of household members (0.65 people), change in employment status from formal sectors into the informal sector (14 per cent).

In contrast to transient poor (-) group, the transient poor (+) group has mostly completed elementary school, lives in an urban area (35 per cent), has better access to electricity, has a low percentage working in agricultural sectors, has a low percentage of households experiencing economic and health risks and has sufficient savings to cope with economic and health risks. The most difference between this group and the two previous groups is a decrease in almost 0.6 of the number of household members, a larger proportion of households receiving micro credit, a higher proportion of households getting access to electricity and a low percentage of households moving from formal sectors to informal sectors.

Lastly, the never poor have different characteristics compared to the other three groups. They are more educated households, almost with the majority having completed junior high school; they have fewer household members, live in urban area; they have a better connection to electricity (90 per cent), less experience on economic risks and health shocks and having enough saving to cope with negative shocks. The daily activities of households in this group disrupted by health shocks are only 3.7 days in a month, around a half of that experienced by chronic poor group. Furthermore, they are working in formal sectors and non-agricultural sectors so the income is less volatile and does not depend on assistance from the government.

Table 7.3 shows that households, based on the living location, are divided into three sub groups: Java-Bali (53 per cent), outside Java-Bali (47 per cent) and National. Households living in Java-Bali could be classified as chronic poor (3.1 per cent), transient poor (-) (5.25 per cent), transient poor (+) (7.18 per cent) and never poor (84.48 per cent). Households living in outside Java-Bali could be classified as chronic poor (3.63 per cent), transient poor (-) (6.49 per cent), transient poor (+) (10.66 per cent) and never poor (79.22 per cent). These figure show households in outside Java-Bali more vulnerable to being transient poor both (-) and (+) compared to households in Java-Bali.

Table 7.2 Descriptive Data of Poverty Status

Variable	Chronic Poor		Transient Poor (-)		Transient Poor (+)		Never Poor	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Demographic Variables in 2005								
1. Marital Status of Household Head (1 = marriage; 0= others)	0.880	0.325	0.853	0.355	0.871	0.335	0.849	0.359
2. Age of Household Head (in years)	47.428	14.281	46.171	14.903	47.429	14.232	45.533	13.709
3. Education Attainment of Household Head (years of schooling)	4.736	3.152	5.096	3.365	5.646	3.191	6.908	4.377
4. Size of Household Member (number of people)	4.719	1.787	4.057	1.744	4.879	1.774	3.853	1.597
5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)	0.490	0.501	0.477	0.500	0.432	0.496	0.546	0.498
6. Dummy of Location (1= Urban; 0= Rural)	0.045	0.207	0.063	0.243	0.349	0.477	0.463	0.499
Socio-Economic Variables in 2005								
7. Working Sector of Household Head (1= agricultural sectors; 0= others)	0.805	0.397	0.719	0.450	0.636	0.481	0.446	0.497
8. Employment Status (1= formal sectors; 0= others)	0.158	0.365	0.179	0.384	0.173	0.378	0.303	0.460
9. Land Ownership (in hectare)	0.639	0.789	0.858	1.186	0.737	1.264	0.519	1.593
10. Size of House (in square meter)	59.774	50.192	58.165	27.923	56.671	55.954	70.317	65.373
11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	0.038	0.191	0.043	0.204	0.038	0.191	0.045	0.207
12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	0.390	0.489	0.269	0.444	0.270	0.444	0.100	0.301
Shocks & Risks and Policy Variables in 2005								
13. Economic Shocks and Risks (1= disaster, price falls, crop loss, job loss, bankruptcy, etc., 0= no experiences)	0.284	0.452	0.257	0.438	0.233	0.423	0.158	0.365
14. Cheap Rice (RASKIN) as A Safety Net to Cope with Shocks and Risks (1= receiving RASKIN; 0= not receiving)	0.021	0.142	0.016	0.125	0.027	0.163	0.007	0.083
15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	6.363	11.203	4.450	8.607	4.849	8.705	3.729	7.800
16. Insurance to Cope with Health Problems (1= having Poor Targeted Health Insurance (ASKESKIN); 0= others)	0.038	0.191	0.028	0.164	0.023	0.151	0.010	0.098
17. Saving as Coping Strategy to Cope with economic risks and health shocks (1= having saving; 0= no saving)	0.007	0.083	0.006	0.077	0.021	0.143	0.026	0.159
18. Microcredit (1= receiving microcredit; 0= no credit)	0.000	0.000	0.026	0.158	0.016	0.124	0.032	0.177
19. Source of Microcredit (1= government; 0= others)	0.000	0.000	0.008	0.088	0.005	0.072	0.010	0.101
20. Family Member Getting Jobs (1= getting job; 0= others)	0.062	0.241	0.045	0.208	0.099	0.299	0.080	0.271
21. Improvement of Public Facilities in Surrounding Living Area (1= improving; 0= others)	0.130	0.337	0.092	0.290	0.082	0.274	0.096	0.294
Change Variables during 2005-2007								
22. Change in Size of Household Member	-0.065	1.273	0.639	1.502	-0.585	1.672	0.070	1.531
23. Change in Marital Status (1= divorce; 0= others)	0.055	0.228	0.045	0.208	0.062	0.242	0.055	0.229
24. Change in Working Sectors (1= Agriculture Sectors to Non-Agriculture Sectors; 0= others)	0.113	0.317	0.110	0.313	0.134	0.341	0.140	0.347
25. Change in Employment Status (1= Formal Sectors to Non-Formal Sectors; 0= others)	0.113	0.317	0.138	0.345	0.081	0.272	0.119	0.324
26. Change in Access to Electricity for Illuminating Energy (1= getting access in 2007 but not in 2005; 0= others)	0.106	0.309	0.079	0.269	0.131	0.338	0.045	0.206
27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	0.027	0.164	0.037	0.190	0.053	0.225	0.071	0.257
Number of Observation	292		509		769		7,156	

Source: Authors' calculation based on SUSENAS 2005 and 2007

Table 7.3 Descriptive Data used in the Ordered Logit Model

Variable	Java and Bali		Outside Java and Bali		National	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Demographic Variables in 2005						
1. Marrital Status of Household Head (1 = marriage; 0= others)	0.850	0.358	0.854	0.353	0.852	0.355
2. Age of Household Head (in years)	46.727	14.030	44.755	13.589	45.801	13.859
3. Education Attainment of Household Head (years of schooling)	6.511	4.265	6.739	4.216	6.618	4.243
4. Size of Household Member (number of people)	3.785	1.538	4.208	1.760	3.984	1.660
5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)					0.530	0.499
6. Dummy of Location (1= Urban; 0= Rural)	0.506	0.500	0.314	0.464	0.416	0.493
Socio-Economic Variables in 2005						
7. Working Sector of Household Head (1= agricultural sectors; 0= others)	0.410	0.492	0.581	0.493	0.490	0.500
8. Employment Status (1= formal sectors; 0= others)	0.299	0.458	0.258	0.438	0.280	0.449
9. Land Ownership (in hectare)	0.227	1.091	0.940	1.833	0.562	1.528
10. Size of House (in square meter)	73.383	62.547	62.038	62.368	68.052	62.716
11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	0.042	0.200	0.046	0.209	0.044	0.205
12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	0.027	0.161	0.257	0.437	0.135	0.342
Shocks & Risks and Policy Variables in 2005						
13. Economic Shocks and Risks (1= disaster, price falls, crop loss, job loss, bankruptcy, etc., 0= no experiences)	0.161	0.368	0.190	0.393	0.175	0.380
14. Cheap Rice (RASKIN) as A Safety Net to Cope with Shocks and Risks (1= receiving RASKIN; 0= not receiving)	0.006	0.076	0.014	0.118	0.010	0.098
15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	3.737	7.668	4.208	8.527	3.958	8.086
16. Insurance to Cope with Health Problems (1= having Poor Targeted Health Insurance (ASKESKIN); 0= others)	0.011	0.104	0.015	0.122	0.013	0.113
17. Saving as Coping Strategy to Cope with economic risks and health shocks (1= having saving; 0= no saving)	0.027	0.163	0.019	0.137	0.024	0.152
18. Microcredit (1= receiving microcredit; 0= no credit)	0.046	0.209	0.011	0.104	0.029	0.169
19. Source of Microcredit (1= government; 0= others)	0.016	0.125	0.002	0.044	0.009	0.096
20. Family Member Getting Jobs (1= getting job; 0= others)	0.082	0.274	0.075	0.264	0.079	0.269
21. Improvement of Public Facilities in Surronding Living Area (1= improving; 0= others)	0.102	0.303	0.088	0.283	0.095	0.294
Change Variables during 2005-2007						
22. Change in Size of Household Member	0.071	1.416	0.007	1.693	0.041	1.553
23. Change in Marrital Status (1= divorce; 0= others)	0.049	0.216	0.063	0.242	0.055	0.229
24. Change in Working Sectors (1= Agriculture Sectors to Non-Agriculture Sectors; 0= others)	0.136	0.343	0.138	0.345	0.137	0.344
25. Change in Employment Status (1= Formal Sectors to Non-Formal Sectors; 0= others)	0.117	0.322	0.116	0.320	0.117	0.321
26. Change in Access to Electricity for Illuminating Energy (1= getting access in 2007 but not in 2005; 0= others)	0.016	0.127	0.101	0.302	0.056	0.230
27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	0.080	0.272	0.050	0.218	0.066	0.248
Poverty Status						
Chronic Poor	143		149		292	
Transient Poor (-)	243		266		509	
Transient Poor (+)	332		437		769	
Never Poor	3,908		3,248		7,156	
Number of Observation	**4,626**		**4,100**		**8,726**	

Source: Authors' calculation based on SUSENAS 2005 and 2007

The significant differences between households living in Java-Bali and outside Java-Bali are households in outside Java-Bali having more family members (4.2 people), mostly living in a rural area (69 per cent) and having a wider agricultural land (almost 1 hectare). Almost 97 per cent households in Java-Bali have connected to electricity while only 74 per cent households in outside Java-Bali have electricity connections for their sources of illuminating energy. Furthermore, households in outside Java-Bali experienced more in economic risks and health shocks than households in Java-Bali. Around 19 per cent of household in outside Java-Bali experienced economic risks while only 16 per cent of households in Java-Bali experienced them. Daily activities of households in outside Java-Bali are disturbed a half day more than that of households in Java-Bali due to health shocks.

7.5 The Determinants of Poverty Dynamics in Indonesia and the Role of Government Assistance on Changing the Poverty Status of Households

This study estimated three models: Java-Bali (MODEL 1), Outside Java-Bali (MODEL 2) and National (MODEL 3). The aim of separating the sample is to ensure the consistency and robustness of estimation. The models are estimated using the maximum likelihood estimation with robust standard errors. The estimation results of the ordered logit model are shown in Table 7.4 and Table 7.6. As a comparison, the estimation results of the multinomial logistic regression are shown in Appendix 7.1. The signs of coefficients in three models are almost same except in variables: age of household head (outside Java-Bali), economic shocks and risks (outside Java-Bali), source of micro credits (outside Java-Bali) and change in marital status (Java-Bali). These variables, however, are statistically insignificant, so these can be ignored. All models show that the Wald Chi-Square statistics of Log likelihood of ordered logit model are statistically significant indicating at least one of covariates or independent variables affects poverty status of households. In addition, independent variables can explain 11.70 per cent of the variation in the dependent variable at national sample. Generally, the ordered logit models of the poverty dynamics show their consistency and robustness.

Table 7.6 shows the partial effects (dy/dx) of changes in a probability of households being chronic poor, transient poor (-), transient poor (+) and never poor responding to change in independent variables. The partial effects (the predicted probability of household poverty status) evaluated at means of independent variables $\left(y = j|x\right)$. The probability of households in Java-Bali being chronic poor, transient poor (-), transient poor (+) and never poor are 1.5 per cent, 3.2 per cent, 5.4 per cent and 89.9 per cent respectively. While the probability of households in Outside Java-Bali being chronic poor, transient poor (-), transient poor (+) and never poor are 2.2 per cent, 4.7 per cent, 9.4 per cent and 83.6 per cent respectively. If the household characteristics are as same as with the average value of sample, the probability of households being never poor is almost 90 per cent in Java-Bali and 84 per cent in Outside Java-Bali while the probability of households being chronic poor is 1.5 per cent in Java-Bali and 2.2 per cent in Outside Java-Bali. Furthermore, households living in Outside Java-Bali have a higher probability being either transient poor (-) or transient poor (+) than households living in Java-Bali.

Demographic Variables

All models statistically confirmed the demographic variables such as the size of household member, educational attainment (years of schooling) and location are the important factors in distinguishing the poverty status of households. In addition, the variables of marital status and age of the household head are both statistically significant influencing the poverty status at a national level (MODEL 3) but not in MODEL 1 and MODEL 2. Married households in outside Java-Bali have a higher probability being never poor. This is because most of the households in outside Java-Bali are working in agricultural sectors, a labor intensive; so a married household has more labor supply to produce more outputs or incomes than a single household.

Table 7.6 shows an increase in a household size decreases the probability of being never poor by 0.046 while this increases the probability being chronic poor, transient poor (-) and transient poor (+) by 0.008, 0.015 and 0.024 respectively. Given a fixed income, an increase in the number of members forced the households to reduce their consumption and to support the additional member(s). Meanwhile, a better education raises the probability of being never poor because a higher-education level provides a higher opportunity for a better job and higher income. These findings confirmed the findings of other studies such as Alisjahbana and Yusuf (2003), Widyanti et al. (2009), Adam and Jane (1995), Jalan and Ravallion (1998), Mango et al. (2004) and McCulloch and Baulch (2000).

Dummy of location has an ability to distinguish poverty status of households in three models. Those living in urban area have a higher probability of being never poor. Urban areas where most industries and economic activities are located provide more job opportunities either in the formal or informal sector. Therefore, everyone searches for jobs or starts a small business will easily get out of the poverty trap in urban area. Moreover, households living in Java-Bali have a higher probability being chronic poor than those living in outside Java-Bali.

BOX 7.1
A Gender Issue on Poverty Dynamics

In the earliest version of this chapter, the gender issue of the household head has been discussed specifically. Applying the multinomial logistic, this study found that the sex of the household head is significant to discriminate between a chronic poor and never poor group. This variable, however, could not significantly discriminate between a transient poor and never poor (Dartanto et al., 2011). This study also found that the gender of household head (female) and the marital status are exactly the same in the case of the chronic poor. While the correlation between the gender of household head and the marital status is closely more than 90 per cent. This correlation has created a multicollinearity problem in the econometric estimation.

The current chapter has dropped the gender and chosen the marital status as one of explanatory variables. Since this study concerns changes in variables during 2005 and 2007, the use of the gender of household head would confuse readers, for example, "a change from male to female" has a negative connotation but in fact it is a change in marital status. In the case of Indonesia, the head of household does not necessarily depends on who becomes an income earner but it depends on the presence of a husband (male) in the family. If the husband is still alive, even if he does not work and the wife acts as the income earner, then the status of household head administratively remains with the husband.

Source: Author

Socio-Economic Variables

As many studies have found, households working in the agricultural sector have a tendency of being chronic poor due to low productivity and wage rates. The probability of being chronic poor of these households increases by 0.013 (Java-Bali), 0.011 (outside Java-Bali) and 0.014 (national) (Table 7.6). Furthermore, households that are working in formal sectors have a higher probability of being never poor. Those working in formal sectors increase their probability being never poor by 0.058 (National), 0.068 (outside Java-Bali) and 0.046 (Java-Bali). This is because formal sectors guarantee stable income and pay higher wage rates than that of the informal sectors.

Table 7.4 Estimation Results of Ordered Logit Model

Variable	MODEL 1: Java and Bali		MODEL 2: Outside Java and Bali		MODEL 3: National	
	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error
Demographic Variables in 2005						
1. Marrital Status of Household Head (1 = marriage; 0= others)	0.198	0.145	0.295	0.134**	0.239	0.097***
2. Age of Household Head (in years)	-0.007	0.004*	0.004	0.004	-0.002	0.003***
3. Education Attainment of Household Head (years of schooling)	0.079	0.012***	0.052	0.011***	0.068	0.008***
4. Size of Household Member (number of people)	-0.431	0.032***	-0.421	0.028***	-0.402	0.021***
5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)					-0.410	0.073***
6. Dummy of Location (1= Urban; 0= Rural)	1.283	0.105***	0.291	0.115**	0.868	0.079***
Socio-Economic Variables in 2005						
7. Working Sector of Household Head (1= agricultural sectors; 0= others)	-0.822	0.109***	-0.540	0.113***	-0.720	0.077***
8. Employment Status (1= formal sectors; 0= others)	0.544	0.161***	0.544	0.161***	0.544	0.113***
9. Land Ownership (in hectare)	0.182	0.091**	0.095	0.033***	0.149	0.032***
10. Size of House (in square meter)	0.006	0.002***	0.007	0.003**	0.006	0.002***
11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	0.716	0.247***	0.097	0.219	0.337	0.159**
12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	-1.984	0.290***	-1.033	0.124***	-0.916	0.108***
Shocks & Risks and Policy Variables in 2005						
13. Economic Shocks and Risks (1= disaster, price falls, crop loss, job loss, bankruptcy, etc., 0= no experiences)	-0.377	0.111***	0.005	0.114	-0.173	0.079**
14. Cheap Rice (RASKIN) as A Safety Net to Cope with Shocks and Risks (1= receiving RASKIN; 0= not receiving)	-0.241	0.378	-0.204	0.282	-0.107	0.229
15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	-0.010	0.005**	-0.007	0.005	-0.007	0.004*
16. Insurance to Cope with Health Problems (1= having Poor Targeted Health Insurance (ASKESKIN); 0= others)	-1.164	0.280***	-0.337	0.307	-0.646	0.212***

Table 7.4 Continued

Table 7.4 Estimation Results of Ordered Logit Model (Continued)

Variable	MODEL 1: Java and Bali		MODEL 2: Outside Java and Bali		MODEL 3: National	
	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error
Shocks & Risks and Policy Variables in 2005 (Continued)						
17. Saving as Coping Strategy to Cope with economic risks and health shocks (1= having saving; 0= no saving)	0.558	0.309*	0.653	0.368*	0.596	0.243***
18. Microcredit (1= receiving microcredit; 0= no credit)	0.920	0.382**	0.118	0.400	0.639	0.278**
19. Source of Microcredit (1= government; 0= others)	-0.254	0.608	0.475	1.049	0.085	0.492
20. Family Member Getting Jobs (1= getting job; 0= others)	0.364	0.173**	0.062	0.156	0.219	0.115*
21. Improvement of Public Facilities in Surronding Living Area (1= improving; 0= others)	-0.318	0.136**	0.601	0.178***	0.092	0.108
Change Variables during 2005-2007						
22. Change in Size of Household Member	-0.152	0.031***	-0.184	0.026***	-0.160	0.020***
23. Change in Marrital Status (1= divorce; 0= others)	0.048	0.218	-0.342	0.176**	-0.190	0.135
24. Change in Working Sectors (1= Agriculture Sectors to Non-Agriculture Sectors; 0= others)	0.528	0.148***	0.240	0.129*	0.393	0.096***
25. Change in Employment Status (1= Formal Sectors to Non-Formal Sectors; 0= others)	-0.265	0.213	-0.675	0.194***	-0.500	0.141***
26. Change in Access to Electricity for Illuminating Energy (1= getting access in 2007 but not in 2005; 0= others)	1.318	0.356***	0.151	0.137	0.150	0.128
27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	0.431	0.179**	0.826	0.237***	0.531	0.138***
/cut0	-4.510	0.289***	-4.614	0.275***	-4.631	0.200***
/cut1	-3.327	0.288***	-3.430	0.270***	-3.465	0.197***
/cut2	-2.496	0.282***	-2.460	0.265***	-2.576	0.193***
Number of Observation	**4,626**		**4,100**		**8,726**	
Log Pseudolikelihood	**-2,345.27**		**-2,629.68**		**-5,055.63**	
Wald Chi-Square	**708.78**		**561.21**		**1,102.26**	
Pseudo R-Square	**0.1462**		**0.1105**		**0.1170**	

Source: Authors' Estimates

*,**,*** *are significant at 10 per cent, 5 per cent and 1 per cent respectively.*

On the other hand, because of the lack job opportunities in Indonesia, individuals who could not find jobs in formal sectors are forced to either work in domestic informal sectors with low wage rate or to work outside Indonesia as migrant workers. Most of the migrant workers are also working in informal sectors as domestic helpers, but they are paid with a higher wage rate. This study confirmed that households having a family member working outside Indonesia tend to be never poor due to remittances. This variable, however, is insignificant in the sample of outside Java-Bali.

Land ownership as an indicator of physical assets significantly affects the poverty status of households. Three models show that one hectare increase in land will increase the probability of being never poor between 0.016 (Java-Bali), 0.013 (outside Java-Bali) and 0.017 (National). Landless and small holder households tend to be chronic poor since their productive assets are inadequate to increase their income. Land reforms to increase the ownership of productive assets of chronic poor households should be considered as a policy alternative to alleviate chronic poverty. This finding is similar to the findings of McCulloch and Baulch (2000), Adam and Jane (1995) and Jalan and Ravallion (1998). The size of a house as one indicator of physical assets can classify the poverty status of households. A larger size of a house will increase the probability being never poor. Both findings imply that certification of agricultural land and house ownership is among possible policy alternatives to alleviate poverty. The certification would legalize land and house ownership that could be utilized as collateral for getting productive credit from the formal institution.

Other socio-economic variables such as access to modern utilities of electricity significantly increase a probability to climbing out of poverty. Unit cost of lighting with electricity is cheaper per kilowatt-hour than lighting with candles or oil lamp. Therefore, households can save energy expenditure that can potentially be reallocated to income-generating activities, or, in the case of children, to education. This can ultimately serve to free households from the poverty trap. This variable seems to have a causality problem, whether a household has no access to electricity due to a poor condition, or they become poor because they do not have access to electricity. However, Table 7.3 shows households in Java-Bali have a better access to electricity than households in outside Java-Bali due to a better availability of electricity grid. Thus, a lack access to electricity is more due to a lack of availability of electricity grid rather than inability of household to pay a connection fee. This is confirmed that they become poor because they do not have access to electricity.

Shocks, Risks and Government Assistance

Low income groups in most developing countries usually face volatility in consumption due to external shocks either positive or negative shocks. Dartanto and Nurkholis (2010) found that households in a rural area of Kebumen, Indonesia, are vulnerable from negative shocks; and they will respond differently to negative shocks depending on consumption structure, asset ownership, livestock ownership and family assistance.

This study found interesting findings that there are significant differences in behaviors between households living in Java-Bali and outside Java-Bali responding to economic risks and health shocks. Households living in Java-Bali are more vulnerable to negative shocks while households living in outside Java-Bali are relatively resilience to negative shocks. Even though, households in outside Java-Bali experienced more in negative shocks than households in Java-Bali (Table 7.3) but the estimation results showed the coefficients of economic risks and health shocks are statistically insignificant affecting the poverty status of households in outside Java-Bali. This might be due to households in outside Java-Bali generally working in agricultural sectors and owning larger lands. They, therefore, could reduce agricultural risks such as crop loss and price fall through a diversification in agricultural cultivations.

Households in Java-Bali experiencing economic risks resulting from crop loss, job loss, price falls. Bankruptcy and increase in production cost in 2005 have a tendency to be chronic poor and transient poor (-). Moreover, health shocks represented by a number of daily activities disrupted by health problems are significantly affecting the poverty status of households. Those experiencing these shocks tend to be chronic poor. However, three models confirmed households experiencing either economic or health shocks and having enough savings could be able to cope with these shocks easily. MODEL 3 shows having savings will decrease the probability of being chronic poor and transient poor (-) by 0.009 and 0.017 respectively.

This study includes only four government assistance: cheap rice, poor targeted health insurance, micro credit and improvement of public facilities due to data availability in SUSENAS panel data set and considering the relation with shocks. Even though, the cheap rice (RASKIN) does not statistically affect the poverty status of households but the probability of households being chronic poor decreases from 0.006 to 0.004 when the government distributed cheap rice to households in Java-Bali who are experiencing economic risks and shocks. This study confirmed Sumarto et al. (2005)'s findings that the subsidized rice program appears to reduce the risk of poverty. Further, the probabilities of being chronic poor and transient poor (-) for those who are experiencing health shocks and getting ASKESKIN in Java-Bali are 0.031 and 0.057 correspondingly. Unexpected results that statistical evidences do not confirm the effectiveness of both policies to protect the poor are due to wrong targets and uneven distribution of government assistance as indicated in Table 7.2 and Table 7.3.

On the contrary, micro credit is well functioned as a poverty alleviation program, particularly in Java-Bali. The positive coefficient of micro credit in all three models marks households receiving credit programs tend to be non-poor. Micro credit either coming from the government or coming from others is not necessary related to the poverty status. This finding confirmed that micro credit has an important role in alleviating poverty in Indonesia. Moreover, the positive shock of obtaining jobs improves the poverty status of households. Getting a job is identical with increase income or expenditure in that both can lift the household from the poverty. If a household member can find a job, the probability of being chronic poor in Java-Bali and National between will decrease by 0.005 and 0.004 respectively.

In addition, the improvement of public facilities such as development of bridges and roads have a positively effect on poverty alleviation, particularly in outside Java-Bali where these regions often face infrastructure bottlenecks. The probability of households being never poor in outside Java-Bali increases by 0.069 along with the development of public facilities in this area. In contrast to the finding in outside Java-Bali, the estimation result is quite surprising in which infrastructure developments in Java-Bali do not have a positive impact on improving the poverty status. This is most likely because Java-Bali is well developed region that haves good infrastructures. Thus, new constructions such as toll roads sometimes lead to either land acquisitions or eviction of residents. Another example, renovation of traditional markets into modern markets occasionally marginalizes previous traders because of inability of them to afford a new price of buildings. These conditions might send households in Java-Bali into a poverty trap.

BOX 7.2

The Role of Government Assistance on Protecting the Poor from Income Shocks: Evidence from Rural Survey in Kebumen, Central Java, Indonesia

Farmers in most developing countries face vulnerability in consumption due to income shocks caused by crop loss, price falls, disaster, sickness and death and unexpected expenditure. A survey of 220 maize-farm-households was collected from the rural area in Kebumen during August 2009. The survey shows that during the last five years, farmers that faced crop loss due to disaster, climate shocks, pests, rodents and other calamities was about 59 per cent, meanwhile from price falls was 73 per cent. Moreover, households experienced demographic shock related to sickness and death was 16.81 per cent. About 53.6 per cent of households experienced expenditure shocks related to customs such as such as wedding, circumcision and birth. In the same period, about 85 per cent of households experienced at least one shock, and every household had approximately two income shocks on average.

Similar to the current survey, other studies also showed how farmers respond differently to income shocks depending on their asset ownership, labor endowment, access to loan, family assistance, and family structure. Kochar (1995) reported that an increase in labor supply was the key response to income shocks in rural India. Eswaran and Kotwal (1989) and Rosenzweig and Wolpin (1993) showed that credit markets played a central role in protecting consumption from income shocks. Morduch (1995) found the sale of assets for smoothing consumption. Moreover, Kazianga and Udry (2006) and McPeak (2004) surveyed the role of cattle/livestock as a buffer for income shocks. However, farm households, due to the lack of other alternatives, are forced to protect consumption from idiosyncratic income shocks through relatively costly methods (Kochar, 1995).

Therefore, this is important to conduct research to find out the consumption smoothing strategies of maize farmers in Kebumen as a response to income shocks and also to evaluate the effectiveness of the government policies in smoothing their consumption. We propose an econometric model to quantitatively estimate farmers' consumption smoothing strategies to recover from shocks. This model is based on Rosenzweig (1988), Kochar (1999) and Berloffa and Modena (2009). We then propose a two-step-calculation. First, we calculate the household consumption gap which is derived from the difference of consumption expenditure between those reported shocks and those in the absence of shocks, $\Delta\hat{C}_h$. Second, the econometric model calculates the farmers' strategies in order to smooth their household consumption as shown as below:

$$\log\left|\Delta\hat{C}_h\right| = \beta_0 + \beta_1 \log(LAND)_h + \beta_2 OTHJOB_h + \beta_3 LOAN_h + \beta_4 REMIT_h + \beta_5 CATTLE_h +$$

$$\beta_6 SALELAND_h + \beta_7 RASKIN_h + \beta_8 TRANSFER_h + \beta_9 ASKES_h + \varepsilon_h$$

Where *LAND* is land ownership of household in square meters; *OTHJOB* is dummy variable of side jobs; 1: having side jobs, 0: otherwise; *LOAN is* dummy variable of access to loan; 1: having access, 0: otherwise; *REMIT* is dummy variable of receiving remittance; 1: receiving, 0: otherwise; *CATTLE* is dummy variable of selling cattle; 1: selling cattle, 0: otherwise; *SALELAND* is dummy variable of selling land; 1: selling land, 0: otherwise; *RASKIN* is dummy variable of receiving cheap rice; 1: receiving, 0: otherwise; *TRANSFER* is dummy variable of receiving cash transfer; 1: receiving, 0: otherwise; *ASKES* is dummy variable of receiving health insurance, 1: receiving, 0: otherwise; ε is error term i.i.d $E(\varepsilon)=0$, $E(\varepsilon^2)=\sigma^2$; and *h* is household-*h, h=1,…,h.*

The coefficients in the model were estimated using Ordinary Least Square (OLS) by dividing samples with four sub samples based on reported shocks such crop loss (Model 1), price falls (Model 2), sickness and death (Model 3) and Customs (Model 4). The OLS estimation result is shown below:

BOX 7.1 Continued…

Table 7.5 The Regression results

Variables	Log Consumption Gap			
	Crops Loss (1)	Price Falls (2)	Sickness-Death (3)	Customs (4)
Constant	14.000***	14.828***	15.482***	14.835***
	19.386	*14.742*	*6.308*	*16.999*
Land Ownership (LAND)	-0.264**	-0.439***	-0.436	-0.435***
	-2.539	*-3.130*	*-1.573*	*-4.055*
Side Job (OTHERJOB)	-0.399**	-0.065	-0.573	0.136
	-2.270	*-0.451*	*-1.217*	*0.471*
Access to Loan (LOAN)	-0.742	-0.391	-3.246***	-0.591**
	-1.109	*-0.717*	*-18.974*	*-2.453*
Remittances (REMIT)	-0.394**	-0.270	-0.968***	-0.125
	-2.367	*-1.275*	*-3.101*	*-0.587*
Cattle Sales (CATTLE)	-0.338*	-0.780***	0.536	-0.329*
	-1.936	*-3.278*	*1.445*	*-1.861*
Land Sale (SALELAND)			-0.330***	-2.466**
			-4.155	*-2.245*
Cheap Rice (RASKIN)	-0.079	0.575*	-0.927***	
	-0.307	*1.636*	*-2.818*	
Cash Transfer (TRANSFER)	0.311*	0.154	0.342	
	1.904	*0.748*	*1.632*	
Poor Health Insurance (ASKES			-0.171	
			-0.621	
R-Squared	**0.372**	**0.385**	**0.788**	**0.421**
F-Statistic	**8.979**	**11.962**	**8.649**	**11.374**
Observation	**114**	**141**	**31**	**101**

Source: Dartanto and Nurkholis (2011)

Notes: Figures in italic are t-statistic which is corrected from heterocedasticity.

****,**,* denote test statistic significant at 1 per cent level, 5 per cent level and 10 per cent level, respectively.*

Main Findings

Farmers respond differently to income shocks depending on their ownership of assets, access to loan, family assistance such as remittance and the type of shocks. In the case of maize farmers in Kebumen, consumption smoothing strategies vary in accordance to the type of shocks and the magnitude of their impact on household income as well as consumption. If a shock for example price falls, has only a little impact on income, farmers choose to sell cattle to protect their consumption. In addition, during other shocks with greater impact than price fall, such as crop loss, farmers not only sell their cattle but also need remittance as an additional coping strategy. An opposite smoothing strategy from previous strategies is chosen when an income shock occurs due to sickness and death. Farmers who experienced this type of shocks face difficult choices to protect their consumption. In the worst case, they are forced to sell their land even though it is costly. However, widening access to loan market enables them to easily protect their consumption. Unfortunately, a consistent statistical evidence does not exist to support the hypothesis that government policies such cheap rice, cash transfer and poor health insurance are effective as an instrument of consumption smoothing policy. Like many previous research findings, this research also confirms that maize farmer households holding large land size are relatively resilient to any type of income shocks.

Source: Dartanto and Nurkholis (2010).

Note: This part is the modified version of "Dartanto, T. and Nurkholis (2010), Income Shocks and Consumption Strategies: An Empirical Investigation of Maize's Farmer Behavior in Kebumen, Central Java, Indonesia, Modern Economy, Vol.1 No.3, pp. pp.149-155".

Changes in Household Indicators during 2005-2007

Lastly, this part discusses the impact on poverty status of some changes in demographic, socio-economic and government assistance variables during 2005 to 2007. An increase of one family member decreases the probability of the household being never poor by 0.019 at a national level. An increase of one family member is associated with falling into poverty since a given amount of resources needs to be redistributed to support the new member. Households with a high dependent ratio could not save and allocate the resources into other productive activities to assist them moving out the poverty trap. This finding should encourage government at any level to continuously and actively promoting a family planning program. Change in the demographic variable of marital status due to divorce is also positively increasing the probability of households being chronic and transient poor (-) in outside Java-Bali but not in Java-Bali. A divorce results in loss of productive family members, either the mother or father that might reduce household ability and capacity in terms of economic power.

Further, change in working status from an agricultural to a non-agricultural sector increases the probability of households being never poor. Non-agriculture sectors theoretically pay higher and stable wage rate. Therefore, households are able to increase and smooth their consumption level. Those who are able to find a job in a non-agriculture sector will increase their probability of being never poor by 0.041 (Java-Bali), 0.031 (outside Java-Bali) and 0.041 (National). A structural reform through either changing the economic basis from agriculture into non-agriculture or changing traditional agriculture into an agriculture-based industry should be considered as an important policy to alleviate poverty. Meanwhile, a change in employment status from the formal sector into the informal sector sends a previously non-poor household into poverty. Households experiencing layoffs and finding new jobs either as an employee or as self-employment in informal sectors is associated with a higher probability being either chronic poor or transient poor (-). Those experiencing layoffs and finding new jobs in informal sector will decrease their probability of being never poor by 0.066 at a national level.

The role of infrastructure development such as widening access to electricity in Indonesia is clearly confirmed by MODEL 1. Expanding electricity access to poor households will decrease the probability of being chronic poor in Java-Bali by 0.011. Increasing access to electricity can substantially enhance the productivity of households, and household based micro-enterprises. Electricity makes possible the use of appliances that substantially increase productivity and hence the income generating potential of micro-enterprises (pumps, sewing machines, power tools), while information and communication technologies enhance the availability of market information and the possibility of social and political participation.

Among the most interesting finding related to the changes of government assistance is that the poor group obtaining credit programs are able to improve their standard of living and climb out of the poverty trap. The program enables and equips households to start up small business, create job opportunities, and empower themselves. At the end, this enables them to move out from the poverty trap. Households receiving micro credit during 2005-2007 will increase their probability of being never poor by 0.034 (Java-Bali), 0.087 (outside Java-Bali) and 0.052 (National). Expanding micro credit, particularly in outside Java-Bali where financial institutions have not well developed yet, will accelerate the poverty reduction in Indonesia.

Table 7.6 Estimation of Partial Effect (dy/dx)

Variable	MODEL 1: Partial Effects (dy/dx) Jawa and Bali				MODEL 2: Partial Effects (dy/dx) Outside Java and Bali				MODEL 3: Partial Effects (dy/dx) National			
	Chronic Poor	Transient Poor (-)	Transient Poor (+)	Never Poor	Chronic Poor	Transient Poor (-)	Transient Poor (+)	Never Poor	Chronic Poor	Transient Poor (-)	Transient Poor (+)	Never Poor
Demographic Variables in 2005												
1. Marital Status of Household Head (1 = marriage; 0= others)	-0.003	-0.006	-0.010	0.019	-0.007	-0.014	-0.022	0.043	-0.005	-0.010	-0.015	0.029
2. Age of Household Head (in years)	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
3. Education Attainment of Household Head (years of schooling)	-0.001	-0.002	-0.004	0.007	-0.001	-0.002	-0.004	0.007	-0.001	-0.003	-0.004	0.008
4. Size of Household Member (number of people)	0.006	0.013	0.020	-0.039	0.009	0.018	0.031	-0.058	0.008	0.015	0.024	-0.046
5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)									0.008	0.015	0.024	-0.047
6. Dummy of Location (1= Urban; 0= Rural)	-0.020	-0.040	-0.060	0.121	-0.006	-0.012	-0.021	0.038	-0.016	-0.031	-0.049	0.096
Socio-Economic Variables in 2005												
7. Working Sector of Household Head (1= agricultural sectors; 0= others)	0.013	0.027	0.040	-0.080	0.011	0.022	0.038	-0.072	0.014	0.027	0.043	-0.084
8. Employment Status (1= formal sectors; 0= others)	-0.007	-0.015	-0.023	0.046	-0.011	-0.021	-0.037	0.068	-0.009	-0.018	-0.030	0.058
9. Land Ownership (in hectare)	-0.003	-0.005	-0.008	0.016	-0.002	-0.004	-0.007	0.013	-0.003	-0.006	-0.009	0.017
10. Size of House (in square meter)	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001
11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	-0.008	-0.016	-0.026	0.050	-0.002	-0.004	-0.007	0.013	-0.006	-0.011	-0.018	0.035
12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	0.080	0.128	0.132	-0.341	0.029	0.054	0.082	-0.166	0.025	0.045	0.064	-0.134
Shocks & Risks and Policy Variables in 2005												
13. Economic Shocks and Risks (1= disaster, price falls, crop loss, job loss, bankruptcy, etc., 0= no experiences)	0.006	0.013	0.019	-0.038	0.000	0.000	0.000	0.001	0.003	0.007	0.011	-0.021
14. Cheap Rice (RASKIN) as A Safety Net to Cope with Shocks and Risks (1= receiving RASKIN; 0= not receiving)	0.004	0.008	0.012	-0.024	0.005	0.009	0.016	-0.030	0.002	0.004	0.007	-0.013
15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.000	-0.001

Table 7.6 continued…

Table 7.6 Estimation of Partial Effect (dy/dx) (Continued)

Variable	MODEL 1: Partial Effects (dy/dx) Jawa and Bali				MODEL 2: Partial Effects (dy/dx) Outside Java and Bali				MODEL 3: Partial Effects (dy/dx) National			
	Chronic Poor	Transient Poor (-)	Transient Poor (+)	Never Poor	Chronic Poor	Transient Poor (-)	Transient Poor (+)	Never Poor	Chronic Poor	Transient Poor (-)	Transient Poor (+)	Never Poor
Shocks & Risks and Policy Variables in 2005 (Continued)												
16. Insurance to Cope with Health Problems (1= having Poor Targeted Health Insurance (ASKESKIN); 0= others)	0.031	0.057	0.074	-0.162	0.009	0.016	0.026	-0.051	0.017	0.031	0.045	-0.093
17. Saving as Coping Strategy to Cope with economic risks and health shocks (1= having saving; 0= no saving)	-0.006	-0.013	-0.021	0.041	-0.011	-0.022	-0.040	0.072	-0.009	-0.017	-0.030	0.056
18. Microcredit (1= receiving microcredit; 0= no credit)	-0.009	-0.019	-0.032	0.060	-0.002	-0.005	-0.008	0.016	-0.009	-0.018	-0.031	0.059
19. Source of Microcredit (1= government; 0= others)	0.004	0.008	0.013	-0.025	-0.008	-0.017	-0.030	0.055	-0.002	-0.003	-0.005	0.009
20. Family Member Getting Jobs (1= getting job; 0= others)	-0.005	-0.010	-0.015	0.029	-0.001	-0.003	-0.004	0.008	-0.004	-0.007	-0.012	0.024
21. Improvement of Public Facilities in Surronding Living Area (1= improving; 0= others)	0.005	0.011	0.016	-0.032	-0.010	-0.021	-0.038	0.069	-0.002	-0.003	-0.005	0.010
Change Variables during 2005-2007												
22. Change in Size of Household Member	0.002	0.005	0.007	-0.014	0.004	0.008	0.013	-0.025	0.003	0.006	0.010	-0.019
23. Change in Marrital Status (1= divorce; 0= others)	-0.001	-0.001	-0.002	0.004	0.009	0.016	0.027	-0.052	0.004	0.008	0.012	-0.023
24. Change in Working Sectors (1= Agriculture Sectors to Non-Agriculture Sectors; 0= others)	-0.006	-0.013	-0.021	0.041	-0.005	-0.010	-0.017	0.031	-0.007	-0.013	-0.021	0.041
25. Change in Employment Status (1= Formal Sectors to Non-Formal Sectors; 0= others)	0.004	0.009	0.013	-0.026	0.019	0.035	0.054	-0.109	0.011	0.022	0.033	-0.066
26. Change in Access to Electricity for Illuminating Energy (1= getting access in 2007 but not in 2005; 0= others)	-0.011	-0.023	-0.039	0.073	-0.003	-0.006	-0.011	0.020	-0.003	-0.005	-0.009	0.017
27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	-0.005	-0.011	-0.018	0.034	-0.013	-0.026	-0.048	0.087	-0.008	-0.016	-0.027	0.052
Probability (y = *j* | x)	**0.015**	**0.032**	**0.054**	**0.899**	**0.022**	**0.047**	**0.095**	**0.836**	**0.019**	**0.040**	**0.074**	**0.867**

Source: Authors' estimation

Note: dy/dx is for discrete change of dummy variable from 0 to 1

7.6 Concluding Remarks

Observing the SUSENAS panel data set of 2005 and 2007 and applying the spell approach in determining poverty status of households, we found that around 28 per cent of poor households in Indonesia could be considered as chronic poor and roughly 7 per cent of non-poor household is vulnerable to being transient poor (-). Poverty in Indonesia is a rural phenomenon and quite sensitive to change in the poverty line. A 25 per cent increase in the poverty line causes more than a two-fold increase in the poverty rate. Further, the rural households are more vulnerable to falling into poverty than that of the urban households. During 2005-2007, around 11 per cent of rural non-poor households fell into poverty while only 1 per cent of 2005 urban non-poor households did. Around 30 per cent of poor households in Java-Bali and around 25 per cent of poor households in outside Java-Bali are categorized as chronic poor households. Further, outside Java-Bali contributed more in transient poor while Java-Bali contributed more in chronic poor.

This study applying the ordered logit model found that the important factors of poverty dynamics in Indonesia are educational attainment, the size of household member, physical assets (land and house ownership), working sector, employment status, access to modern utilities of electricity, economic shocks, changes in the household size, in the working sector and in the micro credit program. The estimation of partial effects of change in independent variables confirmed that one hectare increase in land will increase the probability of being never poor between 0.016 (Java-Bali), 0.013 (outside Java-Bali) and 0.017 (National). An increase of one family member decreases the probability of the household being never poor by 0.019 (National). Besides, households receiving micro credit during 2005-2007 will increase their probability of being never poor by 0.034 (Java-Bali), 0.087 (outside Java-Bali) and 0.052 (National).

This study also found the interesting findings that households living in Java-Bali are more vulnerable to negative shocks while households living in outside Java-Bali are relatively resilience to negative shocks. Moreover, no consistent statistical evidence in three models supports the hypothesis that the role of government policies such as cheap rice (RASKIN), poor targeted health insurance (ASKESKIN) and development of public facilities are effective as an instrument to cope with negative shocks. Micro credit programs, however, are well functioned as a poverty alleviation policy. Even though, there is no consistent statistical evidence of government policies in changing poverty status; this does not necessarily mean that the government should stop these policies. The government, however, should improve targeted households in distributing assistance.

The estimation results confirmed that poverty alleviation policies could not be generalized to all over regions because of the differences in characteristics of poverty between

Java-Bali and outside Java-Bali. Since the poor in Java-Bali is more vulnerable to negative shocks than households in outside Java-Bali, the government should provide more safety nets to enable households in Java-Bali to cope with negative shocks. Moreover, the other policy suggestions particularly deliberated to the rural household are: continuously promoting family planning; redistributing land and certifying both land and house ownership that can be used as collateral for getting credit; widening access to electricity to enhance the productivity of households and household based micro-enterprises, and widening micro credit program and providing technical assistance for starting and doing business. A consistent implementation of these policies will massively enable households to lift out from the poverty trap.

Chapter 8

Frontier Researches on the Relationship between Fiscal Policy and Poverty

Regardless of the different angles and standpoints when analyzing the problem, poverty is still a major point of interest for policy makers, international donors, and academia. Despite the facts that there have been extensive studies aims at identifying the sources of the poverty and proposing a poverty alleviation program, the problem is still a common phenomenon especially in developing and least developing countries. Therefore, among several undisclosed areas concerning poverty issues, this dissertation is motivated to scrutinize the frontier research on the relationship between fiscal policy and poverty problem that is investigated in a more comprehensive analysis.

This dissertation raises two main issues of frontier researches: an inter-temporal (dynamic) general equilibrium analysis and corruption issues. An inter-temporal general equilibrium analysis deals with the fact that consumers and producers make decisions that are both intra and inter-temporally optimal. Thus, the equilibrium is a set of prices that clear the market at every point in time. Moreover, corruption issues, on the other hand, play important role as they might reduce the effectiveness of fiscal policy in reducing the poverty incidence. For example, some government assistances might not be well distributed to the poor household but the assistance enjoyed by public officials themselves. As the results, this phenomenon might reduce the effectiveness of the poverty alleviation policies set by the government.

8.1 An Inter-temporal (Dynamic) General Equilibrium Analysis

8.1.1 Introduction

All results presented from the Chapter 4, Chapter 5 and Chapter 6 are based on the static CGE result. All results should be interpreted as “the condition expected to happen in the future after the specific policy is undertaken, compared with the situation without the adoption of policy”. Those chapters, however, could not determine a change of time path in economic indicators. On the contrary, the dynamic CGE model would able to capture the impact of economic policy in year to year basis. Benefitting this model, the government could design policies which can shorten and reduce the poverty incidence effectively.

Contrary to the dynamic model, the static CGE might not be able to measure a long term impact of human capital investment or corporate income tax rate reforms in the economy. For instance, in a short run, investments on schools, health centers and teachers will increase job opportunities and income. While, in a long run, these investments will increase the human capital as one of important factors enabling the economy to grow faster. Theoretically and empirically, the growth benefits for the poverty reduction. Moreover, a decrease in the corporate tax rate will also increase a capital rate of returns that raises an income of capital owners in the short run. Whereas, in the long run, responding to a decrease in the tax rate enterprises will expand their business demands and create new job opportunities. This would be beneficial to the poverty reduction. Nonetheless, both the long run phenomena could not be captured by the static CGE analysis.

Rather than showing the technical derivation of the inter-temporal dynamic equilibrium, this part is intended to show the interpretation of the simulation outcome from the inter-temporal dynamic equilibrium. First, the discussion addresses the previous research on the dynamic general equilibrium analysis. Second, the analysis will be continued to discuss the proposed model of inter-temporal general equilibrium using rational forward-looking expectations, the initial SAM database and the assumption of model. The construction of inter-temporal (dynamic) general equilibrium model extends the Bayar (2006)'s model by introducing a government and an import tariff.

8.1.2 Notes on Dynamic General Equilibrium

There are two distinct classes of dynamic CGEs in practices, forward moving dynamics and forward looking dynamics (Ghadimi, 2007). The forward moving dynamics assumes static expectations in which the model is solved for a sequence of static equilibrium recursively. While the forward looking dynamics incorporate the expectation of future outcomes by economic agents in which the model is solved for inter-temporal equilibrium.

The first approach of forward moving dynamics assumes that expectations of future events have no effect on today's decisions. The economic behavior of agents depends only on the past and present outcomes. All the exogenous time-dependent variables are updated and entered into the static stage model. This static model then solves for the next period taking the past solutions as given. The dynamic paths for time-dependent variables are generated by the sequential solution of static CGE models. The advantages of this approach are no terminal condition problem and also ease to compute. Yet, the drawbacks of this approach are: 1) economic agents are myopic and there is no feedback from the future anticipated paths of dynamic variables; 2) errors made in each year might quickly compound and lead to unexpected results. Many researchers used this approach such as Wang (1999), Thurlow (2004), Annabi et al. (2005), Mabugu and Chitiga (2007), Lemelin (2007), and Thurlow and Seventer (2008).

The second approach of forward looking dynamics is fully dynamic model that can capture the impact of the future events and solve for inter-temporal equilibrium. Events in each period affect the equilibrium of all other periods so that decisions are made on the basis of past outcomes and expectations of all future events. The main advantage of this approach is the correct way of specifying rational behavior. However, the main drawback is that the assumption of perfect foresight substantially complicates empirical implementation. An approximation of the infinite horizon model is needed to solve the model. Many researchers applied this approach such as Jorgensen and Wilcoxen (1990), Devarajan and Go (1998), Diao et al. (1996), Lledo (2005) and Vellinga (2006).

8.1.3 Inter-temporal General Equilibrium Model (Rational Forward-Looking Expectation)

Model Structure

The model is a small open economy consisting: 1) three sectors (agriculture, industry and service), 2) one consumer, 3) export and import, 4) government, 5) no intermediate inputs and gross production is determined by labor (L) and capital (K); 6) labor is divided into two categories: labor-1 (unskilled) and labor-2 (skilled labor).

The consumer is assumed to have an infinite horizon with perfect foresight (rational forward looking expectation). The consumer owns labor (LS) and all the financial assets (A). The representative consumer allocates income to consumptions (C) and savings to maximize an inter-temporal utility function over an infinite horizon as:

$$U = \sum_{t=1}^{\infty} \frac{(1+g)^{t-1}}{(1+\rho)^{t}} \log\left(\prod_{ti} C_{ti}^{\alpha H_i} \right) \tag{8.1}$$

Subject to $$A_{t+1} = (1+r_t)A_t + \sum_{j=1} PL_{tj} LS_{tj} - \sum_{i=1} P_{ti} C_{ti} \tag{8.2}$$

where g is the population growth rate; ρ is the time preference rate; r is the interest rate; PL

is the wage rate (labor price); P is the consumer price of good; j is the industry-j; i is the good-i and t is the time period. αH_i is the household consumption share of good-i. The labor supply (LS) is exogenous and increases at the constant growth rate g on the steady state path:

$$LS_t = LS_0(1+g)^{t-1} \qquad (8.3)$$

Government maximizes government consumption (G) subject to income rising from taxation. Government utility function is as same as with consumer utility function shown as.

$$U = \sum_{t=1}^{\infty} \frac{(1+g)^{t-1}}{(1+\rho)^t} \log\left(\prod_{ti} G_{ti}^{\alpha G_i}\right) \qquad (8.4)$$

Subject to $\sum_{i=1} tx_{ti} PM_{ti} QM_{ti} = \sum_{i=1} P_{ti} G_{ti}$ (8.5)

where tx is the import tariff; PM is the price of imported goods; QM is the quantity of imported goods. αG_i is the government consumption share of good-i. The model assumed there is no government saving.

Firm (producer) operates under perfect competition and constant return to scale with the Cobb-Douglas Technology. The output (XD) production function for labor (K) and capital (L) can be written as:

$$XD_{ti} = f_{ti}(K_{ti}, L_{ti}) = aF_i K_{ti}^{\alpha K_i} L_{ti}^{\alpha L_i} \qquad (8.6)$$

where aF is the total factor productivity; αK and αL are the capital and labor shares respectively in the value of the output.

The representative firm (producer) is assumed to have an infinite horizon with perfect foresight (rational forward looking expectations). There is no uncertainty and no money illusion. Firm chooses the optimal investment and employment strategies to maximize the present value of the firm, taking into account expected future price of output, the price of investment and wage rate subject to the capital accumulation constraint.

$$MaxV_i = \sum_{t=1}^{\infty} \prod_{s=1}^{t} \left(\frac{1}{1+r_s} \right) \left(DIV_{ti} - V_{ti}^{N} \right) \tag{8.7}$$

Subject to $K_{t+1,i} = (1-\delta_i)K_{ti} + INV_{ti}$ (8.8)

$$DIV_{ti} = PD_{ti} \cdot \alpha F_i K_{ti}^{\alpha K_i} L_{ti}^{\alpha L_i} - PL_t L_{ti} - PD_{ti} \cdot \phi_i \cdot \frac{INV_{ti}^2}{K_{ti}} - rp. \cdot PK_t \cdot INV_{ti} \tag{8.9}$$

$$V_{ti}^{N} = (1-rp) \cdot PK_t \cdot INV_{ti} \tag{8.10}$$

where V is the market value of the firm; DIV is the current dividend payment of firm; INV is the firm investment; δ is the annual rate of depreciation; V^N is the new shares issued by firm; PD is the producer price of output; PK is the price of capital; ϕ is the adjustment cost parameter; and rp is the share of the investments financed by retained profits. The initial capital stock in period $t=1$ is specified exogenously:

$$K_{1i} = \overline{K}_{1i} \tag{8.11}$$

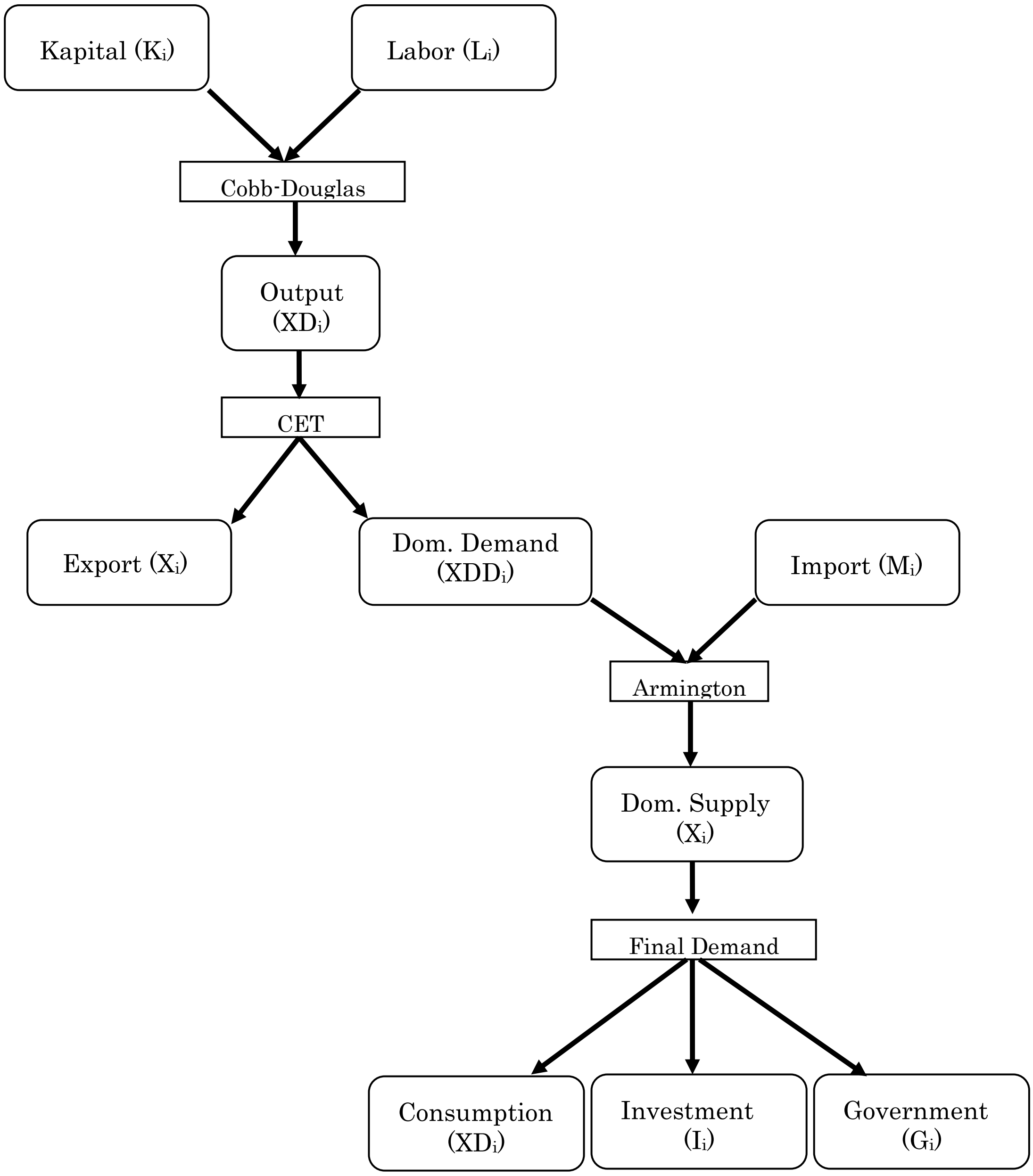
Both labor and capital are assumed perfectly mobile across sectors.

The flow of goods and services in the economy are shown in Figure 8.1 while the technical derivation of the inter-temporal general equilibrium and the summary of model are clearly shown in Bayar (2006). Considering the new type of labors and the new account of government and import tariff, this study modified the GAMS code of inter-temporal general equilibrium that was originally written by Bayar (2006).

Initial Data, Assumption and Simulations

Data used in this analysis is the imaginary social accounting matrix data as shown in Table 8.1. The model assumed that: 1) SAM data reflects long rung steady state; 2) The real interest rate is exogenous and is equal to 5 per cent over time; 3) The time preference is equal to 5 per cent; 4) The adjustment cost is equal to 10 per cent; 5) The economic growth rate in the steady state condition is 2 per cent as same as the population growth rate. The baseline scenario of the economy is on the steady state growth path; 6) Half of investments are financed through retained profits and the other half through new shares (rp = 0.5); 7) Both Armington Elasticity and CET are (AGRI (sec-1) = 0.75; IND (sec-2) = 1.5; SERV (sec-3) = 2); 8) Current Account is equilibrium and ignoring the capital movements cross country; 9) The wage rate in each period *t* is fixed as a numeraire; 10) The time period of simulation is 100 years; 11) two policy simulations occur in the period-5.

Figure 8.1 Production of the Domestic Commodity, Domestic Supply, the Composite Commodity and Domestic Demand



Source: Adapted from Bayar (2006)

Table 8.1 An Imaginary Data of Social Accounting Matrix

		Commodities			Firms			Capital	Labor-1	Labor-2	Consumers	Firms	Government	Investment	Tariff	ROW	Total
		AGR	IND	SERV	AGR	IND	SERV										
Commodities	AGR										69		1	7			77
	IND										117		3	43			163
	SERV										179		6	95			280
Firms	AGR	55														15	70
	IND		130													20	150
	SERV			240												50	290
Capital					50	60	100										210
Labor-1					15	40	50										105
Labor-2					5	50	140										195
Consumers								65	105	195							365
Firms								145									145
Government															10		10
Saving												145					145
Tariff		2	3	5													10
ROW		20	30	35													85
Total		77	163	280	70	150	290	210	105	195	365	145	10	145	10	85	

Source: Author

Note: AGR is the agricultural sector; IND is the industrial sector; SERV is the service sector and ROW is Rest of the World.

There are two simulations; Simulation-1 is 10 per cent increase in the world imported price of agricultural product (Sector-1) while Simulation-2 is 2 per cent increase in the supply of skilled labor (labor-2). Both simulations are conducted to tracking the growth path of some macroeconomic indicators such as import, investment and domestic production responding to these shocks.

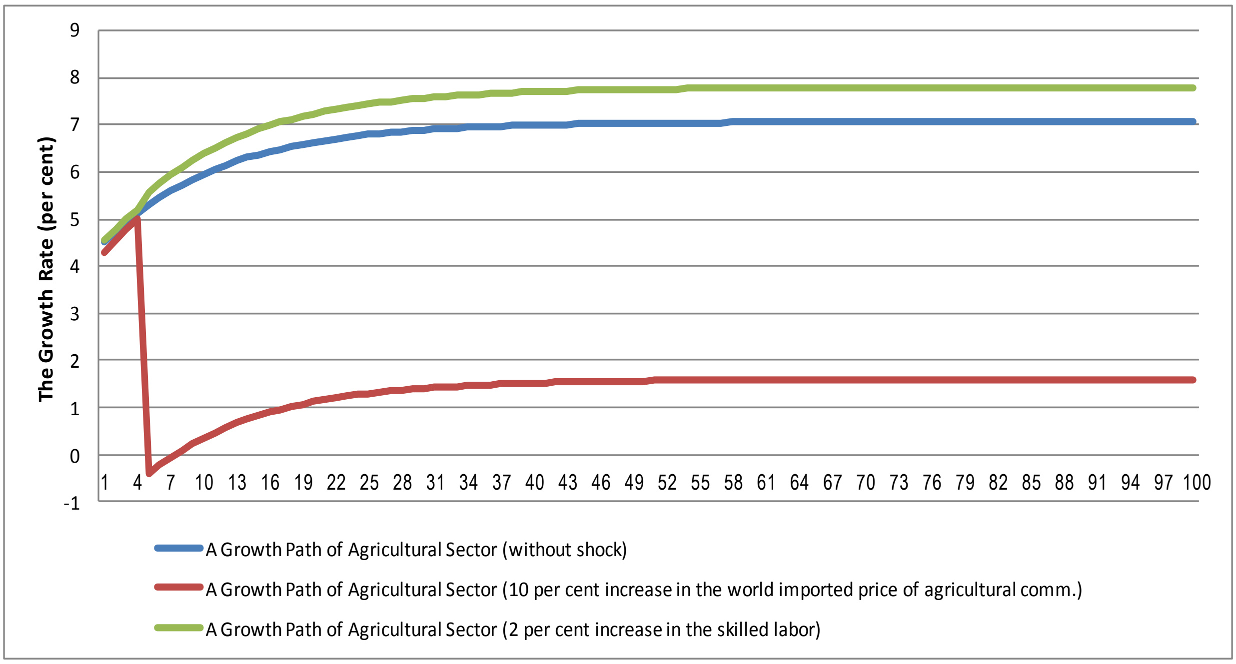
Simulation-1 is an external shock, uncontrollable shock. The external shock of an increase in the world import price happens in the 5th period. Simulation-2 is an internal shock, a controllable shock. An increase in the skilled labor could be outcome of a human capital investment such as increasing number of school facility, teacher training and scholarship. These policies, however, need a lag between policy implementation and the policy emerging. To deal with this issue, this study assumes there is a five year lag between a human capital investment and the policy outcome.

8.1.4 The Analysis of Simulation Outcomes

Figure 8.2, 8.3, 8.4 and 8.5 illustrate responses of some macroeconomic indicators countering to two shocks. Figure 8.2 shows, without a shock, the import of agricultural product continuously grows 4.5 per cent (period-1), 5.3 per cent (period-5) and more than 7 per cent (from period-41 and beyond). However, responding to the 10 per cent increase in the world import price of agricultural product, the growth of import in the period-5 significantly drops from 5 per cent (period-4) to -0.42 per cent (period-5). The growth of import gradually recovers starting from the period-8 but the growth of import will constantly grow at 1.5 per cent for a rest of time.

A rise in the world imported price increases the domestic price of imported agricultural products and then lowers the demand of these products. Consequently, as a rational agent, the producer (firm) will invest more on the agricultural sector to seek a gain from changing in the consumer behavior. A consumer, as the rational agent, will sift the consumption behavior by replacing imported goods with domestic goods due to a substitution effect.

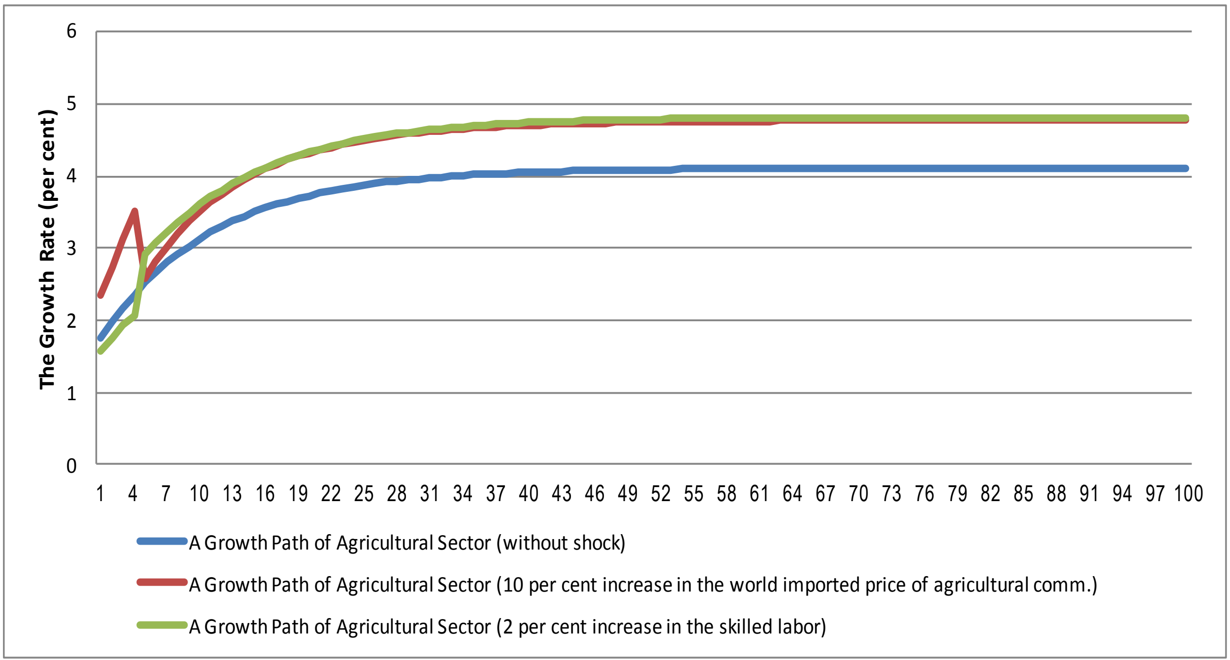
Figure 8.2 Import Growth Paths of the Agricultural Sector



Source: Author's calculation based on simulation results of inter-temporal dynamic GE

Figure 8.3 obviously demonstrates the forward looking behavior of producer in which the firm producing agricultural goods decides to invest more on the agricultural sector before the increase in the world import price. As the results, the investment on the agricultural sector raises 2.3 per cent, in the first period, and jumps to 3.5 per cent in the period-4, one period before the increase in the world price. The growth rate of investment, however, decreases below 3 per cent in the period-5 and 6 and recovers over 3 per cent in the period-7 and beyond.

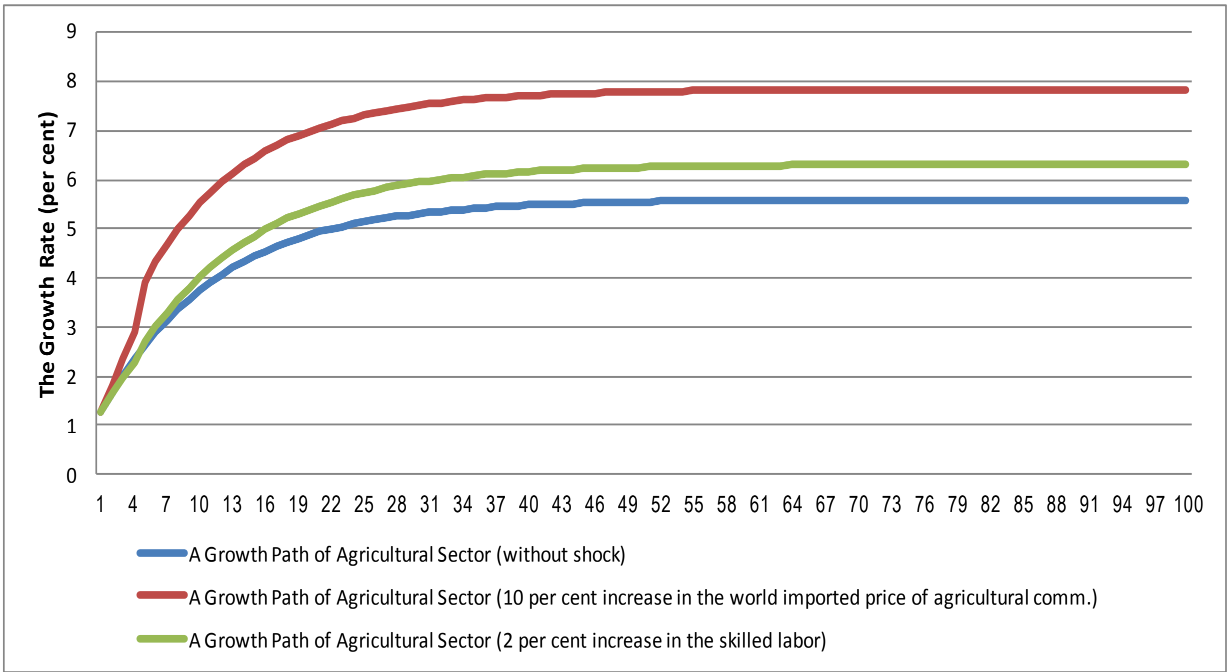
Figure 8.3 Investment Growth Paths of the Agricultural Sector



Source: Author's calculation based on simulation results of inter-temporal dynamic GE

The significant increase of investment in the period-4 indicates the expectation plays a critical role in firm's decision. A firm operated in the agricultural sector expects a larger profit in the period-5 and beyond; thus, a firm invests more on the agricultural sector to increase a production capacity. Although the agricultural sector does not much employ the skilled labor, a firm operating in this sector still responses positively towards the shock of 2 per cent increase in the skilled labor shown by an increase in investment on the agricultural sector. This is due to the reason that a firm expects an increase in the skilled labor would increase the production of service sector; a sector that highly depends on the supply of skilled labor. Besides that, the phenomenon will also increase welfare of whole society that would also demand more on the agricultural sector.

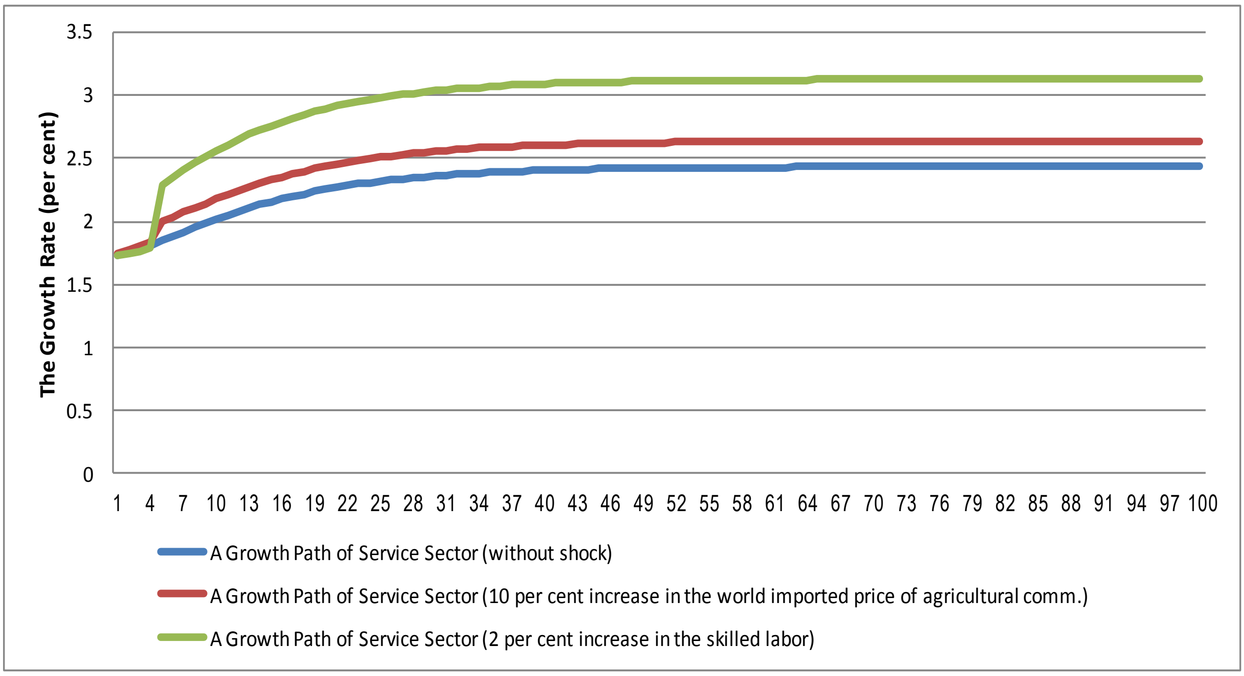
Figure 8.4 Domestic Production Growth Paths of the Agricultural Sector



Source: Author's calculation based on simulation results of inter-temporal dynamic GE

As a result of the higher investment on the agricultural sector, the faster the domestic production of agricultural sector grows at almost 2.9 per cent (period-4), 3.9 per cent (period-5) and over 4 per cent (period-6 and beyond) (Figure 8.4). The simulation indicates that there is a significant gap in the domestic production path with and without shock. Without any shock in the economy, the domestic production of agricultural sector achieves a 5 per cent growth rate in the period-22, while with the shock of 10 per cent increase in the world import price, a 5 per cent growth rate can be reached quicker in the period-8. Contrary, the impact of 2 per cent increase in the skilled labor on the growth of agricultural sector is not as high as the impact of 10 per cent increase in the world import price. This is because a firm expects differently on profit responding to shocks. The shock of increase in the world import price would give more profit than that of the second shock; thus, the firm would invest and produce more the agricultural sector.

Figure 8.5 Domestic Production Growth Paths of the Service Sector



Source: Author's calculation based on simulation results of inter-temporal dynamic GE

Figure 8.5 illustrates the domestic production growth of the service sector in responding to a 2 per cent increase in the skilled labor. The service sector employs almost 75 per cent of its labor coming from the skilled labor. Thus, an increase in the supply of skilled labor boosts the domestic production of the service sector. Without a shock in the labor supply, the growth of the service sector is only 1.85 per cent (period-5), while under a shock of 2 per cent increase in the skilled labor, the service sector grows by 2.3 per cent (period-5).

The simulation analyses using the inter-temporal dynamic general equilibrium evidently show the forward looking behavior has important roles on the growth path of some economic indicators. Events in each period affect the equilibrium of all other periods. The firm would invest massively when there is a positive expectation on profit in the future. This model is a good tool to analyze the current economic behavior such as consumption, investment and production in response to an announcement effect of some polices.

8.2 The Relationship between Corruption and Public Investment at the Municipalities' Level in Indonesia♠

8.2.1 Introduction

In Indonesia, corruption has become one of the major political and economic issues in recent years both pre and post Suharto's era. In the era of Suharto, the nature of corruption

♠ This part is the modification of the article of "Dartanto, T. (2010a), The relationship between corruption and public investment at the municipalities' level in Indonesia, Vol.9, No. 8: pp. 1-7".

in Indonesia was more centralized and thus was more predictable. However, the post-Suharto era has resulted in a different kind of corruption which was triggered by changes in the political system. The old, highly centralized system has been transformed and replaced by a large decentralized system in which power and authority are more diffused. As a consequence, the corruption is now more fragmented with the local government officials and local legislative members who have a dominant role as the actors (Kuncoro, 2004; 2006). A recent survey by Transparency International Indonesia (henceforth TII) in 2008 showed that corruption in Indonesia is commonly found in activities related to business licenses/permits, bureaucratic process, public contracts/tenders and judicial decisions.

Related to public contracts/tenders, public investment projects have frequently lent to elites or those responsible for acts of high-level corruption or rent seeking. Tanzi and Davoodi (1997, 1998), utilizing cross-country data, showed that higher levels of corruption is associated with higher public investment, and leads to a reduction in the project’s productivity, a lowering government revenue and expenditure on operations and maintenances, and a diminishing quality of public infrastructure. However, they also argued that corruption is likely to increase public investment. This may arise because public investment can be easily manipulated by powerful political or bureaucratic personalities, and often gives rise to the payment of higher “commissions” by those who carry out the project. On the other hand, Mauro (1995), also using cross country data, found that corruption reduces total investment and thereby slows down economic growth. A similar result is also shown by Sarkar and Hasan (2001). By using Transparency International's Corruption Perception Index, this study showed that corruption reduces both the volume and efficiency of investment and economic growth.

Given the fragmented nature of corruption in Indonesia and its effect on worsening the economy, it is important to conduct quantitative research to measure the relationship between corruption and public investment at the municipalities' level in Indonesia. This part consists of two main parts. The first section describes the game theory model to explain the relationship between corruption and public investment. The second part discusses the econometrics model and the results. The model is used to verify whether the relationship between corruption and public investment is in line with the solution of game theory.

8.2.2 The Theoretical Model: The Corruption-Public Investment Game

This study develops a simple theoretical game in order to analyze the relationship between corruption and public investment. The so called corruption public investment game consists of two rational players, an individual public official (called player 1) and a Corruption Eradication Commission (henceforth CEC) as a part of government body (called player 2)[24]. The strategy of player 1 is to decide whether to corrupt or not to corrupt

[24] Corruption Eradication Commission (CEC) known as KPK *(Komisi Pemberantasan Korupsi)* was founded in 2004 in order to combat massive corruption in Indonesia. I assume that the individual public official cannot perfectly observe the strategy carried out by the CEC.

meanwhile the strategy of player 2 is to do strict supervision highly or just low. The payoff function of each player and strategies are represented in Table 8.2. This payoff draws upon Becker's (1968) analysis of crime in general, Rose-Ackerman's (1975) analysis of the economics of corruption and Macrae's (1982) idea of game theory approach on the economics of corruption.

Table 8.2 Payoff Matrix of Corruption-Investment Game

		Corruption Eradication Commission (CEC): Strict Supervision	Corruption Eradication Commission (CEC): Low Supervision
Individual Public Official	Corrupt	(w+rK-J(I)), K-rK+M-C(I)	w+rK, K-rK
	Non Corrupt	w+R(I), (K-C(I))	w+R(I), K

Sources: Author

Let *w* be a wage rate. *r* is a fraction/percentage of rent seeking behavior resulting from government projects on public works. *K* is an amount of public investments. *I* is a corruption perception index, ranging from 0 (most corrupt) to 10 (cleanest). *J(I)* is penalties/costs paid by an individual public official when he/she is detected and arrested due to corruption[25]. *R(I)* is a reward to an individual public official for not doing corrupt activities. Thus, the benefits from not being detected as being corrupt received by an official are *(w+rK)*. On the other hand, the benefits of being detected are *(w+rK-J(I))*. Moreover, the benefits received by an individual public official from not being corrupt are *w+R(I)*. Since the

[25] The penalties/costs include not only jail terms but also moral and social costs, bribery and extortion costs, etc.

condition of corruption acceptable to the public official is *rK* > *R(I)*, the corruptions are economically rational.

Let us assume *J* is a continuous decreasing function in the corruption index *(I)*, $\partial J(I)/\partial I = J'(I) < 0$. This implies that the paid costs or penalties in a corrupt system are larger than that of in non corrupt one[26]. Further, we assume that the second derivative of *J(I)* is negative following the law of diminishing returns, $\partial^2 J(I)/\partial I^2 = J''(I) < 0$, on the contrary, *R(I)* is a continuous increasing function in *I*, $\partial R(I)/\partial I = R'(I) > 0$. These assumptions imply that a clean government system will create a better reward and punishment system for public officials, thus an increase in *I* will increase the reward *R*. That is the same as *J(I)*, the second derivate of *R(I)* is negative, $\partial^2 R(I)/\partial I^2 = R''(I) < 0$.

Moreover, *M* represents the government's credibility and public trust and *C(I)* is the supervision costs as a function of the corruption index. If the government/CEC commits to a strict supervision and is able to catch perpetrators of corruption, they will get benefits, *K-rK+M-C(I)*. We assume that the benefit from government credibility and public trust *(M)* are larger than the costs of combating corruption *(C)*. Therefore, the activities against corruption by a ruling government are economically rational. *C* is a continuous increasing function in *I*, $\partial C(I)/\partial I = C'(I) > 0$ and the negative second derivative, $\partial^2 C(I)/\partial I^2 = C''(I) < 0$. The high value of *I* represents more budgets or resources allocated in recruiting new employee for supervision, investing online procurement, and creating a fair justice system and

[26] This assumption is made given the facts that in the corrupt system like Indonesia, sometimes, a defendant is like "a cash cow" an object of extortion by polices, prosecutors and judges. Extortions and illegal charges not only happen during the legal process but also occur when in prison. Inmates must pay illegal charges in order to obtain better facilities such as a bigger room or tastier meals *(Kompas, 01/14/2010, The Jakarta Post, 01/13/2010 and Majalah Tempo 47/XXXVIII 01/11/2010)*. It should be remembered that in a corrupt system, a defendant can bribe in order to get the minimum penalty or even to avoid prosecutions. However, doing bribery is costly and the probability of success is also low. On the contrary, in the non corrupt system, a defendant will follow the legal process without any extortion and other expenses incurred by the defendant. Therefore, I assume that *J(I)* is continuous decreasing function in *I*.

reforming a remuneration system which are needed to develop an accountable and clean government.

The Nash Equilibrium is derived under assumptions as $rK\text{-}J(I) < R(I)$ and $rK < M$. The first assumption means that the net benefits of committing corrupt acts under a strict supervision are smaller than the net benefits of not being corrupt. It follows that every public official will commit corrupt acts if the net benefits of committing corrupt acts are larger than that of not being corruption. It contradicts the facts that supervision is aimed to reduce corruption. The second assumption means that the value of the government's credibility and public trust is greater than or equal to the value of corrupted public investments. If this assumption is violated, there is no rational reason for the ruling government to eradicate corruptions.

By definition, the strategy-i is a Nash Equilibrium, if for each player-*i*, strategy-*i* is player *i*'s best response to the strategies of the *n-1* other players. In this game, the chosen individual public official is the best response to the strategies of government (CEC). According to the payoff matrix in Table 8.2, if CEC chooses to commit to implementing strict supervision, a public official's best response is not to be corrupt. However, if CEC does not commit to fight corruption, which means low supervision, an individual public official's best response is corruption. In contrast, if an individual public official chooses to actively corruptly/not corruptly the government's best response is strict supervision/low supervision.

Following the conditions, a Nash Equilibrium does not exist in this game because the solution to such a game necessarily involves uncertainty about what players will do. We introduce the notion of "a mixed strategy", which we will interpret in terms of one player's uncertainty about what another player will do. Thus a "mixed strategy" for player-i is a probability distribution $p_i = (p_{1i}, ..., p_{iK})$, where $0 \le p_{iK} \le 1$ for *k=1,...,K* and $p_{i1} + ... + p_{iK} = 1$ (Gibbons, 1992).

In this game, a mixed strategy for CEC is the distribution function *(p,1-p)*, where *p* is the probability of committing strict supervision and *1-p* is the probability of committing low supervision, and $0 \le p \le 1$. Furthermore, a mixed strategy for an individual public official is the distribution function *(q,1-q)*, where *q* is the probability of committing corrupt acts, *1-q* is the probability of not committing corrupt acts, and $0 \le q \le 1$. Therefore, the solution of *p* can be derived by following the expected profit of an individual public official as shown below:

$$E\ (\pi_{corrupt}) = p(w + rK - J(I)) + (1 - p)(w + rK)$$

$$= -pJ(I) + (w + rK) \tag{8.12}$$

$$E\ (\pi_{not-corrupt}) = p(w + R(I)) + (1 - p)(w + R(I))$$

$$= w + R(I) \tag{8.13}$$

Substituting Eq. 8.13 into Eq. 8.12, we get:

$$p = \frac{rK - R(I)}{J(I)} \tag{8.14}$$

or

$$K = \frac{R(I) + pJ(I)}{r} \tag{8.15}$$

Eq. 8.14 intuitively shows an increase in rent seeking behavior *(rK)* followed by an increase in the probability of strict supervision. In contrast, strict supervision is needed to reduce corrupt activities, but an increase in penalties/costs and the reward systems lower the probability of strict supervision. Further, Eq. 8.15 intuitively shows a strict supervision in a government system will increase the public investment because the public official will work as efficiently/effectively as possible. An increase in the penalties/costs *J(I)* and the reward system *R(I)* raises public investment since the public official avoids penalties by being involved in corruption. In contrast, the rent seeking behavior (*r*) reduces public investment.

From Eq. 8.15 we can derive the impact of the corruption index (*I*) on public investment (*K*). The first order condition of Eq. 8.15 is shown as below:

$$K_I' = \frac{R'(I) + pJ'(I)}{r} \tag{8.16}$$

Suppose to $J'(I) < 0$ and $R'(I) > 0$, then K_I' can be both positive and negative depending on the level of *I* itself. If $|pJ'(I)| > R'(I)$, then K_I' will be negative, and if $|pJ'(I)| < R'(I)$, then K_I' will be positive. Moreover, K_I' will be zero which is called as turning point, when $|pJ'(I)| = R'(I)$. Therefore, the relationship between public investment and corruption will be positive which means low corruption will increase public investment when the reward system is well developed. On the contrary, the relationship will be negative when the reward system is not well developed yet and the punishment system is dominated.

8.2.3 Model Specification

The author proposes an econometric model to quantitatively measure the relationship between corruption and public investment based on the solution of the corruption public investment game. In order to capture the phenomena of Eq.8.16, this study proposes a quadratic function of an econometric model. In addition, the quadratic function permits us to discern the value of the corruption index which can minimize/maximize public investment. The econometric model is shown as:

$$devrev_i = \beta_{11} + \beta_{12} corrupt_i + \beta_{13} corrupt_i^2 + \beta_{14} \log(gdrbcap_i) + \varepsilon_i \qquad (8.17)$$

$$devgrdp_i = \beta_{21} + \beta_{22} corrupt_i + \beta_{23} corrupt_i^2 + \beta_{24} \log(pop_i) + v_i \qquad (8.18)$$

where, *devrev* is a public investment represented by the ratio between expenditure of development to total revenue, and *devgrdp* is the public investment represented by a ratio between development expenditure to gross regional domestic product[27]; *corrupt* is the corruption perception index; *grdpcap* is income per capita; *pop* is number of the population; ε_i and v_i are error term; and lastly, *i* represents region. The data of development expenditure are calculated from the regional budget of each municipality published by the Ministry of Finance, while regional income per capita and population refers to the publication of Central Bureau of Statistic (BPS)[28].

Instead of an absolute value, we use a ratio to lessen the effect of large variation in the development expenditure among regions due to populations and the area size. A region with high income per capita may need more public investments both in quantity and in quality, but the population size may reduce the quantity of public investment. The populous regions commonly also have many public officials, so a larger budget must be allocated on routine expenditures such as salary which might reduce a portion of public investment. Therefore, we

[27] Public investment (development expenditure) is all expenditure such as education, health, infrastructure, etc. in the regional budget except wages/salaries for public officials.
[28] The regional budget of municipalities in Indonesia can be accessed at the Ministry of Finance homepage: http:// www.djpk.depkeu.go.id/datadjpk/71/.

use regional income per capita in Eq. 8.17 and population in Eq. 8.18 as control variables. In addition, to check the consistency of the relationship between corruption and public investment, the magnitude of corruption's coefficients in both equations must be the same.

We estimate these models by utilizing both 2004 cross-section data and pooled data of 2004/2006. However, we have difficulties employing a large data set because the data of regional corruption index is very limited. TII in 2004 surveyed only 21 cities/municipalities which were conducted among 1,305 business people from the cities/regions[29]. In addition, in 2006, TII conducted surveys in 32 districts/cities, with a total of 1,760 respondents. The corruption index is on a 10-point scale where 0 means corrupt/bad and 10 means clean/good. Furthermore, the aim of estimating the models both using cross-section data and pooled data is to obtain robust estimation and consistent results. This has the advantage of enabling us to control the unobservable region-specific-characteristics that may be correlated with corruption and public investment. In addition, the method enables us to control regions and time invariant variables where a time series or cross section study cannot do (Baltagi, 1995).

8.2.4 The Non Linear Relationship between Corruption and Public Investment

Estimation using least squares and pooled least squares provide statistically strong

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[29] This index was calculated as the average scores of perception by the bribe payers on public contract and service performance index. The cities/municipalities included in this survey are Medan, Solok Regency, Padang, Tanah Datar Regency, Pekanbaru, Palembang, Batam, Jakarta, Bekasi, Wonosobo Regency, Semarang, Yogjakarta, Surabaya, Tangerang, Cilegon, Denpasar, Banjarmasin, Kota Baru, Balikpapan, Manado, and Makassar. However, Jakarta and Kota Baru are not included in the pooled data.

evidence of a non-linear relationship between corruption and public investment. Table 8.3 shows that the magnitude of all corruption coefficients is at the same direction indicating consistent results. The second model with DEVGRDP as dependent variable provides lower standard errors of regression both in the cross section and the pooled estimation.

Table 8.3 The Regression Results

Variables	Least squares		Pooled least squares	
	DEVREV	DEVGRDP	DEVREV	DEVGRDP
Constant	131.72	39.10	82.84	44.49
	1.14	*1.92**	*1.09*	*118.35****
Corruption perception index	-110.07**	-14.59	-92.43	-16.62
	-2.55	*-1.79**	*-2.04***	*-23.45****
Corruption perception squared index	12.27	1.61	9.97	1.88
	*2.70***	*1.81**	*1.93**	*20.38****
Log(GRDPCAP)	8.78		10.18	
	*4.84****		*10.08****	
Log(Population)		-0.35		-0.47
		-0.94		*-5.67****
R-squared	0.53	0.29	0.28	0.47
F-statistic	6.49	2.36	4.36	9.98
S.E of regression	8.234	1.011	11.155	1.184
Observation	21	21	38	38

Source: Author's estimation.

*Notes: Figures in italic are t-statistic. The standard errors are corrected due to heterocedasticity; ***,**,* are significant at 1per cent, 5 per cent and 10 per cent respectively.*

The coefficients of corruption perception index in each model are -110.07, -14.59, -92.43 and -16.62 respectively. However, the coefficients of corruption squared index are 12.27, 1.61, 9.97 and 1.88 respectively. This means that the corruption index negatively influences public investment while its square moves in the opposite direction. Since the higher corruption index, the cleaner the system, the eradication of corruption represented by a higher corruption index will reduce the share of development expenditure while the marginal effect of eradicating corruption will increase the share of public investment. This confirms the U-shaped form of the relationship between corruption and public investment. These findings are in line with the solution of corruption public investment game that the relationship could be both positive and negative depending on the level of the corruption index.

According to the U-shaped form, both corrupt and non-corrupt regions tend to have a larger share of development expenditure. Along with Tanzi (1997) and Tanzi and Davoodi (1998), in a region where the corruption is higher, the public investment is also higher. In high-level corruption or rent seeking, high level officials are the decision makers of public investment regarding in terms of its scale and composition. This may distort such public projects been carried out specifically to provide some individuals or political groups with opportunities to receive "commissions" from the project implementers. Government officials, in collusion with local legislative members, sometimes decide budget allocation in accordance with orders from private companies. Hence, the decision of budget allocation for public investment projects is based on the commission that is offered and received from the third parties, instead of on the basis of the cost benefit analysis.

However, the public investment will decrease along with the campaign against corruption and the combating activities represented by an improvement of the corruption index. At this stage, the number of private companies which were previously privileged to order public projects, and which colluded with government officials and local legislative members to allocate budget based on “commission received”, sharply decrease due to high supervision from the Corruption Eradication Commission and media’s focus on corrupt activities. In addition, the budget is allocated based on the cost benefit analysis and the local needs, thus, public investment is not as much as before.

A further consequence of the campaign against corruption is that many government officials refuse to be appointed as a project leader. The rejection of this position is because of anxiety over being arrested as a corruption defendant after the project finished. Another corollary is in the business side where many companies fail to fulfill the requirements of public projects bidding such as tax clearance, tax registering, submitting financial statements, etc.. In some cases, many projects are offered without bidders interested in participating in the tender, and cause the project to fail to be completed on time and the process to be repeated and take a longer time. Moreover, the law enforcement which has not implemented perfectly yet forces the interested private companies to wait and see. Therefore, an under developed either prudential system of project tenders or law enforcement might delay the implementation of some projects and the public investment will decrease along with an improvement in the corruption index.

According to the U-shaped form, the ratio of development expenditure to total revenue will reach the lowest/minimum value when the corruption index equals 4.49 in 2004 and 4.64 in pooled data. Moreover, the ratio of development expenditure to gross regional domestic product will attain the lowest value when the corruption index equals 4.53 in 2004 and 4.42 in pooled data. Generally, the public investment reaches the lowest value when the corruption index ranges from 4.42-4.64. In those regions having a corruption index below the turning point, the public investment decreases along with the improvement in the corruption index. In contrast, in those regions having a corruption index larger than the turning point, the public investment and corruption index move in the same direction which means the public investment will increase in conjunction with an increase in the corruption index. TII's survey showed the average of regional corruption index was 4.69 in 2004 and 4.72 in 2006, thus most of regions were just past the turning point.

One of reasons why the public investment and the corruption index moved in the same direction when the corruption index is greater than 4.42-4.64 is that both law enforcement and reward/remuneration systems are well developed, so there is little incentive for corruption by public officials. Consequently, either the total revenue share of development expenditure or the GRDP share of development expenditure tends to be higher because some of development expenditure/public investment is not diverted to the pockets of public officials. Moreover, the budget allocations are decided along with the schedule, in a transparent and well targeted way, based on the cost benefit analysis and the needs of the local people. In general, a low level of corruption represented by a high corruption index has been demonstrated to be positively correlated with the achievement of better investment rates, particularly through the building of institutions in support markets. This enhances market efficiency and bureaucracy, fairness of business, trust in society, and reduces transaction costs and uncertainty in the economy. This finding supports Mauro (1995) which institutional efficiency encourages a high investment.

8.3 Concluding Remarks

This part ends with several conclusions. In the part of inter-temporal dynamic general equilibrium, this study showed that the expectation (forward looking behavior) plays a significant role on the economy. Economic Agents (consumer and producer) make decision both intra and inter temporarily optimal. For example, a firm will consider investing a certain time when there is an announcement of implementation of free trade agreement in 2020. The static analysis, however, could not capture the growth path (behavior) of economic indicators yearly. An inter-temporal (dynamic) general equilibrium is a powerful tool to show how economic agents might response towards external shocks by considering a forward looking behavior. A numerical analysis using the inter-temporal dynamic general equilibrium clearly shows that the growth path of some economic indicators could be observed yearly, so that we could simulate policies or shocks to find out the best policy for alleviating poverty. An inter-temporal general equilibrium, however, might not be appropriate to analyze economic conditions in the developing economies, since the countries are not in the steady state yet.

On the frontier research of corruption issue, the Nash Equilibrium derived from mixed strategies proves that the relationship between corruption and public investment can be both positive and negative depending on the level of the corruption Index. The estimation results from both the cross section data and the pooled data show that the relationship between corruption and public investment is a non-linear quadratic, U-shaped form. Both corrupt and non corrupt regions tend to have a larger share of development expenditure. However, a larger share in the corrupt regions is caused by rent seeking behavior in which government officials try to allocate a larger budget on public projects in order to acquire commission from private companies. In contrast, a larger share in the non corrupt regions is a result of institutional efficiency. Even though most regions in Indonesia are at the lowest level of public investment, great efforts to eradicate corruption would likely have an immediate effect of increasing public investment. An increase in public investment will boost an economic growth and also improve the poor’s access on public facilities. Both access to public facilities and an economic growth would benefit to poverty alleviation in Indonesia.

Chapter 9

Conclusion and Policy Recommendation

9.1 Conclusion

Poverty is an age-old issue but one that remains an unsolved problem for every ruling government in Indonesia since poverty has a dynamic behavior as a life entity that is growing and changing overtime. The poverty measurement also always changes as it responds to changes in the socio-economic conditions and societal needs. The poverty incidence had decreased from 40.1 per cent (1976) to 11.3 per cent (1996) and jumped to 24.2 per cent (1998) and then again decreased to 13.3 per cent (2010). The massive increase in the poverty incidence in 1998 was not only caused by external shocks of the Asian economic crisis but also caused by a change in the method of calculating poverty. The change of poverty line measurement had increased the headcount index from 11.3 per cent to 17.5 per cent while the Asian economic crisis had increased the headcount index from 17.5 per cent to 24.4 per cent.

The current government has made poverty reduction the main priority in RPJMN 2004-2009 and RPJMN 2010-2014. There are four pillars for poverty reduction strategies: 1) creating an opportunity for the poor; 2) increasing the capacity of the poor through human resources development; 3) empowering the poor through equipping them with access to public decision-making processes and access to economic resources; 4) protecting the poor against economic and other shocks through the provision of social safety nets. In the RPJMN 2010-2014, the fiscal policy is directed to maintain fiscal sustainability, stimulate economic growth and protect domestic economy responding to the global recession. Regarding the dynamism of poverty in response to change in the socio-economic conditions and the poverty measurement, the fiscal policy as one tool of the poverty alleviation policies will face many challenges and opportunities in supporting the poverty reduction in Indonesia.

This dissertation addresses four main challenges of fiscal policies: 1) the role of import tariff policies on protecting the poor from the volatility of world commodity prices; 2) reallocation fuel subsidies and its implication to fiscal balance and poverty; 3) the 2008 corporate income tax reforms and its contribution on poverty reduction; 4) poverty dynamics and the role of government assistance on changing poverty status.

There are, however, two main issues that should be identified firstly in analyzing the poverty impacts of fiscal policies: first, the five-W (what, who, where, when and why) questions in poverty. What is the measurement used to calculate the poverty? Most researchers agreed that poverty can be conceptualized in the idea of absolute deprivation suffered by the population. There are many definitions on the poverty; however, this study utilizes the poverty measurement based on the expenditure approach. The second question is who the poor is. Where is the poor located? When does the poor condition happen? Why does poverty occur? Good understanding on these questions is important in proposing and implementing appropriate policies in alleviating and protecting the poor.

The second issue is how fiscal policy influence poverty. When the expenditure approach is applied as a basis of poverty measurement, fiscal policies will influence poverty through five channels: 1) change in expenditure as a result of a change in price; 2) change in expenditure as a response to utility change due to a change in price; 3) change in expenditure as a response to utility change due to a change in income; 4) change in poverty line as a response to a price change; 5) change in income distribution as a response to a change in endowment. Channel 1, 2 and 3 are the basis of a microsimulation procedure connecting macroeconomic phenomenon and household data while Channel 4 is a basis of the endogenous poverty line.

Regarding Channel 4, this study has proven that, under the fixed poverty line, the poverty impact of policy reforms that significantly increase (decrease) price will always be underestimated (overestimated). Further, the empirical simulation showed that there is 0.315 percentage point (660,138 people) difference of outcome between applying the endogenous poverty line and the fixed poverty line. Therefore, analyzing the poverty impact of policy reforms using the fixed poverty line might provide biased policy guidance and would call a different policy implication.

On the methodology side, since the fiscal policy would influence the economy at the macro level while the poverty is household phenomena, therefore, there is a need to link between the macro and micro model to evaluate the poverty impact of fiscal policies. This study applies the CGE-MS approach. A CGE model generates prices that link in to the microsimulation of the household model. GGE model is based on the extension of 2005 Social Accounting Matrix while the microsimulation is based on the 2005 National Socio-Economic Survey (SUSENAS). This study also applies the endogenous poverty line due to the precision in outcomes of the poverty impact of policy reforms.

Regarding the first research question of the role of tariff policies on protecting the poor from increase in the world commodity prices, this study found that the volatility of world rice and soybean prices during 2007 to 2010 had a great effect on the poverty incidence in Indonesia. A 60 per cent increase in world rice price raises the headcount index by 0.81 per cent which is equivalent to an increase in the number of poor by 1,687,270. However, the zero import tariffs on rice could only reduce the headcount index by 0.19 per cent equal to 390,160 people. On the other hand, a 40 per cent increase in the world soybean prices raises the headcount index by 0.204 per cent, which equals 427.9 thousands. However, the zero import tariffs implemented by the government through regulation 01/PMK.011/2008 responding to a high world soybean price could only decrease the poverty incidence by 0.059 (123,492 people). The zero import tariffs imposed on rice are not effective to protect the poor while the zero import tariffs would be effective to protect the poor in Indonesia if the world soybean price increased not larger than 10 per cent.

In the case of soybean prices, the government, therefore, should combine the zero import tariffs with either public infrastructure projects (cash transfer) or soybean production subsidies. Combining zero import tariffs and production subsidies will solve two problems of protecting the poor and providing an incentive for farmer to produce more at once. Combining between zero import tariffs and triple increases in soybean production subsidies will protect almost 230 thousand people falling into the poverty trap.

Zero import tariffs and subsidies on production inputs will lead to problems of fiscal deficit since both are negative taxation policies. However, the government does not need to worry about the fiscal deficit. This deficit can be financed through reallocating or reducing inappropriate budget allocation such as fuel subsidies. This study found there are many inappropriate allocations in the national budget. During 2000-2011, Indonesia burns and throws away averagely 61.2 per cent of oil and gas revenues on unproductive allocation. Moreover, energy subsidies (fuel and electricity) have consumed averagely 13.75 per cent of the national budget while development expenditure has taken only 10.97 per cent of the budget.

Therefore, there are three main reasons why Indonesia should reallocate fuel subsidies into more productive allocation: 1) massive fuel subsidies reduce the fiscal space to promote economic growth through investment in infrastructure and human capital; 2) improving the income distribution since 72 per cent of subsidies are enjoyed by the richest income group; 3) reducing fuel consumption and promoting the usage of more clean energy. If the government is able to cut fuel and electricity subsidies by 86 per cent, there is no budget deficit in 2011.

The simulation result showed that a 100 per cent removal of fuel subsidies and then reallocating 50 per cent to government expenditures, government transfers and other subsidies does not have adverse impacts on household welfare; the poverty incidence even slightly decreases by 0.277 per cent (580,657 people). However, these reallocation policies might not be effective to compensate the adverse impacts of the 100 per cent removal of fuel subsidies if economic agents try to seek gain through mark-up pricing over the increase of production costs.

Reallocations of fuel subsidies into infrastructure, education, health and other expenditures are expected to improve an availability of physical and human capital. Both are a basic and necessary requirement for an economic growth and a poverty reduction. However, as in many market economies, private sectors both-large businesses and SMEs- play an important role in boosting economic growth. In the globalization context, capital can easily move from one country to others and always seeks the most profitable place; a lower corporate income tax might be one incentive to attract more investment both domestic and foreign. The 2008 income tax reform enacted by the new income tax law No.36/2008 is one of best policy in terms of economic impacts and its contribution to poverty reduction in Indonesia.

This study found the 2008 CIT reform supported the administrative tax reforms and the 2008 tax amnesty policy called the sunset policy has increased new corporate tax payers by 422,407 and tax revenue by 53.95 per cent during 2009 to 2011. Therefore, a decrease in the CIT rate did not deteriorate tax revenue; thus, there is no concern that the government will reduce poverty alleviation programs. In terms of the poverty impacts, the simulation result of CGE-Microsimulation shows that cutting the CIT rate from 30 per cent to 25 per cent will attract IDR 41.77 trillion of new investments, create 441,910 new job opportunities, boost 1.46 per cent of economic growth, decline consumer price index by 1 per cent, and raise averagely 1.5 per cent of wage rates. These macroeconomic changes contribute significantly to lift 1.88 million people (0.898 per cent) out of poverty. Moreover, the reducing poverty is observed mainly in households working in the agricultural, industrial, and construction sectors.

Zero import tariffs, production subsidies, reallocation of fuel subsidies and CIT reforms are macroeconomic policies influencing the poor indirectly. In recent years, the government has innovated and implemented many micro policies such as cash transfer, micro credit and scholarship that directly affect the poor. Thus, it is necessary to evaluate the role these played in assisting protection the poor and poverty dynamics. Observing the SUSENAS panel data set of 2005 and 2007, this study found that around 28 per cent of poor households were classified as chronic poor while around 7 per cent of non-poor households are vulnerable to being transient poor (-). Outside Java-Bali contributed more in transient poor while Java-Bali contributed more in chronic poor while the rural households are more vulnerable to falling into poverty than that of the urban households. Around 11 per cent of rural non-poor households fell into poverty while only 1 per cent of 2005 urban non-poor households did. Moreover, poverty in Indonesia is a quite sensitive to change in the poverty line. A 25 per cent increase in the poverty line causes more than a two-fold increase in the poverty rate.

The estimations of logit ordered model showed that the most important factors of poverty dynamics in Indonesia are size of household member, physical assets, working sector, employment status, economic shocks, access to modern utilities of electricity, access to financial institution such as microcredit and saving. The estimation of partial effects of change in independent variables confirmed that an increase of one family member decreases the probability of the household being never poor by 0.019 (National). Besides, households receiving micro credit during 2005-2007 will increase their probability of being never poor by 0.034 (Java-Bali), 0.087 (outside Java-Bali) and 0.052 (National). This study also found that households living in Java-Bali are more vulnerable to negative shocks while households living in outside Java-Bali are relatively resilient to negative shocks. Unfortunately, there is no consistent statistical evidence of government policies in changing poverty status; this does not necessarily mean that the government should stop these policies.

Even though, while this study appears to be scrutinizing a comprehensive analysis on contributions and challenges of fiscal policies on supporting poverty alleviation in Indonesia, there is still remaining frontier issue such as an inter-temporal equilibrium and a corruption that should be addressed. All issues in Chapter 4, 5 and 6 have been analyzed using a static CGE; therefore, these chapters could not determine a change of time path in economic indicators. The numerical analysis of inter-temporal dynamic general equilibrium showed that the growth path of some economic indicators could be observed on a year to year basis, so that we could simulate policies or shocks to discover the best and shortest policy for alleviating poverty.

The simulations also illustrated that the forward looking behavior has a significant role on influencing the growth path, i.e. the firm would invest massively when there is a positive expectation on profit in the future. According to the simulation, an increase in the world import price of agricultural product would increase the domestic production of agricultural product. This would benefit the poverty reduction. However, this outcome might contradict the analysis of Chapter 4 that a high increase in the world commodity prices is not good for the poor. There is no concern to conflict both results since the inter-temporal general equilibrium model is built based on certain assumptions that might not fit with the Indonesian's case. The inter-temporal general equilibrium, however, is a powerful tool for analyzing how economic indicators react to announcement effect.

Lastly, all policy simulations are conducted with the assumption that all government institutions do their best effort in implementing those policies so that there are no policy leakages. In most developing countries, however, institutions such as law enforcement and capacity building are not developed yet. Therefore, the success of fiscal policies in supporting poverty alleviation in many developing countries needs the support of a good institution. In the case of Indonesia, institutional issues such as corruption play an important role in enabling the contribution of fiscal policy in alleviating the poverty. Corruption increases the quantity but not the quality of public investment. Sometimes, the allocation of the project does not necessarily meet people needs. Corruption reduces the effectiveness of fiscal policy on reducing poverty because some of the public investment or government assistance is diverted to the pocket of public officials.

9.2 Policy Recommendation

Regarding the main findings, this study comes with nine policy recommendations for effectively reducing the poverty in Indonesia. This study attempts to avoid general and normative policy recommendations. Some recommendations, however, are not new and might be already voiced by other researchers. Repeating various recommendations would encourage and inspire the government to seriously implement these policies. The nine policy recommendations are as follows:

1. In order to minimize the measurement error, the endogenous poverty line should be applied when analyzing the poverty impacts of fiscal policies or policy reforms due to the accuracy in outcomes.
2. The government should change (or complement) zero import tariff policies imposed on rice and soybeans to input subsidies in order to achieve self sufficiency particularly on soybeans products. Higher self sufficiency will reduce the vulnerability from the world price volatility.
3. The government should promote and accommodate local wisdoms in food security policies. Nationwide policies such as import tariffs and the national food buffer like *BULOG* might not be effective to protect the poor in a wide and diverse area such as Indonesia. Indonesia consists of many ethnic groups that have their own wisdom on food

security. In the western part of Indonesia, people depend on rice as a staple food so both central and local government should collaborate to revitalize *Lumbung Padi*, a kind of food buffer institutions like BULOG in rural area. While in the eastern part of Indonesia, rice is not important staple foods so that both central and local government should promote their own staple foods such as maize, pearl sago and cassava.

4. The government should communicate to all people a need for reallocating fuel subsidies so that this policy would be socially and politically acceptable. Top rank government officials should act as role models of clean behavior in both environmental and political perspective.
5. The government should perform a credible price surveillance that can be used to determine how much prices should be increased as a response to reducing fuel subsidies.
6. The 2008 corporate income tax is a necessary condition but not sufficient. In order to attract more investment both domestic and foreign, the government should reduce a high cost economy resulted from rent seeking and corruption activities, shorten and simplify business license process.
7. The government should provide more safety nets to enable households in Java-Bali to cope with negative shocks. Further, the government should improve targeted households in distributing assistance in order to improve the effectiveness of government assistance

on protecting the poor.

8. The government should be continuously promoting family planning; redistributing land and certifying both land and house ownership; widening access to electricity to enhance the productivity of households and household based micro-enterprises, and widening microcredit program for starting and doing business.
9. Governments at any level should consistently combat corruption in order to improve the average corruption index from 4.72 (2006) to more than 5. This is because great efforts to eradicate corruption would likely have an immediate effect of increasing public investment.

9.3 The Limitations of the Study

Although this study has covered all issues of the relationship between the fiscal policy and poverty in Indonesia and has investigated both using macro and micro model, it has certain limitations. The limitations are: 1) Chapter 4 does not cover the impact of zero import tariffs on farmer behaviors in production decision; 2) Chapter 5 does not examine how to make a reallocation of fuel subsidies socially and politically accepted; 3) Chapter 6 needs more investigation of firms' decisions-both big enterprises and SMEs- responding to the decrease in CIT rate; 4) the calculation of household welfare in microsimulation assumed that the consumption pattern of households did not change following the price change and the change of household welfare will directly influence household consumption (expenditure) and there is no saving activity; 5) this study does not discuss the poverty impact of fiscal policy under the decentralization system.

9.4 Future Research

Considering current conditions and remaining issues, there are two main research agenda in the future:

1. Improving the methodology of CGE-Microsimulation and an endogenous poverty line aiming to increase a precise outcome of the poverty impact of policy reforms. The deterministic microsimulation and the endogenous poverty line should consider substitutions on household consumption. Further, the result of deterministic microsimulation should be compared with the result of the stochastic microsimulation.

2. Analyzing poverty dynamics using a longer data period. There are, however, two main issues on poverty dynamics: 1) intra generation poverty dynamics: why a household remains in the poverty condition for long periods. It needs to analyze the past dependence condition; 2) inter-generation poverty dynamics: why a poor household produces a poor generation. It needs to be considered what kind of intervention policy would be appropriate and what international agencies can do to break the circular poverty trap.

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Appendices

Appendix 1.1 The Regional Poverty Incidence (the Headcount Index) (in per cent)

Province	Head Count Index							
	1999	2002	2003	2005	2007	2008	2009	2010
Nanggroe Aceh D.	14.16	na	18.66	na	26.65	23.53	21.80	20.98
North Sumatera	13.91	15.84	11.34	14.36	13.90	12.55	11.51	11.31
West Sumatera	5.85	11.57	17.26	12.29	11.90	10.67	9.54	9.50
Riau	3.27	13.61	7.83	10.59	11.20	10.63	9.48	8.65
Jambi	17.14	13.19	15.76	10.75	10.27	9.32	8.77	8.34
South Sumatera	14.23	22.32	24.99	21.09	19.15	17.73	16.28	15.47
Bengkulu	12.96	22.70	17.41	22.35	22.13	20.64	18.59	18.30
Lampung	17.95	24.05	23.70	21.46	22.19	20.98	20.22	18.94
Bangka Belitung	-	11.62	11.64	10.79	9.54	8.58	7.46	6.51
Riau Islands	-	-	-	13.33	10.30	9.18	8.27	8.05
DKI Jakarta	4.16	3.42	2.72	5.73	4.61	4.29	3.62	3.48
West Java	25.98	13.38	11.90	12.42	13.55	13.01	11.96	11.27
Central Java	34.18	23.06	18.36	19.98	20.43	19.23	17.72	16.56
DI Yogyakarta	19.83	20.14	16.98	20.41	18.99	18.32	17.23	16.83
East Java	31.03	21.91	20.54	20.04	19.98	18.51	16.68	15.26
Banten	-	9.22	8.10	9.22	9.07	8.15	7.64	7.16
Bali	7.14	6.90	10.60	7.22	6.63	6.17	5.13	4.88
West Nusa Tenggara	27.98	27.76	21.57	24.30	24.99	23.81	22.78	21.55
East Nusa Tenggara	58.63	30.74	33.84	30.54	27.51	25.65	23.31	23.03
West Kalimantan	13.93	15.46	14.60	14.56	12.91	11.07	9.30	9.02
Central Kalimantan	7.62	11.88	14.32	12.61	9.38	8.71	7.02	6.77
South Kalimantan	17.45	8.51	12.40	8.23	7.01	6.48	5.12	5.21
East Kalimantan	13.08	12.89	16.20	14.91	11.04	9.51	7.73	7.66
North Sulawesi	12.70	11.22	11.68	14.63	11.42	10.10	9.79	9.10
Central Sulawesi	23.02	24.90	35.94	22.78	22.42	20.75	18.98	18.07
South Sulawesi	19.24	15.88	17.40	16.12	14.11	13.34	12.31	11.60
South East Sulawesi	31.83	24.22	30.44	20.47	21.33	19.53	18.93	17.05
Gorontalo	-	32.12	26.97	29.32	27.35	24.88	25.01	23.19
West Sulawesi	-	-	-	-	19.03	16.73	15.29	13.58
Maluku	46.61	na	27.34	20.83	31.14	29.66	28.23	27.74
North Maluku	-	na	14.00	na	11.97	11.28	10.36	9.42
West Irian Jaya	-	-	-	-	39.31	35.12	35.71	34.88
Papua	52.38	na	34.36	42.86	40.78	37.08	37.53	36.80
National	**24.09**	**17.61**	**16.58**	**16.59**	**16.58**	**15.42**	**14.15**	**13.33**

Source: BPS, 2011

Appendix 1.2 The Regional Poverty Gap Index (in per cent)

Province	Poverty Gap Index							
	1999	2002	2003	2005	2007	2008	2009	2010
Nanggroe Aceh D.	2.18	na	3.73	na	5.41	4.92	4.46	4.11
North Sumatera	2.26	2.63	1.84	3.15	2.17	2.17	1.92	2.04
West Sumatera	0.63	1.81	2.77	2.50	1.84	1.60	1.41	1.49
Riau	0.45	2.01	1.15	2.22	2.18	1.63	1.25	1.38
Jambi	2.77	2.39	2.86	1.89	1.88	1.56	1.38	1.05
South Sumatera	2.16	3.60	4.98	4.53	3.84	3.15	3.06	2.63
Bengkulu	1.65	3.39	2.59	4.38	4.03	3.74	2.98	2.75
Lampung	3.06	4.18	4.34	4.26	3.94	3.83	3.94	2.98
Bangka Belitung	-	1.44	1.73	2.30	1.68	1.28	1.20	0.93
Riau Islands	-	-	-	2.78	1.90	2.07	2.02	1.05
DKI Jakarta	0.63	0.39	0.34	0.92	0.59	0.72	0.57	0.45
West Java	5.10	2.21	1.99	2.17	2.26	2.17	1.95	1.93
Central Java	6.63	4.00	3.08	3.77	3.84	3.39	2.96	2.49
DI Yogyakarta	3.76	3.81	3.01	4.20	3.80	3.35	3.52	2.85
East Java	6.22	3.88	3.72	4.17	3.91	3.38	2.88	2.38
Banten	-	1.27	1.06	1.72	1.40	1.12	1.32	1.00
Bali	1.15	0.95	1.70	1.11	0.94	0.84	0.74	0.71
West Nusa Tenggara	5.09	5.01	3.81	4.49	5.13	4.49	5.15	3.77
East Nusa Tenggara	15.85	6.48	6.67	6.72	4.87	4.87	4.14	4.74
West Kalimantan	2.14	2.39	2.59	2.72	1.79	1.66	1.55	1.18
Central Kalimantan	1.34	2.04	2.63	2.16	1.68	1.47	1.03	1.02
South Kalimantan	2.78	1.11	2.26	1.28	0.81	1.03	0.73	0.69
East Kalimantan	2.30	2.08	3.27	3.59	1.81	1.61	1.51	1.27
North Sulawesi	2.42	1.54	2.39	3.43	1.88	1.53	1.55	1.14
Central Sulawesi	4.79	4.46	7.97	5.16	4.46	4.33	4.09	3.09
South Sulawesi	3.25	2.78	3.03	2.67	2.60	2.44	2.08	1.91
South East Sulawesi	6.70	4.81	6.37	4.12	4.33	3.74	3.44	3.18
Gorontalo	-	6.20	5.93	6.73	5.57	4.59	4.59	4.14
West Sulawesi	-	-	-	na	2.59	2.63	2.47	1.55
Maluku	10.92	na	4.72	4.44	6.38	5.89	5.59	5.23
North Maluku	-	na	2.15	na	2.23	1.65	1.44	1.47
West Irian Jaya	-	-	-	na	12.97	9.18	9.75	10.47
Papua	16.36	na	9.10	12.74	10.84	10.89	9.07	9.36
National	**4.76**	**3.01**	**2.96**	**3.31**	**2.99**	**2.77**	**2.50**	**2.21**

Source: BPS, 2011

Appendix 1.3 The Regional Squared Poverty Gap Index (in per cent)

Province	Squared Poverty Gap Index							
	1999	**2002**	**2003**	**2005**	**2007**	**2008**	**2009**	**2010**
Nanggroe Aceh D.	0.51	na	1.17	na	1.64	1.50	1.34	1.26
North Sumatera	0.57	0.65	0.48	1.28	0.55	0.58	0.50	0.57
West Sumatera	0.12	0.43	0.72	0.82	0.44	0.39	0.32	0.35
Riau	0.11	0.48	0.27	0.79	0.68	0.40	0.25	0.37
Jambi	0.63	0.71	0.82	0.51	0.54	0.41	0.36	0.23
South Sumatera	0.52	0.95	1.49	1.50	1.14	0.85	0.86	0.71
Bengkulu	0.32	0.83	0.61	1.37	1.00	1.07	0.77	0.69
Lampung	0.79	1.12	1.19	1.34	1.07	1.03	1.12	0.72
Bangka Belitung	-	0.31	0.40	0.82	0.47	0.31	0.31	0.23
Riau Islands	-	-	-	0.92	0.50	0.72	0.77	0.25
DKI Jakarta	0.15	0.07	0.07	0.24	0.12	0.19	0.14	0.11
West Java	1.50	0.56	0.53	0.62	0.57	0.58	0.50	0.52
Central Java	1.89	1.05	0.81	1.13	1.08	0.90	0.74	0.60
DI Yogyakarta	1.02	1.07	0.82	1.26	1.12	0.92	1.04	0.73
East Java	1.81	1.03	1.04	1.47	1.15	0.93	0.76	0.59
Banten	-	0.29	0.24	0.53	0.34	0.28	0.33	0.24
Bali	0.29	0.21	0.42	0.27	0.23	0.18	0.17	0.14
West Nusa Tenggara	1.37	1.28	1.01	1.25	1.54	1.28	1.68	1.01
East Nusa Tenggara	5.73	1.97	2.06	2.18	1.34	1.35	1.14	1.43
West Kalimantan	0.48	0.60	0.73	0.81	0.41	0.42	0.40	0.24
Central Kalimantan	0.32	0.57	0.82	0.63	0.51	0.37	0.22	0.24
South Kalimantan	0.68	0.23	0.64	0.32	0.16	0.27	0.17	0.18
East Kalimantan	0.64	0.54	1.02	1.31	0.46	0.39	0.43	0.34
North Sulawesi	0.71	0.36	0.78	1.21	0.47	0.38	0.36	0.24
Central Sulawesi	1.61	1.21	2.59	1.74	1.38	1.41	1.37	0.80
South Sulawesi	0.81	0.75	0.81	0.68	0.68	0.67	0.55	0.49
South East Sulawesi	2.06	1.44	2.00	1.27	1.21	1.08	0.98	0.89
Gorontalo	-	1.79	2.06	2.29	1.68	1.27	1.27	1.00
West Sulawesi	-	-	-	na	0.57	0.66	0.60	0.35
Maluku	3.39	na	1.27	1.68	1.84	1.75	1.67	1.47
North Maluku	-	na	0.55	na	0.64	0.39	0.36	0.33
West Irian Jaya	-	-	-	na	5.66	3.50	3.57	4.30
Papua	7.35	na	3.39	5.28	3.88	4.01	2.98	3.37
National	**1.41**	**0.79**	**0.83**	**1.07**	**0.84**	**0.76**	**0.68**	**0.58**

Source: BPS, 2011

Appendix 3.1 The Provincial Poverty Line in Indonesia (IDR/Capita/Month)

Province	Urban			Rural			Total		
	2004	**2005**	**2006**	**2004**	**2005**	**2006**	**2004**	**2005**	**2006**
Aceh	141,926	195,882	226,599	124,857	166,608	177,637	129,615	172,084	196,130
North Sumatera	142,966	175,152	209,282	114,214	117,578	156,867	122,414	143,095	180,956
West Sumatera	181,506	175,730	219,990	128,610	125,602	166,062	144,704	140,962	184,266
Riau	198,075	196,892	266,897	164,921	151,718	219,483	179,589	167,620	244,004
Jambi	160,203	187,608	202,612	117,428	122,185	140,453	129,805	141,157	175,959
South Sumatera	154,768	172,684	242,135	108,457	120,331	185,430	124,353	138,444	185,253
Bengkulu	148,156	172,659	191,541	102,335	110,275	124,155	115,569	128,541	164,397
Lampung	146,566	164,909	195,912	108,611	113,728	148,389	117,135	125,319	162,479
Bangka Belitung	162,288	197,082	210,878	143,114	178,701	188,898	151,243	186,531	202,718
Riau Island*	-	231,346	247,540	-	156,453	173,319	-	215,803	210,653
DKI Jakarta	197,306	237,735	295,267	-	-	-	197,306	237,735	295,267
West Java	152,144	151,235	207,233	122,475	113,964	157,664	137,929	133,701	185,702
Central Java	140,391	143,776	193,745	116,998	120,115	160,753	126,651	130,013	176,859
DI Yogyakarta	148,247	160,690	196,406	114,671	130,807	187,521	134,371	148,476	190,693
East Java	138,792	146,743	196,877	119,405	115,272	155,080	127,524	128,598	172,060
Banten	150,384	183,927	217,536	115,988	108,855	140,648	133,534	150,209	185,866
Bali	158,639	166,962	230,636	136,166	136,897	178,359	147,617	152,519	205,936
West Nusa Tenggara	144,001	134,488	140,490	99,686	109,403	120,042	116,145	118,891	149,250
East Nusa Tenggara	142,351	141,168	156,696	94,886	89,764	103,903	102,695	98,263	137,147
West Kalimantan	160,491	164,397	171,289	103,400	109,777	125,852	118,838	124,804	159,291
Central Kalimantan	148,964	161,231	172,517	128,382	125,980	136,949	134,374	136,309	162,696
South Kalimantan	148,413	163,565	176,650	111,821	107,455	125,025	121,879	128,598	163,459
East Kalimantan	163,976	213,378	300,031	170,296	161,910	229,750	165,755	189,851	257,723
North Sulawesi	148,343	150,421	205,685	132,207	118,675	177,246	136,470	130,929	184,597
Central Sulawesi	154,043	173,991	208,494	116,373	121,193	144,379	124,133	131,524	189,386
South Sulawesi	136,222	138,576	170,517	107,309	97,027	123,441	109,979	109,503	148,584
South East Sulawesi	140,925	122,067	170,063	108,260	107,902	154,770	111,018	110,978	172,995
Gorontalo	126,612	135,837	165,585	94,889	115,018	142,331	103,247	120,670	145,578
Maluku	152,194	189,173	202,415	123,769	150,271	166,800	131,654	161,114	171,183
North Maluku	174,000	174,425	184,891	107,142	122,936	140,147	124,713	137,010	149,743
Papua	160,866	193,307	214,739	130,649	145,610	175,237	135,558	157,074	177,977
National	**143,455**	**165,565**	**179,144**	**108,725**	**117,365**	**135,896**	**122,775**	**138,574**	**158,051**

Source: BPS, 2011.

*Note: * until 2004, Riau Island was a part of Riau Province.*

Appendix 4.1 Simulated Changes in Selected Macroeconomic Indicators under Various Changes in the World Rice Prices and the Import Tariffs of Rice (in per cent)

Indicators	Initial Value*	Increase in the World Rice Price					Decrease in the World Rice Price				Decrease in the Import Tariffs of Rice					Increase in the Import Tariffs of Rice				
		20%	40%	60%	80%	100%	20%	40%	60%	80%	20%	40%	60%	80%	100%	20%	40%	60%	80%	100%
Selected Macroeconomic Indicators (Real Value)																				
Private Consumption	23658.74	-0.045	-0.079	-0.107	-0.129	-0.147	0.060	0.148	0.291	0.596	0.001	0.002	0.002	0.002	0.003	-0.001	-0.002	-0.003	-0.005	-0.006
Exports	9988.57	-0.012	-0.022	-0.031	-0.039	-0.047	0.015	0.113	0.221	0.456	0.007	0.015	0.024	0.033	0.042	-0.007	-0.014	-0.020	-0.026	-0.032
Imports	-9169.37	-0.099	-0.161	-0.201	-0.226	-0.242	0.165	0.473	1.176	3.711	0.008	0.017	0.026	0.035	0.046	-0.008	-0.015	-0.022	-0.028	-0.034
Net Indirect Tax	759.45	-0.207	-0.344	-0.439	-0.505	-0.552	0.330	0.928	2.250	6.902	0.022	0.046	0.071	0.097	0.125	-0.021	-0.041	-0.061	-0.079	-0.096
GDP	31444.82	-0.009	-0.019	-0.032	-0.044	-0.055	0.002	-0.015	-0.104	-0.599	0.001	0.001	0.002	0.002	0.002	-0.001	-0.002	-0.003	-0.004	-0.005
Consumer Price Index (CPI)	120.00	0.235	0.331	0.431	0.571	0.662	-0.225	-0.410	-0.717	-1.428	0.037	0.063	0.087	0.100	0.100	-0.010	-0.032	-0.029	-0.053	-0.089
Selected Sectoral Changes**																				
Food Agriculture	2573.5	0.032	0.057	0.078	0.096	0.111	-0.044	-0.102	-0.203	-0.603	-0.007	-0.014	-0.021	-0.029	-0.038	0.006	0.013	0.018	0.024	0.029
Soybeans	108.5	-0.026	-0.047	-0.065	-0.079	-0.092	0.032	0.075	0.098	0.198	-0.001	-0.001	-0.002	-0.004	-0.005	0.000	0.001	0.001	0.001	0.000
Non Food Agriculture	983.1	-0.017	-0.030	-0.042	-0.052	-0.061	0.022	0.053	0.101	0.201	0.003	0.006	0.009	0.013	0.016	-0.003	-0.006	-0.008	-0.011	-0.013
Livestocks	794.7	-0.038	-0.068	-0.092	-0.102	-0.103	0.049	0.100	0.201	0.501	0.004	0.008	0.012	0.016	0.020	-0.004	-0.007	-0.011	-0.014	-0.018
Forestry	278.8	-0.007	-0.012	-0.017	-0.021	-0.025	0.009	0.021	0.042	0.089	0.002	0.003	0.005	0.007	0.009	-0.001	-0.003	-0.004	-0.006	-0.007
Fishery	742.4	-0.017	-0.030	-0.040	-0.049	-0.056	0.023	0.057	0.100	0.300	0.001	0.003	0.004	0.006	0.008	-0.001	-0.003	-0.004	-0.006	-0.007
Rice Industry	1375.4	-0.408	-0.618	-0.930	-1.145	-1.362	0.506	1.110	2.112	4.013	0.052	0.100	0.200	0.200	0.300	-0.050	-0.099	-0.100	-0.200	-0.200
Food and Beverage Industry	4125.8	-0.021	-0.037	-0.051	-0.061	-0.070	0.028	0.067	0.098	0.298	-0.001	-0.002	-0.003	-0.004	-0.005	0.001	0.001	0.001	0.001	0.001
Textile and Garment Industry	1639.6	0.002	0.005	0.008	0.012	0.016	-0.002	-0.003	-0.003	0.004	-0.003	-0.007	-0.010	-0.014	-0.019	0.003	0.006	0.009	0.011	0.013
Chemical Industry	6300.9	0.005	0.010	0.015	0.020	0.025	-0.006	-0.012	-0.017	-0.016	-0.004	-0.008	-0.012	-0.017	-0.022	0.004	0.007	0.010	0.013	0.016
Electricity, Gas and Water	923.4	0.004	0.007	0.010	0.012	0.015	-0.004	-0.009	-0.012	-0.009	-0.003	-0.005	-0.008	-0.011	-0.015	0.002	0.005	0.007	0.009	0.011
Restaurants	2460.5	-0.101	-0.201	-0.302	-0.303	-0.404	0.100	0.301	0.601	1.300	0.010	0.021	0.032	0.043	0.054	-0.010	-0.021	-0.031	-0.041	-0.050
Land Transportation	1121.6	0.001	0.002	0.004	0.006	0.010	-0.001	-0.003	-0.011	-0.053	-0.006	-0.012	-0.018	-0.025	-0.033	0.005	0.010	0.015	0.019	0.023
Banking and Insurances	1961.9	0.012	0.017	0.022	0.027	0.006	-0.008	0.299	0.599	1.199	-0.002	-0.005	-0.007	-0.010	-0.012	0.002	0.004	0.006	0.008	0.010
Government Services	3655.1	-0.004	-0.007	-0.009	-0.011	-0.011	0.006	0.014	0.027	0.050	-0.002	-0.004	-0.006	-0.008	-0.011	0.002	0.003	0.005	0.006	0.007

Source: CGE Simulations

*Note: * value in 10 billion IDR except in Consumer Price Index and ** is the Quantity of Composite (domestic and Imported) Good Supply*

Appendix 4.2 Simulated Changes in Domestic Consumer Price under Various Changes in the World Rice Prices and Import Tariffs of Rice (in per cent)

Commodity	Increase in the World Rice Price					Decrease in the World Rice Price				Decrease in the Import Tariffs of Rice					Increase in the Import Tariffs of Rice				
	20%	40%	60%	80%	100%	20%	40%	60%	80%	20%	40%	60%	80%	100%	20%	40%	60%	80%	100%
Food Croops	-0.001	-0.055	-0.086	-0.155	-0.174	0.101	0.072	0.017	-0.764	0.020	0.030	0.064	0.072	0.070	0.007	0.004	-0.002	0.001	0.001
Soybeans	-0.075	-0.191	-0.307	-0.385	-0.516	0.233	0.321	0.632	0.745	0.039	0.067	0.100	0.200	0.200	-0.010	-0.030	-0.051	-0.063	-0.076
Other Croops	-0.017	-0.080	-0.188	-0.157	-0.277	0.124	0.115	0.124	-0.563	0.023	0.034	0.071	0.082	0.082	0.005	-0.001	-0.008	-0.007	-0.009
Livestock	-0.060	-0.180	-0.288	-0.257	-0.377	0.229	0.315	0.424	0.103	0.026	0.041	0.081	0.095	0.099	0.001	-0.007	-0.018	-0.020	-0.025
Forestry	-0.051	-0.185	-0.196	-0.269	-0.394	0.131	0.218	0.428	0.048	0.030	0.049	0.094	0.100	0.100	-0.002	-0.014	-0.028	-0.033	-0.040
Fishery	-0.069	-0.280	-0.387	-0.456	-0.575	0.229	0.415	0.724	0.836	0.029	0.046	0.089	0.100	0.100	-0.001	-0.013	-0.026	-0.031	-0.038
Oil and Metal Mining	-0.079	-0.302	-0.424	-0.511	-0.651	0.236	0.527	1.039	1.653	0.052	0.095	0.200	0.200	0.200	-0.023	-0.055	-0.087	-0.100	-0.100
Other Mining and Quarrying	-0.073	-0.187	-0.299	-0.374	-0.501	0.231	0.419	0.929	1.542	0.035	0.060	0.100	0.100	0.200	-0.007	-0.024	-0.042	-0.051	-0.062
Rice	2.490	4.600	6.300	8.000	9.400	-2.915	-6.759	-12.068	-20.964	-0.300	-0.700	-1.100	-1.400	-1.900	0.400	0.700	1.000	1.400	1.700
Food and Beverage Industry	-0.074	-0.290	-0.404	-0.382	-0.511	0.232	0.521	0.931	1.444	0.039	0.068	0.100	0.200	0.200	-0.011	-0.031	-0.052	-0.064	-0.078
Textile-clothes-leather Industry	-0.073	-0.188	-0.300	-0.376	-0.503	0.231	0.519	0.929	1.542	0.036	0.062	0.100	0.100	0.200	-0.008	-0.025	-0.044	-0.053	-0.065
Wood Processing Industry	-0.073	-0.188	-0.300	-0.376	-0.503	0.231	0.419	0.929	1.442	0.036	0.061	0.100	0.100	0.200	-0.008	-0.024	-0.043	-0.052	-0.064
Pulp-Paper and Metal Industry	-0.076	-0.295	-0.412	-0.393	-0.527	0.234	0.523	0.934	1.647	0.044	0.078	0.100	0.200	0.200	-0.015	-0.040	-0.065	-0.081	-0.098
Chemical Industry	-0.076	-0.295	-0.413	-0.394	-0.529	0.234	0.523	0.934	1.548	0.044	0.079	0.100	0.200	0.200	-0.016	-0.040	-0.066	-0.082	-0.100
Electricity-Gas-Water	-0.069	-0.179	-0.286	-0.354	-0.472	0.229	0.515	1.023	1.736	0.026	0.042	0.082	0.097	0.100	0.001	-0.007	-0.018	-0.020	-0.024
Constructions	-0.074	-0.189	-0.303	-0.379	-0.508	0.232	0.520	0.930	1.543	0.038	0.065	0.100	0.100	0.200	-0.009	-0.028	-0.048	-0.059	-0.072
Trade	-1.500	-1.600	-1.600	-2.800	-1.600	-2.100	-1.100	-3.400	0.100	-0.400	-0.400	-1.200	-1.200	-0.800	-0.500	-0.700	-0.800	-1.100	-1.400
Restaurants	0.238	0.336	0.440	0.585	0.681	-0.076	-0.394	-0.587	-1.176	-0.016	-0.043	-0.047	-0.078	-0.100	0.042	0.073	0.100	0.100	0.200
Hotels	-0.074	-0.189	-0.303	-0.380	-0.509	0.232	0.420	0.931	1.543	0.037	0.063	0.100	0.100	0.200	-0.008	-0.026	-0.045	-0.055	-0.067
Land Transportation	-0.072	-0.186	-0.298	-0.372	-0.498	0.231	0.519	0.928	1.641	0.034	0.058	0.100	0.100	0.100	-0.006	-0.022	-0.039	-0.047	-0.057
Air-Water Transp. and Telecommunication	-0.071	-0.184	-0.293	-0.365	-0.488	0.230	0.417	0.927	1.539	0.030	0.050	0.096	0.100	0.100	-0.002	-0.015	-0.028	-0.033	-0.040
Warehousing	-0.073	-0.187	-0.299	-0.374	-0.501	0.231	0.419	0.929	1.542	0.034	0.059	0.100	0.100	0.100	-0.006	-0.022	-0.039	-0.048	-0.058
Financial Services	-0.066	-0.172	-0.274	-0.337	-0.349	0.226	0.411	0.919	1.731	0.018	0.024	0.055	0.060	0.053	0.009	0.009	0.006	0.010	0.013
Real Estate	-0.072	-0.285	-0.396	-0.369	-0.493	0.230	0.518	1.028	1.840	0.033	0.057	0.100	0.100	0.100	-0.005	-0.021	-0.037	-0.045	-0.055
Government and Private Services	-0.068	-0.177	-0.282	-0.349	-0.365	0.228	0.413	0.822	1.434	0.022	0.034	0.070	0.081	0.080	0.005	0.000	-0.007	-0.006	-0.008
Individual Services	-0.069	-0.280	-0.287	-0.355	-0.474	0.229	0.515	1.024	1.836	0.028	0.045	0.087	0.100	0.100	0.000	-0.010	-0.022	-0.025	-0.030

Source: CGE Simulations

Appendix 4.3 Simulated Changes in Factor Incomes under Various Changes in the World Rice Prices and Import Tariffs of Rice (in per cent)

Commodity	Increase in the World Rice Price					Decrease in the World Rice Price				Decrease in the Import Tariffs of Rice					Increase in the Import Tariffs of Rice				
	20%	40%	60%	80%	100%	20%	40%	60%	80%	20%	40%	60%	80%	100%	20%	40%	60%	80%	100%
Rural Agricultural Labour	0.012	-0.033	-0.075	-0.086	-0.167	0.083	0.022	-0.095	-1.102	0.017	0.023	0.053	0.057	0.050	0.010	0.010	0.007	0.012	0.015
Urban Agricultural Labour	-0.011	-0.073	-0.130	-0.152	-0.244	0.113	0.099	0.061	-0.754	0.019	0.027	0.060	0.067	0.062	0.008	0.006	0.005	0.004	0.005
Rural Production-Operator-Unskilled Labour	-0.052	-0.136	-0.205	-0.234	-0.330	0.189	0.331	0.668	1.138	0.030	0.050	0.095	0.115	0.126	-0.002	-0.013	-0.026	-0.031	-0.037
Urban Production-Operator-Unskilled Labour	-0.092	-0.208	-0.304	-0.356	-0.472	0.242	0.455	0.906	1.597	0.034	0.057	0.106	0.130	0.145	-0.006	-0.021	-0.037	-0.045	-0.054
Rural sales and administration (semi-skilled) labour	-0.480	-0.909	-1.264	-1.538	-1.844	0.739	1.643	3.165	5.996	0.065	0.120	0.200	0.256	0.301	-0.037	-0.083	-0.131	-0.169	-0.209
Urban sales and administration (semi-skilled) labour	-0.397	-0.758	-1.057	-1.281	-1.545	0.634	1.394	2.696	5.095	0.057	0.103	0.176	0.223	0.259	-0.029	-0.067	-0.107	-0.137	-0.170
rural skilled labour	-0.229	-0.457	-0.647	-0.779	-0.964	0.412	0.853	1.625	2.836	0.039	0.067	0.120	0.148	0.165	-0.011	-0.032	-0.055	-0.070	-0.086
Urban skilled labour	-0.223	-0.446	-0.630	-0.757	-0.937	0.407	0.845	1.622	2.886	0.039	0.067	0.121	0.149	0.167	-0.011	-0.032	-0.055	-0.069	-0.086
Non Labor Factor	0.162	0.264	0.361	0.482	0.524	-0.060	-0.222	-0.267	-0.290	0.000	-0.012	0.001	-0.012	-0.035	0.028	0.046	0.062	0.085	0.106

Source: CGE Simulations

Appendix 4.4 Simulated Changes in Poverty Line under Various Changes in the World Rice Prices and Import Tariffs of Rice

Province	the 2005 Poverty Line (IDR/Month)		Increase (Decrease) in the 2005 Poverty Line Line Under Selected Simulation (Change in IDR/Month)															
			Increase in the World Rice Price				Decrease in the World Rice Price				Decrease in Import Tariffs of Rice				Increase in Import Tariffs of Rice			
			20%		60%		20%		60%		20%		60%		20%		60%	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Nanggroe Aceh D.	195,882	166,608	565.46	532.08	1140.89	1101.13	-421.78	-423.45	-1989.39	-1969.86	-25.7	-28.3	-143.5	-145.3	98.9	92.1	209.0	198.0
North Sumatera	175,152	117,578	505.62	375.49	1020.16	777.08	-377.15	-298.84	-1778.86	-1390.16	-23.0	-20.0	-128.3	-102.6	88.4	65.0	186.9	139.7
West Sumatera	175,730	125,602	507.29	401.12	1023.52	830.11	-378.39	-319.23	-1784.73	-1485.03	-23.1	-21.3	-128.7	-109.6	88.7	69.4	187.5	149.3
Riau	196,892	151,718	568.38	484.52	1146.78	1002.72	-423.96	-385.60	-1999.65	-1793.81	-25.8	-25.8	-144.2	-132.3	99.4	83.8	210.1	180.3
Jambi	187,608	122,185	541.58	390.21	1092.70	807.53	-403.97	-310.54	-1905.36	-1444.63	-24.6	-20.8	-137.4	-106.6	94.7	67.5	200.2	145.2
South Sumatera	172,684	120,331	498.50	384.29	1005.78	795.28	-371.83	-305.83	-1753.79	-1422.71	-22.7	-20.4	-126.5	-105.0	87.2	66.5	184.3	143.0
Bengkulu	172,659	110,275	498.43	352.17	1005.63	728.82	-371.78	-280.27	-1753.54	-1303.82	-22.7	-18.7	-126.5	-96.2	87.2	60.9	184.3	131.0
Lampung	164,909	113,728	476.05	363.20	960.50	751.64	-355.09	-289.05	-1674.83	-1344.64	-21.6	-19.3	-120.8	-99.2	83.2	62.8	176.0	135.1
Bangka Belitung	197,082	178,701	568.93	570.70	1147.88	1181.05	-424.37	-454.18	-2001.58	-2112.84	-25.9	-30.4	-144.4	-155.9	99.5	98.8	210.3	212.4
Riau Island	231,346	156,453	667.84	499.64	1347.45	1034.01	-498.15	-397.64	-2349.57	-1849.79	-30.4	-26.6	-169.5	-136.5	116.8	86.5	246.9	185.9
DKI Jakarta	237,735	-	686.28	-	1384.66	-	-511.90	-	-2414.45	-	-31.2	-	-174.2	-	120.0	-	253.7	-
West Java	151,235	113,964	436.58	363.95	880.85	753.20	-325.65	-289.65	-1535.95	-1347.43	-19.9	-19.4	-110.8	-99.4	76.3	63.0	161.4	135.4
Central Java	143,776	120,115	415.05	383.60	837.41	793.85	-309.59	-305.28	-1460.20	-1420.16	-18.9	-20.4	-105.3	-104.8	72.6	66.4	153.4	142.7
DI Yogyakarta	160,690	130,807	463.87	417.74	935.92	864.52	-346.01	-332.46	-1631.98	-1546.57	-21.1	-22.2	-117.7	-114.1	81.1	72.3	171.5	155.4
East Java	146,743	115,272	423.61	368.13	854.69	761.84	-315.97	-292.97	-1490.33	-1362.90	-19.3	-19.6	-107.5	-100.5	74.1	63.7	156.6	137.0
Banten	183,927	108,855	530.95	347.64	1071.26	719.43	-396.04	-276.66	-1867.98	-1287.03	-24.1	-18.5	-134.7	-94.9	92.8	60.2	196.3	129.4
Bali	166,962	136,897	481.98	437.19	972.45	904.76	-359.51	-347.94	-1695.68	-1618.58	-21.9	-23.3	-122.3	-119.4	84.3	75.7	178.2	162.7
West Nusa Tenggara	134,488	109,403	388.23	349.39	783.31	723.05	-289.59	-278.06	-1365.87	-1293.51	-17.7	-18.6	-98.5	-95.4	67.9	60.5	143.5	130.0
East Nusa Tenggara	141,168	89,764	407.52	286.67	822.22	593.26	-303.97	-228.14	-1433.71	-1061.31	-18.5	-15.3	-103.4	-78.3	71.3	49.6	150.7	106.7
West Kalimantan	164,397	109,777	474.57	350.58	957.51	725.53	-353.99	-279.01	-1669.63	-1297.93	-21.6	-18.7	-120.4	-95.8	83.0	60.7	175.4	130.5
Central Kalimantan	161,231	125,980	465.44	402.33	939.07	832.61	-347.17	-320.19	-1637.47	-1489.50	-21.2	-21.4	-118.1	-109.9	81.4	69.6	172.1	149.7
South Kalimantan	163,565	107,455	472.17	343.17	952.67	710.18	-352.20	-273.11	-1661.18	-1270.48	-21.5	-18.3	-119.8	-93.7	82.6	59.4	174.6	127.7
East Kalimantan	213,378	161,910	615.97	517.07	1242.80	1070.08	-459.46	-411.51	-2167.08	-1914.31	-28.0	-27.5	-156.3	-141.2	107.7	89.5	227.7	192.4
North Sulawesi	150,421	118,675	434.23	379.00	876.11	784.33	-323.89	-301.62	-1527.69	-1403.13	-19.7	-20.2	-110.2	-103.5	75.9	65.6	160.5	141.0
Central Sulawesi	173,991	121,193	502.27	387.04	1013.39	800.98	-374.65	-308.02	-1767.07	-1432.90	-22.8	-20.6	-127.5	-105.7	87.8	67.0	185.7	144.0
South Sulawesi	138,576	97,027	400.04	309.86	807.12	641.26	-298.39	-246.60	-1407.39	-1147.18	-18.2	-16.5	-101.5	-84.6	69.9	53.6	147.9	115.3
South East Sulawesi	122,067	107,902	352.38	344.59	710.97	713.13	-262.84	-274.24	-1239.72	-1275.76	-16.0	-18.3	-89.4	-94.1	61.6	59.6	130.3	128.2
Gorontalo	135,837	115,018	392.13	367.32	791.17	760.16	-292.49	-292.33	-1379.57	-1359.90	-17.8	-19.5	-99.5	-100.3	68.6	63.6	145.0	136.7
West Sulawesi	189,173	150,271	546.10	479.90	1101.82	993.15	-407.34	-381.93	-1921.26	-1776.70	-24.8	-25.5	-138.6	-131.1	95.5	83.0	201.9	178.6
Maluku	174,425	122,936	503.52	392.61	1015.92	812.50	-375.58	-312.45	-1771.47	-1453.51	-22.9	-20.9	-127.8	-107.2	88.0	67.9	186.1	146.1
Papua	193,307	145,610	558.03	465.02	1125.90	962.35	-416.24	-370.08	-1963.24	-1721.59	-25.4	-24.7	-141.6	-127.0	97.6	80.5	206.3	173.0
National	**165,565**	**117,365**	**477.95**	**374.81**	**964.32**	**775.68**	**-356.50**	**-298.29**	**-1681.49**	**-1387.64**	**-21.7**	**-19.9**	**-121.3**	**-102.4**	**83.6**	**64.9**	**176.7**	**139.5**

Source: CGE Simulations

Appendix 4.5 Simulated Changes in Selected Macroeconomic Indicators under Various Changes in the World Soybean Prices and the Import Tariffs of Soybeans (in per cent)

Indicators	Initial Value*	Increase in the World Soybean Price					Decrease in the World Soybean Price				Decrease in the Import Tariffs of Soybeans					Increase in the Import Tariffs of Soybeans				
		20%	40%	60%	80%	100%	-20%	-40%	-60%	-80%	-20%	-40%	-60%	-80%	-100%	20%	40%	60%	80%	100%
Selected Macroeconomic Indicators (Real Value)																				
Private Consumption	23638.23	-0.061	-0.114	-0.159	-0.198	-0.233	0.077	0.175	0.318	0.603	0.002	0.003	0.004	0.006	0.007	-0.002	-0.003	-0.005	-0.007	-0.009
Exports	9995.83	0.013	0.023	0.031	0.039	0.045	-0.016	-0.037	-0.068	-0.116	0.005	0.010	0.015	0.021	0.027	-0.005	-0.009	-0.013	-0.017	-0.021
Imports	-9176.62	-0.102	-0.174	-0.226	-0.265	-0.294	0.151	0.391	0.821	1.860	0.005	0.011	0.017	0.023	0.030	-0.005	-0.010	-0.014	-0.019	-0.023
Net Indirect Tax	761.19	-0.200	-0.345	-0.453	-0.537	-0.602	0.291	0.746	1.553	3.508	0.016	0.034	0.051	0.071	0.091	-0.016	-0.031	-0.045	-0.058	-0.072
GDP	31456.52	-0.013	-0.028	-0.044	-0.059	-0.074	0.006	0.011	0.017	0.022	0.001	0.002	0.003	0.004	0.005	-0.001	-0.003	-0.004	-0.005	-0.007
Consumer Price Index (CPI)	120.00	0.034	0.106	0.188	0.235	0.293	-0.094	-0.127	-0.155	-0.315	-0.019	-0.028	-0.027	-0.030	-0.036	0.029	0.028	0.036	0.036	0.048
Selected Output Changes**																				
Food Agriculture	2572.4	-0.069	-0.105	-0.209	-0.213	-0.318	0.078	0.203	0.303	0.404	0.007	0.014	0.020	0.028	0.035	-0.007	-0.014	-0.020	-0.027	-0.033
Soybeans	108.8	-2.162	-3.712	-5.000	-5.900	-6.700	3.172	8.452	19.040	51.335	0.300	0.700	1.000	1.500	1.900	-0.300	-0.600	-0.900	-1.200	-1.500
Non Food Agriculture	983.7	-0.047	-0.089	-0.107	-0.211	-0.215	0.052	0.102	0.203	0.203	0.007	0.014	0.020	0.028	0.035	-0.007	-0.013	-0.020	-0.026	-0.032
Livestocks	795.4	-0.064	-0.104	-0.207	-0.211	-0.315	0.072	0.202	0.203	0.303	0.006	0.013	0.019	0.026	0.032	-0.006	-0.013	-0.019	-0.025	-0.031
Forestry	278.8	0.025	0.047	0.066	0.083	0.099	-0.029	-0.063	-0.101	-0.101	-0.003	-0.005	-0.008	-0.011	-0.014	0.003	0.005	0.008	0.010	0.013
Fishery	742.8	-0.049	-0.093	-0.106	-0.209	-0.213	0.055	0.102	0.202	0.303	0.005	0.010	0.016	0.021	0.027	-0.005	-0.010	-0.015	-0.020	-0.025
Rice Industry	1383.7	-0.022	-0.042	-0.060	-0.076	-0.091	0.025	0.055	0.088	0.100	0.001	0.001	0.002	0.002	0.002	-0.001	-0.001	-0.002	-0.003	-0.004
Food and Beverage Industry	4126.7	-0.045	-0.086	-0.099	-0.199	-0.198	0.052	0.100	0.200	0.300	0.002	0.003	0.004	0.005	0.006	-0.002	-0.003	-0.005	-0.007	-0.009
Textile and Garment Industry	1639.1	-0.003	-0.005	-0.006	-0.006	-0.006	0.004	0.011	0.023	0.044	-0.003	-0.006	-0.010	-0.013	-0.017	0.003	0.006	0.008	0.011	0.014
Chemical Industry	6298.7	-0.008	-0.014	-0.019	-0.024	-0.027	0.010	0.023	0.042	0.071	-0.003	-0.005	-0.008	-0.011	-0.015	0.002	0.005	0.007	0.009	0.011
Electricity, Gas and Water	923.2	-0.008	-0.015	-0.020	-0.025	-0.029	0.010	0.022	0.038	0.060	-0.001	-0.003	-0.004	-0.006	-0.008	0.001	0.002	0.004	0.005	0.006
Land Transportation	1120.7	0.028	0.055	0.080	0.104	0.127	-0.029	-0.057	-0.078	-0.078	-0.010	-0.021	-0.031	-0.043	-0.055	0.010	0.019	0.029	0.037	0.046
Banking and Insurances	1961.4	-0.004	-0.007	-0.010	-0.012	-0.014	0.005	0.012	0.020	0.033	-0.001	-0.002	-0.003	-0.005	-0.006	0.001	0.002	0.003	0.004	0.004
Government Services	3654.5	-0.006	-0.010	-0.014	-0.017	-0.019	0.007	0.018	0.032	0.056	-0.004	-0.008	-0.012	-0.016	-0.021	0.004	0.007	0.010	0.013	0.016

Source: CGE Simulations

*Note: * value in 10 billion IDR except in Consumer Price Index and ** is the Quantity of Composite (domestic and Imported) Good Supply*

Appendix 4.6 Simulated Changes in Consumer Price Level under Various Changes in the World Soybean Price and Import Tariffs of Soybeans (in per cent)

Commodity	Increase in the World Soybean Prices					Decrease in the World Soybean Prices				Decrease in Import Tariffs of Soybeans					Increase in Import Tariffs of Soybeans				
	20%	40%	60%	80%	100%	-20%	-40%	-60%	-80%	-20%	-40%	-60%	-80%	-100%	20%	40%	60%	80%	100%
Food Croops	0.408	0.849	1.162	1.500	1.800	-0.517	-0.995	-1.483	-2.046	-0.065	-0.100	-0.097	-0.200	-0.200	0.075	0.100	0.200	0.200	0.300
Soybeans	11.500	22.100	31.800	41.100	50.000	-12.927	-27.800	-46.000	-69.000	-1.600	-3.200	-4.700	-6.400	-8.000	1.600	3.100	4.600	6.100	7.600
Other Croops	0.406	0.745	1.055	1.300	1.600	-0.416	-0.893	-1.281	-1.844	-0.059	-0.100	-0.079	-0.200	-0.200	0.069	0.100	0.200	0.200	0.200
Livestock	0.303	0.539	0.844	1.100	1.300	-0.313	-0.690	-1.076	-1.439	-0.053	-0.096	-0.060	-0.200	-0.100	0.063	0.092	0.100	0.200	0.200
Forestry	0.407	0.847	1.158	1.500	1.800	-0.516	-0.994	-1.582	-2.145	-0.064	-0.100	-0.092	-0.200	-0.200	0.074	0.100	0.200	0.200	0.300
Fishery	0.098	0.227	0.324	0.490	0.570	-0.110	-0.284	-0.369	-0.430	-0.034	-0.057	-0.002	-0.092	-0.029	0.044	0.054	0.080	0.085	0.100
Oil and Metal Mining	-0.074	-0.099	-0.150	-0.222	-0.182	0.047	0.123	0.160	0.134	0.013	0.038	0.100	0.100	0.200	-0.001	-0.035	-0.052	-0.088	-0.099
Other Mining and Quarrying	-0.220	-0.415	-0.548	-0.619	-0.783	0.204	0.439	0.760	1.000	0.017	0.044	0.200	0.100	0.200	-0.005	-0.043	-0.065	-0.100	-0.100
Rice	-0.049	-0.045	-0.073	-0.056	-0.032	0.029	0.105	0.243	0.283	-0.014	-0.018	0.058	-0.011	0.073	0.025	0.016	0.023	0.010	0.022
Food and Beverage Industry	-0.044	-0.038	-0.066	-0.051	-0.028	0.018	0.071	0.130	0.093	-0.004	0.004	0.091	0.034	0.100	0.015	-0.004	-0.005	-0.027	-0.024
Textile-clothes-leather Industry	-0.117	-0.207	-0.234	-0.298	-0.354	0.101	0.235	0.454	0.495	0.004	0.018	0.100	0.063	0.200	0.007	-0.018	-0.028	-0.056	-0.060
Wood Processing Industry	-0.101	-0.105	-0.230	-0.293	-0.246	0.082	0.234	0.353	0.393	0.002	0.014	0.100	0.055	0.200	0.009	-0.014	-0.022	-0.048	-0.051
Pulp-Paper and Metal Industry	-0.119	-0.214	-0.246	-0.316	-0.378	0.100	0.238	0.359	0.400	0.011	0.034	0.100	0.096	0.200	0.000	-0.032	-0.048	-0.083	-0.093
Chemical Industry	-0.103	-0.112	-0.244	-0.313	-0.274	0.081	0.238	0.358	0.299	0.010	0.031	0.100	0.090	0.200	0.002	-0.029	-0.043	-0.077	-0.085
Electricity-Gas-Water	-0.217	-0.408	-0.536	-0.601	-0.758	0.202	0.535	0.855	1.096	0.005	0.021	0.100	0.067	0.200	0.006	-0.022	-0.033	-0.065	-0.071
Construction	-0.119	-0.211	-0.342	-0.410	-0.470	0.103	0.337	0.557	0.698	0.010	0.032	0.100	0.091	0.200	0.001	-0.031	-0.046	-0.081	-0.091
Trade	0.600	-0.500	-0.400	-1.500	-2.900	0.286	-0.600	-2.000	-1.300	0.400	0.500	-2.000	0.100	-2.600	-0.700	-0.400	-0.600	-0.200	-0.600
Restaurant	-0.034	-0.016	-0.030	0.001	0.040	0.014	0.073	0.144	0.184	-0.017	-0.024	0.049	-0.024	0.057	0.028	0.022	0.032	0.022	0.036
Hotel	-0.120	-0.213	-0.345	-0.415	-0.477	0.103	0.338	0.559	0.600	0.010	0.030	0.100	0.089	0.200	0.002	-0.030	-0.044	-0.078	-0.088
Land Transportation	-0.219	-0.311	-0.442	-0.510	-0.670	0.203	0.437	0.657	0.898	0.011	0.032	0.100	0.092	0.200	0.001	-0.032	-0.048	-0.083	-0.094
Air-Water Transp. and Telecommunicatio	-0.117	-0.308	-0.436	-0.501	-0.558	0.202	0.335	0.555	0.796	0.005	0.021	0.100	0.067	0.200	0.006	-0.021	-0.031	-0.062	-0.067
Warehousing	-0.118	-0.210	-0.339	-0.406	-0.464	0.102	0.336	0.556	0.697	0.008	0.026	0.100	0.080	0.200	0.004	-0.026	-0.039	-0.072	-0.079
Financial Services	-0.215	-0.403	-0.528	-0.688	-0.740	0.200	0.533	0.852	1.192	-0.001	0.007	0.096	0.039	0.100	0.012	-0.010	-0.015	-0.041	-0.042
Real Estate	-0.218	-0.310	-0.439	-0.505	-0.564	0.202	0.436	0.656	0.797	0.006	0.023	0.100	0.073	0.200	0.005	-0.024	-0.036	-0.067	-0.074
Government and Private Services	-0.214	-0.301	-0.424	-0.483	-0.532	0.199	0.332	0.650	0.890	-0.003	0.005	0.093	0.035	0.100	0.013	-0.007	-0.011	-0.035	-0.035
Individual Services	-0.216	-0.306	-0.432	-0.596	-0.650	0.201	0.434	0.754	0.994	0.003	0.016	0.100	0.058	0.200	0.008	-0.017	-0.027	-0.056	-0.061

Source: CGE Simulations

Appendix 4.7 Simulated Changes in Factor Incomes under Various Changes in the World Soybean Prices and Import Tariffs of Soybeans (in per cent)

Factor Production	Increase in the World Soybean Prices					Decrease in the World Soybean Prices				Decrease in Import Tariffs of Soybeans					Increase in Import Tariffs of Soybeans				
	20%	**40%**	**60%**	**80%**	**100%**	**-20%**	**-40%**	**-60%**	**-80%**	**-20%**	**-40%**	**-60%**	**-80%**	**-100%**	**20%**	**40%**	**60%**	**80%**	**100%**
Rural Agricultural Labour	0.475	0.947	1.343	1.748	2.135	-0.539	-1.139	-1.745	-2.396	-0.076	-0.142	-0.129	-0.263	-0.244	0.086	0.137	0.203	0.249	0.318
Urban Agricultural Labour	0.459	0.916	1.299	1.691	2.067	-0.521	-1.099	-1.679	-2.302	-0.075	-0.140	-0.127	-0.260	-0.240	0.085	0.135	0.201	0.245	0.313
Rural Production-Operator-Unskilled Labour	-0.274	-0.475	-0.694	-0.856	-1.000	0.273	0.611	0.985	1.283	0.026	0.063	0.180	0.154	0.282	-0.014	-0.061	-0.091	-0.140	-0.164
Urban Production-Operator-Unskilled Labour	-0.265	-0.458	-0.668	-0.822	-0.959	0.265	0.594	0.962	1.260	0.022	0.055	0.168	0.138	0.261	-0.010	-0.054	-0.080	-0.126	-0.147
Rural sales and administration (semi-skilled) lal	-0.523	-0.940	-1.347	-1.676	-1.971	0.567	1.253	2.047	2.851	0.026	0.062	0.178	0.149	0.273	-0.015	-0.064	-0.097	-0.149	-0.178
Urban sales and administration (semi-skilled) la	-0.473	-0.847	-1.216	-1.511	-1.774	0.508	1.127	1.840	2.548	0.024	0.059	0.173	0.142	0.264	-0.013	-0.060	-0.091	-0.141	-0.167
Rural skilled labour	-0.203	-0.339	-0.492	-0.591	-0.673	0.203	0.475	0.803	1.107	-0.003	0.004	0.090	0.031	0.125	0.014	-0.006	-0.010	-0.034	-0.034
Urban skilled labour	-0.253	-0.432	-0.626	-0.764	-0.880	0.264	0.591	0.981	1.345	0.004	0.019	0.113	0.062	0.165	0.007	-0.021	-0.032	-0.062	-0.069
Non Labor Factor	-0.228	-0.386	-0.559	-0.677	-0.776	0.228	0.520	0.847	1.100	0.019	0.049	0.160	0.126	0.247	-0.007	-0.048	-0.071	-0.114	-0.131

Source: CGE Simulations.

Appendix 4.8 Simulated Changes in Poverty Line under Various Changes in the World Soybean Price and Import Tariffs of Soybeans

Province	the 2005 Poverty Line (IDR/Month)		Increase (Decrease) in the 2005 Poverty Line Line Under Selected Simulation (Change in IDR/Month)															
			Increase in the World Soybean Price				Decrease in the World Soybean Price				Decrease in the Import Tariffs of Soybeans				Increase in the Import Tariffs of Soybeans			
			20%		80%		20%		80%		20%		80%		20%		80%	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Nanggroe Aceh D.	195,882	166,608	152.31	164.09	749.11	755.82	-227.12	-232.13	-995.08	-1021.80	-48.2	-45.3	-100.5	-102.5	69.5	63.3	104.1	105.0
North Sumatera	175,152	117,578	136.19	115.80	669.84	533.40	-203.09	-163.82	-889.77	-721.10	-43.1	-31.9	-89.9	-72.4	62.2	44.7	93.1	74.1
West Sumatera	175,730	125,602	136.64	123.70	672.05	569.80	-203.76	-175.00	-892.71	-770.31	-43.3	-34.1	-90.2	-77.3	62.4	47.7	93.4	79.1
Riau	196,892	151,718	153.09	149.42	752.98	688.27	-228.30	-211.39	-1000.21	-930.48	-48.5	-41.2	-101.0	-93.4	69.9	57.7	104.6	95.6
Jambi	187,608	122,185	145.87	120.34	717.47	554.30	-217.53	-170.24	-953.05	-749.35	-46.2	-33.2	-96.3	-75.2	66.6	46.4	99.7	77.0
South Sumatera	172,684	120,331	134.27	118.51	660.40	545.89	-200.23	-167.65	-877.24	-737.98	-42.5	-32.7	-88.6	-74.1	61.3	45.7	91.8	75.8
Bengkulu	172,659	110,275	134.25	108.61	660.30	500.27	-200.20	-153.64	-877.11	-676.31	-42.5	-30.0	-88.6	-67.9	61.3	41.9	91.7	69.5
Lampung	164,909	113,728	128.22	112.01	630.66	515.93	-191.21	-158.45	-837.74	-697.49	-40.6	-30.9	-84.6	-70.0	58.5	43.2	87.6	71.7
Bangka Belitung	197,082	178,701	153.24	176.00	753.70	810.68	-228.52	-248.98	-1001.18	-1095.96	-48.5	-48.5	-101.1	-110.0	69.9	67.9	104.7	112.6
Riau Island	231,346	156,453	179.88	154.09	884.74	709.75	-268.24	-217.98	-1175.24	-959.52	-57.0	-42.5	-118.7	-96.3	82.1	59.5	122.9	98.6
DKI Jakarta	237,735	-	184.85	-	909.17	-	-275.65	-	-1207.70	-	-58.5	-	-122.0	-	84.4	-	126.3	-
West Java	151,235	113,964	117.59	112.24	578.37	517.00	-175.36	-158.78	-768.28	-698.94	-37.2	-31.0	-77.6	-70.1	53.7	43.3	80.4	71.8
Central Java	143,776	120,115	111.79	118.30	549.84	544.91	-166.71	-167.35	-730.38	-736.66	-35.4	-32.6	-73.8	-73.9	51.0	45.7	76.4	75.7
DI Yogyakarta	160,690	130,807	124.94	128.83	614.53	593.41	-186.32	-182.25	-816.31	-802.23	-39.6	-35.5	-82.4	-80.5	57.0	49.7	85.4	82.4
East Java	146,743	115,272	114.10	113.53	561.19	522.93	-170.15	-160.61	-745.46	-706.96	-36.1	-31.3	-75.3	-70.9	52.1	43.8	78.0	72.6
Banten	183,927	108,855	143.01	107.21	703.39	493.82	-213.26	-151.67	-934.35	-667.60	-45.3	-29.6	-94.4	-67.0	65.3	41.4	97.7	68.6
Bali	166,962	136,897	129.82	134.83	638.51	621.04	-193.59	-190.74	-848.17	-839.58	-41.1	-37.2	-85.7	-84.3	59.3	52.0	88.7	86.3
West Nusa Tenggara	134,488	109,403	104.57	107.75	514.32	496.31	-155.94	-152.43	-683.20	-670.96	-33.1	-29.7	-69.0	-67.3	47.7	41.6	71.5	68.9
East Nusa Tenggara	141,168	89,764	109.76	88.41	539.87	407.22	-163.68	-125.07	-717.14	-550.52	-34.8	-24.4	-72.4	-55.2	50.1	34.1	75.0	56.6
West Kalimantan	164,397	109,777	127.82	108.12	628.70	498.01	-190.62	-152.95	-835.14	-673.26	-40.5	-29.8	-84.3	-67.6	58.3	41.7	87.4	69.2
Central Kalimantan	161,231	125,980	125.36	124.08	616.60	571.51	-186.95	-175.53	-819.06	-772.63	-39.7	-34.2	-82.7	-77.5	57.2	47.9	85.7	79.4
South Kalimantan	163,565	107,455	127.18	105.83	625.52	487.47	-189.65	-149.71	-830.91	-659.02	-40.3	-29.2	-83.9	-66.1	58.0	40.8	86.9	67.7
East Kalimantan	213,378	161,910	165.91	159.46	816.02	734.51	-247.41	-225.59	-1083.96	-992.99	-52.5	-44.0	-109.5	-99.7	75.7	61.5	113.4	102.0
North Sulawesi	150,421	118,675	116.96	116.88	575.26	538.37	-174.41	-165.35	-764.14	-727.83	-37.0	-32.2	-77.2	-73.0	53.4	45.1	79.9	74.8
Central Sulawesi	173,991	121,193	135.28	119.36	665.40	549.80	-201.74	-168.86	-883.88	-743.27	-42.8	-32.9	-89.3	-74.6	61.7	46.1	92.4	76.4
South Sulawesi	138,576	97,027	107.75	95.56	529.96	440.17	-160.68	-135.19	-703.97	-595.06	-34.1	-26.4	-71.1	-59.7	49.2	36.9	73.6	61.1
South East Sulawesi	122,067	107,902	94.91	106.27	466.82	489.50	-141.54	-150.34	-620.10	-661.76	-30.1	-29.3	-62.6	-66.4	43.3	41.0	64.9	68.0
Gorontalo	135,837	115,018	105.62	113.28	519.48	521.78	-157.50	-160.25	-690.05	-705.40	-33.4	-31.2	-69.7	-70.8	48.2	43.7	72.2	72.5
West Sulawesi	189,173	150,271	147.09	148.00	723.46	681.71	-219.35	-209.37	-961.00	-921.60	-46.6	-40.8	-97.1	-92.5	67.1	57.1	100.5	94.7
Maluku	174,425	122,936	135.62	121.08	667.05	557.70	-202.25	-171.28	-886.08	-753.96	-42.9	-33.4	-89.5	-75.7	61.9	46.7	92.7	77.5
Papua	193,307	145,610	150.30	143.41	739.27	660.56	-224.14	-202.88	-982.00	-893.02	-47.6	-39.6	-99.2	-89.6	68.6	55.3	102.7	91.8
National	**165,565**	**117,365**	**128.73**	**115.59**	**633.17**	**532.43**	**-191.97**	**-163.52**	**-841.07**	**-719.79**	**-40.8**	**-31.9**	**-84.9**	**-72.2**	**58.8**	**44.6**	**88.0**	**74.0**

Source: Authors' calculation based on the CGE result.

Appendix 5.1 Simulated Macroeconomic Indicator and Domestic Production Changes under Various Simulations of Fuel Subsidy Systems and Reallocation Policies (in per cent)

Description	Initial Value	SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Selected Macroeconomic Indicators (Real Value)																					
Private Consumption	23,848.9	-0.02	-0.04	-0.06	-0.09	-0.04	-0.08	-0.13	-0.18	-0.60	-0.79	-0.62	-0.82	-1.26	-1.46	-0.64	-0.83	-0.70	-0.90	-1.45	-1.64
Exports	10,011.0	-0.04	-0.08	-0.12	-0.17	-0.08	-0.16	-0.25	-0.35	-0.14	-0.18	-0.18	-0.22	-0.40	-0.43	-0.22	-0.26	-0.34	-0.38	-0.74	-0.78
Imports	-9,191.8	-0.04	-0.09	-0.14	-0.19	-0.08	-0.17	-0.27	-0.38	-0.16	-0.20	-0.20	-0.24	-0.43	-0.47	-0.24	-0.28	-0.38	-0.42	-0.81	-0.85
Net Income Tax	780.8	0.30	0.62	0.95	1.30	0.61	1.24	1.91	2.61	0.16	0.06	0.48	0.38	1.00	0.90	0.77	0.67	1.73	1.63	3.60	3.50
Gross Domestic Product	31,502.8	-0.02	-0.05	-0.07	-0.10	-0.04	-0.09	-0.14	-0.20	-0.03	-0.03	-0.05	-0.05	-0.12	-0.13	-0.07	-0.07	-0.14	-0.15	-0.32	-0.33
Consumer Price Index (CPI)	120.0	0.16	0.24	0.46	0.77	0.33	0.48	0.92	1.54	0.18	0.13	0.12	0.08	0.54	0.46	0.22	0.17	0.37	0.32	1.31	1.23
Selected Domestic Output Growth																					
Food Croops	2,231.6	0.01	0.02	0.03	0.04	0.02	0.03	0.05	0.07	0.01	0.01	0.02	0.01	0.06	0.05	0.03	0.02	0.05	0.05	0.13	0.12
Livestock	768.5	0.02	0.04	0.05	0.07	0.04	0.07	0.11	0.15	-0.11	-0.15	-0.10	-0.13	-0.19	-0.29	-0.08	-0.12	-0.02	-0.06	-0.04	-0.14
Forestry	270.9	0.02	0.04	0.06	0.08	0.04	0.08	0.12	0.16	0.18	0.27	0.20	0.29	0.39	0.48	0.22	0.30	0.28	0.36	0.55	0.64
Fishery	748.9	0.01	0.02	0.03	0.04	0.02	0.04	0.07	0.09	-0.08	-0.11	-0.07	-0.10	-0.16	-0.18	-0.06	-0.09	-0.03	-0.06	-0.07	-0.10
Oil and Metal Mining	1,497.3	-0.11	-0.22	-0.42	-0.53	-0.22	-0.43	-0.85	-1.06	-0.19	-0.22	-0.30	-0.33	-0.70	-0.71	-0.41	-0.43	-0.73	-0.76	-1.77	-1.77
Other Mining and Quarrying	363.7	-0.02	-0.04	-0.07	-0.09	-0.04	-0.08	-0.13	-0.18	0.54	0.73	0.52	0.71	1.03	1.22	0.51	0.69	0.44	0.63	0.85	1.03
Rice	1,330.6	0.01	0.03	0.04	0.06	0.03	0.06	0.09	0.12	-0.05	-0.08	-0.03	-0.06	-0.07	-0.10	-0.02	-0.05	0.02	0.00	0.05	0.02
Food and Beverage Industry	3,493.4	0.04	0.08	0.12	0.17	0.08	0.16	0.25	0.33	-0.15	-0.17	-0.11	-0.13	-0.23	-0.34	-0.07	-0.09	0.06	0.04	0.10	-0.01
Textile-clothes-leather Industry	1,424.9	0.02	0.04	0.06	0.08	0.04	0.08	0.12	0.15	-0.20	-0.32	-0.18	-0.30	-0.49	-0.50	-0.16	-0.28	-0.10	-0.22	-0.34	-0.35
Wood Processing Industry	415.4	0.04	0.07	0.11	0.15	0.07	0.15	0.22	0.29	0.05	0.12	0.09	0.16	0.12	0.22	0.12	0.19	0.23	0.30	0.42	0.51
Pulp-Paper and Metal Industry	5,097.4	0.02	0.04	0.06	0.09	0.04	0.09	0.13	0.17	0.01	-0.01	0.03	0.02	0.09	0.08	0.05	0.04	0.12	0.10	0.26	0.26
Fuel and Chemical Industry	3,734.6	-0.26	-0.50	-0.80	-1.10	-0.53	-1.00	-1.60	-2.20	-0.38	-0.41	-0.61	-0.64	-1.29	-1.40	-0.90	-0.93	-1.61	-1.64	-3.49	-3.60
Electricity-Gas-Water	921.9	-0.02	-0.04	-0.07	-0.09	-0.04	-0.09	-0.13	-0.19	-0.26	-0.26	-0.28	-0.28	-0.58	-0.68	-0.30	-0.30	-0.37	-0.37	-0.77	-0.86
Construction	5,587.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	1.20	0.90	1.20	1.79	2.09	0.90	1.20	0.90	1.20	1.79	2.09
Restaurant	2,487.4	0.00	-0.01	-0.02	-0.01	-0.01	-0.02	-0.04	-0.02	-0.40	-0.39	-0.40	-0.40	-0.74	-0.81	-0.41	-0.40	-0.42	-0.42	-0.76	-0.83
Ground Transportation	1,089.4	-0.01	-0.03	-0.01	-0.10	-0.02	-0.05	-0.03	-0.20	-0.57	-0.84	-0.59	-0.86	-1.14	-1.41	-0.59	-0.87	-0.64	-0.91	-1.34	-1.61
Financial Services	1,866.8	0.01	0.01	0.02	0.02	0.01	0.02	0.03	0.04	-0.13	-0.13	-0.13	-0.13	-0.26	-0.26	-0.12	-0.12	-0.11	-0.11	-0.22	-0.22
Government and Private Services	3,400.3	0.03	0.07	0.10	0.14	0.07	0.14	0.21	0.28	0.55	0.83	0.58	0.86	1.27	1.35	0.62	0.89	0.72	1.00	1.55	1.63

Source: CGE Simulation Results.

Appendix 5.2 Simulated Price Changes under Various Simulations of Fuel Subsidy Systems and Reallocation Policies (in per cent)

Commodity	SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Food Croops	0.16	0.12	0.30	0.60	0.32	0.24	0.60	1.20	-0.18	-0.46	-0.46	-0.74	-0.72	-1.07	-0.26	-0.53	-0.34	-0.62	-0.12	-0.47
Soybeans	0.04	0.10	0.20	0.50	0.09	0.20	0.40	1.00	0.03	-0.06	-0.06	-0.22	-0.15	-0.03	-0.08	-0.23	0.04	-0.12	0.65	0.47
Other Croops	0.08	0.16	0.35	0.55	0.17	0.32	0.69	1.10	-0.08	-0.34	-0.34	-0.49	-0.33	-0.75	-0.34	-0.49	-0.18	-0.33	0.21	-0.20
Livestock	0.05	0.10	0.20	0.40	0.10	0.20	0.40	0.80	-0.24	-0.52	-0.52	-0.79	-0.74	-1.26	-0.52	-0.79	-0.42	-0.69	-0.34	-0.86
Forestry	0.15	0.20	0.30	0.60	0.30	0.40	0.60	1.20	0.66	0.70	0.70	0.84	1.59	1.69	0.80	0.93	0.90	1.04	2.19	2.29
Fishery	0.13	0.25	0.48	0.70	0.25	0.50	0.95	1.40	-0.51	-0.99	-0.99	-1.57	-1.76	-2.44	-0.99	-1.57	-0.74	-1.32	-1.06	-1.74
Oil and Metal Mining	-0.20	-0.50	-0.70	-0.90	-0.40	-1.00	-1.40	-1.80	-0.71	-0.72	-0.72	-0.91	-1.53	-1.58	-0.62	-0.81	-1.22	-1.41	-2.43	-2.48
Other Mining and Quarrying	-0.30	-0.60	-1.00	-1.10	-0.60	-1.20	-2.00	-2.20	0.34	0.71	0.71	1.19	1.69	2.12	0.71	1.19	0.11	0.59	0.59	1.02
Rice	0.12	0.13	0.35	0.59	0.24	0.27	0.71	1.18	-0.29	-0.66	-0.66	-1.26	-1.25	-1.69	-0.56	-1.16	-0.53	-1.13	-0.67	-1.10
Food and Beverage Industry	0.04	0.00	0.10	0.40	0.07	0.00	0.20	0.80	-0.16	-0.32	-0.32	-0.57	-0.31	-0.58	-0.25	-0.49	-0.32	-0.57	0.09	-0.18
Textile-clothes-leather Industry	0.03	0.10	0.20	0.30	0.07	0.20	0.40	0.60	-0.12	-0.15	-0.15	-0.36	-0.37	-0.51	-0.19	-0.40	-0.05	-0.26	-0.07	-0.21
Wood Processing Industry	0.00	-0.10	-0.01	0.00	0.00	-0.21	-0.02	0.00	0.16	0.41	0.41	0.47	0.87	1.00	0.52	0.58	0.31	0.37	0.87	1.00
Pulp-Paper and Metal Industry	0.04	0.00	0.10	0.30	0.08	0.00	0.20	0.60	0.10	0.11	0.11	0.11	0.41	0.39	0.19	0.19	0.11	0.11	0.71	0.69
Fuel and Chemical Industry	1.40	2.70	4.20	5.80	2.80	5.40	8.40	11.60	2.63	2.51	2.51	2.49	5.44	5.31	2.61	2.59	5.21	5.19	11.24	11.11
Electricity-Gas-Water	0.16	0.10	0.30	0.60	0.33	0.20	0.60	1.20	-0.56	-0.62	-0.62	-0.81	-0.89	-1.11	-0.40	-0.58	-0.52	-0.71	-0.29	-0.51
Construction	0.09	0.10	0.25	0.54	0.19	0.20	0.49	1.08	1.24	1.76	1.76	2.36	4.01	4.67	1.85	2.45	1.86	2.46	4.55	5.21
Trade	-1.90	-1.00	-4.90	-10.40	-3.80	-2.00	-9.80	-20.80	-2.35	-2.20	-2.20	-3.36	-13.75	7.99	-5.00	-6.16	-3.20	-4.36	-24.15	-2.41
Restaurant	0.03	-0.04	0.05	0.18	0.07	-0.08	0.09	0.36	-0.81	-1.02	-1.02	-1.20	-1.78	-2.02	-0.91	-1.09	-1.06	-1.24	-1.60	-1.84
Hotel	0.05	0.01	0.10	0.30	0.11	0.01	0.20	0.60	-0.44	-0.53	-0.53	-0.59	-0.75	-0.76	-0.43	-0.49	-0.52	-0.58	-0.45	-0.46
Ground Transportation	0.19	0.40	0.64	0.93	0.39	0.80	1.28	1.86	0.44	0.50	0.50	0.59	0.92	1.08	0.48	0.58	0.90	0.99	1.85	2.01
Air-Water Transp. And Telecommunication	0.06	0.02	0.14	0.30	0.12	0.04	0.28	0.60	-0.57	-0.64	-0.64	-0.72	-1.09	-1.17	-0.53	-0.62	-0.62	-0.70	-0.79	-0.87
Warehousing	-0.04	-0.18	-0.11	-0.11	-0.07	-0.36	-0.22	-0.21	-0.11	-0.09	-0.09	0.03	0.23	0.18	0.02	0.13	-0.27	-0.15	0.12	0.08
Financial Services	0.04	0.00	0.11	0.18	0.08	0.00	0.22	0.35	-1.01	-1.23	-1.23	-1.40	-2.30	-2.54	-1.14	-1.31	-1.23	-1.40	-2.12	-2.37
Real Estate	0.04	-0.01	0.06	0.26	0.09	-0.03	0.12	0.52	-0.42	-0.55	-0.55	-0.73	-0.96	-1.08	-0.44	-0.63	-0.56	-0.75	-0.70	-0.82
Government and Private Services	0.03	-0.04	0.04	0.17	0.07	-0.09	0.08	0.35	2.16	3.09	3.09	4.22	6.84	7.91	3.20	4.33	3.05	4.18	7.01	8.08
Individual Services	0.04	-0.01	0.04	0.22	0.09	-0.01	0.08	0.44	-0.33	-0.46	-0.46	-0.43	-0.57	-0.58	-0.36	-0.34	-0.46	-0.44	-0.34	-0.36

Source: CGE Simulation Result.

Appendix 5.3 Simulated Factor Income Changes under Various Simulations of Fuel Subsidy Systems and Reallocation Policies (in per cent)

Factor Production	SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Rural Agricultural Labor	0.07	0.04	0.18	0.38	0.14	0.09	0.36	0.76	-0.64	-0.98	-0.67	-1.01	-0.93	-1.42	-0.57	-0.91	-0.63	-0.97	-0.55	-1.04
Urban Agricultural Labor	0.09	0.09	0.25	0.47	0.19	0.17	0.50	0.93	-0.70	-1.08	-0.71	-1.08	-1.02	-1.55	-0.61	-0.98	-0.62	-1.00	-0.56	-1.08
Rural Production-Operator-Unskilled Labor	-0.73	-1.58	-2.29	-2.97	-1.45	-3.15	-4.58	-5.94	0.26	0.59	-0.60	-0.26	-0.92	-0.68	-0.47	-0.14	-2.17	-1.84	-3.89	-3.65
Urban Production-Operator-Unskilled Labor	-0.67	-1.46	-2.11	-2.73	-1.34	-2.92	-4.22	-5.46	0.14	0.42	-0.65	-0.37	-1.04	-0.85	-0.53	-0.24	-2.11	-1.83	-3.77	-3.58
Rural sales and administration (semi-skilled) labor	-0.27	-0.67	-0.93	-1.15	-0.55	-1.34	-1.85	-2.31	0.11	0.53	-0.29	0.13	-0.23	0.07	-0.16	0.25	-0.96	-0.54	-1.39	-1.08
Urban sales and administration (semi-skilled) labor	-0.32	-0.75	-1.05	-1.32	-0.63	-1.51	-2.10	-2.64	0.28	0.70	-0.16	0.26	0.01	0.33	-0.04	0.39	-0.92	-0.49	-1.31	-0.99
Rural skilled labor	-0.07	-0.26	-0.29	-0.28	-0.14	-0.51	-0.57	-0.55	4.97	6.61	4.79	6.42	10.34	11.97	4.90	6.54	4.53	6.17	10.06	11.69
Urban skilled labor	-0.19	-0.49	-0.64	-0.76	-0.37	-0.98	-1.29	-1.52	4.18	5.62	3.88	5.32	8.40	9.81	4.00	5.44	3.39	4.83	7.64	9.05
Non Labor Factor	-0.88	-1.86	-2.68	-3.45	-1.76	-3.73	-5.37	-6.90	-1.17	-1.20	-2.15	-2.19	-3.98	-4.10	-2.05	-2.08	-4.01	-4.05	-7.43	-7.55

Source: CGE Simulation Results.

Appendix 5.4 Simulated Selected Poverty Line under Various Simulations of Fuel Subsidy Systems and Reallocation Policies

Province	Poverty Line 2005		SIM1		SIM2		SIM3		SIM4		SIM6		SIM8		SIM10	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Nanggroe Aceh D.	195,882	166,608	196,117	166,794	196,171	166,825	196,527	167,114	197,095	168,576	194,978	166,455	195,032	165,987	195,063	165,635
North Sumatera	175,152	117,578	175,362	117,709	175,410	117,731	175,728	117,935	176,237	118,967	174,343	117,470	174,392	117,140	174,420	116,891
West Sumatera	175,730	125,602	175,940	125,742	175,989	125,766	176,308	125,984	176,819	127,086	174,919	125,487	174,967	125,134	174,996	124,868
Riau	196,892	151,718	197,128	151,887	197,182	151,916	197,540	152,179	198,112	153,510	195,983	151,579	196,038	151,153	196,069	150,832
Jambi	187,608	122,185	187,833	122,321	187,885	122,344	188,225	122,556	188,770	123,628	186,742	122,073	186,794	121,730	186,824	121,471
South Sumatera	172,684	120,331	172,891	120,465	172,939	120,488	173,252	120,697	173,754	121,752	171,887	120,221	171,935	119,883	171,962	119,628
Bengkulu	172,659	110,275	172,866	110,398	172,914	110,419	173,227	110,610	173,729	111,578	171,862	110,174	171,910	109,864	171,937	109,631
Lampung	164,909	113,728	165,106	113,855	165,152	113,876	165,452	114,074	165,931	115,071	164,148	113,624	164,193	113,304	164,220	113,064
Bangka Belitung	197,082	178,701	197,318	178,900	197,373	178,934	197,731	179,244	198,303	180,812	196,172	178,537	196,227	178,035	196,258	177,657
Riau Island	231,346	156,453	231,623	156,627	231,687	156,657	232,107	156,929	232,779	158,301	230,278	156,309	230,342	155,870	230,379	155,539
DKI Jakarta	237,735	-	238,020	-	238,085	-	238,517	-	239,208	-	236,638	-	236,703	-	236,741	-
West Java	151,235	113,964	151,416	114,091	151,458	114,112	151,733	114,310	152,172	115,310	150,537	113,859	150,579	113,539	150,603	113,298
Central Java	143,776	120,115	143,948	120,249	143,988	120,271	144,249	120,480	144,667	121,534	143,112	120,005	143,152	119,667	143,175	119,413
DI Yogyakarta	160,690	130,807	160,882	130,953	160,927	130,977	161,219	131,205	161,685	132,352	159,948	130,687	159,993	130,320	160,018	130,043
East Java	146,743	115,272	146,919	115,400	146,959	115,422	147,226	115,622	147,652	116,634	146,066	115,166	146,106	114,842	146,130	114,599
Banten	183,927	108,855	184,147	108,976	184,198	108,997	184,532	109,186	185,066	110,141	183,078	108,755	183,129	108,449	183,158	108,219
Bali	166,962	136,897	167,162	137,049	167,208	137,075	167,511	137,313	167,996	138,514	166,191	136,771	166,238	136,387	166,264	136,097
West Nusa Tenggara	134,488	109,403	134,649	109,525	134,686	109,545	134,931	109,736	135,321	110,695	133,867	109,303	133,904	108,995	133,926	108,764
East Nusa Tenggara	141,168	89,764	141,337	89,864	141,376	89,881	141,633	90,037	142,042	90,824	140,516	89,682	140,555	89,430	140,578	89,240
West Kalimantan	164,397	109,777	164,594	109,899	164,639	109,920	164,938	110,111	165,415	111,074	163,638	109,676	163,684	109,368	163,710	109,136
Central Kalimantan	161,231	125,980	161,424	126,120	161,469	126,144	161,762	126,363	162,230	127,468	160,487	125,864	160,531	125,511	160,557	125,244
South Kalimantan	163,565	107,455	163,761	107,575	163,806	107,595	164,103	107,782	164,578	108,724	162,810	107,356	162,855	107,055	162,881	106,827
East Kalimantan	213,378	161,910	213,634	162,090	213,693	162,121	214,080	162,402	214,700	163,822	212,393	161,761	212,452	161,307	212,486	160,964
North Sulawesi	150,421	118,675	150,601	118,807	150,643	118,830	150,916	119,036	151,353	120,077	149,727	118,566	149,768	118,233	149,792	117,982
Central Sulawesi	173,991	121,193	174,199	121,328	174,248	121,351	174,564	121,561	175,069	122,624	173,188	121,082	173,236	120,741	173,264	120,485
South Sulawesi	138,576	97,027	138,742	97,135	138,780	97,153	139,032	97,322	139,434	98,173	137,936	96,938	137,975	96,665	137,997	96,460
South East Sulawesi	122,067	107,902	122,213	108,022	122,247	108,043	122,469	108,230	122,823	109,176	121,504	107,803	121,537	107,500	121,557	107,272
Gorontalo	135,837	115,018	136,000	115,146	136,037	115,168	136,284	115,368	136,678	116,377	135,210	114,912	135,248	114,589	135,269	114,346
West Sulawesi	189,173	150,271	189,400	150,438	189,452	150,467	189,795	150,728	190,345	152,046	188,300	150,133	188,352	149,711	188,382	149,393
Maluku	174,425	122,936	174,634	123,073	174,682	123,096	174,999	123,310	175,506	124,388	173,620	122,823	173,668	122,478	173,696	122,218
Papua	193,307	145,610	193,538	145,772	193,592	145,800	193,943	146,053	194,504	147,330	192,415	145,476	192,468	145,067	192,499	144,760
National	**165,565**	**117,365**	**165,763**	**117,496**	**165,809**	**117,518**	**166,110**	**117,722**	**166,591**	**118,751**	**164,801**	**117,257**	**164,847**	**116,928**	**164,873**	**116,680**

Source: Author's calculations based on CGE results.

Appendix 6.1 Simulated Price Changes under the Short Run and Long Run Condition (in per cent)

Commodity	The Short Run Condition				The Long Run Condition			
	SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%		SIM1 CIT Decreases from 30% to 25%		SIM2 CIT Decreases from 30% to 23.5%	
	0.250	**0.375**	**0.250**	**0.375**	**0.250**	**0.375**	**0.250**	**0.375**
Food Croops	-0.046	-0.019	-0.048	-0.023	-0.683	-0.418	-0.684	-0.419
Soybeans	-0.136	-0.058	-0.143	-0.071	-1.813	-1.103	-1.818	-1.107
Other Croops	-0.089	-0.036	-0.092	-0.044	-2.513	-1.520	-2.515	-1.522
Livestock	-0.105	-0.043	-0.109	-0.052	-0.554	-0.338	-0.554	-0.338
Forestry	-0.180	-0.074	-0.187	-0.089	-1.964	-1.193	-1.966	-1.194
Fishery	-0.183	-0.075	-0.191	-0.091	-0.572	-0.349	-0.572	-0.349
Oil and Metal Mining	-0.258	-0.107	-0.269	-0.130	-0.754	-0.457	-0.752	-0.456
Other Mining and Quarrying	-0.103	-0.042	-0.107	-0.051	-3.167	-1.909	-3.170	-1.912
Rice	-0.095	-0.040	-0.099	-0.048	-0.714	-0.437	-0.715	-0.438
Food and Beverage Industry	-0.146	-0.059	-0.151	-0.071	-0.764	-0.463	-0.763	-0.462
Textile-clothes-leather Industry	-0.173	-0.065	-0.177	-0.078	-0.722	-0.417	-0.706	-0.401
Wood Processing Industry	-0.111	-0.035	-0.111	-0.042	-0.696	-0.395	-0.676	-0.374
Pulp-Paper and Metal Industry	-0.199	-0.083	-0.208	-0.100	-0.743	-0.450	-0.742	-0.449
Chemical Industry	-0.218	-0.091	-0.227	-0.111	-0.694	-0.422	-0.694	-0.422
Electricity-Gas-Water	-0.226	-0.094	-0.236	-0.114	-1.538	-0.936	-1.539	-0.936
Constructions	-0.179	-0.074	-0.187	-0.090	-10.685	-6.194	-10.694	-6.201
Restaurants	-0.113	-0.046	-0.118	-0.056	-0.537	-0.327	-0.537	-0.327
Hotels	-0.175	-0.071	-0.181	-0.085	-0.995	-0.603	-0.993	-0.601
Land Transportation	-0.145	-0.060	-0.151	-0.073	-1.201	-0.731	-1.202	-0.732
Air-Water Transp. And Telecommunication	-0.204	-0.085	-0.212	-0.103	-1.650	-1.001	-1.652	-1.003
Warehousing	-0.160	-0.066	-0.167	-0.081	-3.900	-2.317	-3.906	-2.322
Financial Services	-0.214	-0.089	-0.223	-0.108	-1.056	-0.645	-1.058	-0.646
Real Estate	-0.219	-0.092	-0.229	-0.111	-3.002	-1.805	-3.006	-1.809
Government and Private Services	-0.082	-0.033	-0.085	-0.041	-1.224	-0.747	-1.225	-0.747
Individual Services	-0.174	-0.072	-0.182	-0.087	-0.797	-0.486	-0.798	-0.486

Source: CGE Simulations

Appendix 7.1 The Estimation Results of Multinomial Logistic Regression (Never Poor as Reference)

Variable	Chroic Poor		Transient Poor (-)		Transient Poor (+)	
	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error
Demographic Variables in 2005						
1. Marrital Status of Household Head (1 = marriage; 0= others)	-0.225	0.212	-0.293*	0.156	-0.142	0.131
2. Age of Household Head (in years)	0.004	0.006	-0.004	0.004	0.006*	0.004
3. Education Attainment of Household Head (years of schooling)	-0.100***	0.019	-0.068***	0.014	-0.052***	0.010
4. Size of Household Member (number of people)	0.554***	0.043	0.336***	0.036	0.391***	0.028
5. Dummy of Island (1= Java and Bali; 0= outside Java and Bali)	0.899***	0.165	0.567***	0.119	0.135	0.095
6. Dummy of Location (1= Urban; 0= Rural)	-2.449***	0.311	-2.263***	0.204	0.069	0.103
Socio-Economic Variables in 2005						
7. Working Sector of Household Head (1= agricultural sectors; 0= others)	1.156***	0.172	0.573***	0.122	0.671***	0.108
8. Employment Status (1= formal sectors; 0= others)	-0.563*	0.299	-0.737***	0.236	-0.523***	0.140
9. Land Ownership (in hectare)	-0.519***	0.080	-0.047	0.039	-0.110**	0.043
10. Size of House (in square meter)	-0.003*	0.002	-0.005***	0.001	-0.009***	0.003
11. Household with a Family Member Working as Migrant Workers (TKI) (1= having TKI; 0= others)	-0.452	0.328	-0.347	0.237	-0.320	0.213
12. Access to Electricity for Illuminating Energy (1= no access to electricity; 0= having access to electricity)	1.733***	0.202	0.775***	0.153	0.664***	0.152
Shocks & Risks and Policy Variables in 2005						
13. Economic Shocks and Risks (1= disaster, price falls, crop loss, job loss, bankruptcy, etc., 0= no experiences)	0.115	0.161	0.197*	0.119	0.127	0.107
14. Cheap Rice (RASKIN) as A Safety Net to Cope with Shocks and Risks (1= receiving RASKIN; 0= not receiving)	-0.041	0.469	-0.104	0.423	0.612**	0.303
15. Daily Activities Disrupted by Health Problems for All Family Members (days in a month)	0.018***	0.006	0.002	0.006	0.003	0.005
16. Insurance to Cope with Health Problems (1= having Poor Targeted Health Insurance (ASKESKIN); 0= others)	0.703*	0.396	0.863*	0.325	0.529*	0.312

Appendix 7.1 Continued

Appendix 7.1 The Estimation Results of Multinomial Logistic Regression (Never Poor as Reference) Continued

Variable	Chroic Poor		Transient Poor (-)		Transient Poor (+)	
	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error	Coeff.	Robust Std. Error
Shocks & Risks and Policy Variables in 2005 (Continued)						
17. Saving as Coping Strategy to Cope with economic risks and health shocks (1= having saving; 0= no saving)	-1.056	0.750	-1.391**	0.556	-0.212	0.290
18. Microcredit (1= receiving microcredit; 0= no credit)	-14.784***	0.199	-0.189	0.367	-0.577	0.390
19. Source of Microcredit (1= government; 0= others)	0.119	0.300	0.030	0.625	-0.198	0.648
20. Family Member Getting Jobs (1= getting job; 0= others)	-0.433*	0.269	-0.633***	0.232	0.106	0.137
21. Improvement of Public Facilities in Surronding Living Area (1= improving; 0= others)	0.226	0.199	-0.159	0.173	-0.254*	0.149
Change Variables during 2005-2007						
22. Change in Size of Household Member	0.238***	0.039	0.393***	0.031	-0.063**	0.029
23. Change in Marrital Status (1= divorce; 0= others)	0.379	0.293	0.275	0.236	0.030	0.172
24. Change in Working Sectors (1= Agriculture Sectors to Non-Agriculture Sectors; 0= others)	-0.513**	0.206	-0.440**	0.158	-0.244**	0.128
25. Change in Employment Status (1= Formal Sectors to Non-Formal Sectors; 0= others)	0.575*	0.348	1.042***	0.261	0.071	0.189
26. Change in Access to Electricity for Illuminating Energy (1= getting access in 2007 but not in 2005; 0= others)	-0.498**	0.246	-0.455**	0.217	0.427**	0.172
27. Change in Credits (1= receiving credit in 2007 but not in 2005; 0= others)	-1.138***	0.371	-0.637***	0.244	-0.261	0.182
Constant	-5.469***	0.440	-3.055***	0.308	-3.571***	0.266
Number of Observation	**8,726**					
Log Pseudolikelihood	**4,788.66**					
Wald Chi-Square (28)	**12,351.95**					
Pseudo R-Square	**0.1637**					

Source: Author's Estimation