Chapter 8

Impact of Fuel Subsidy Removal on Government Spending

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CHAPTER 8

Impact of Fuel Subsidy Removal on the Indonesian Economy

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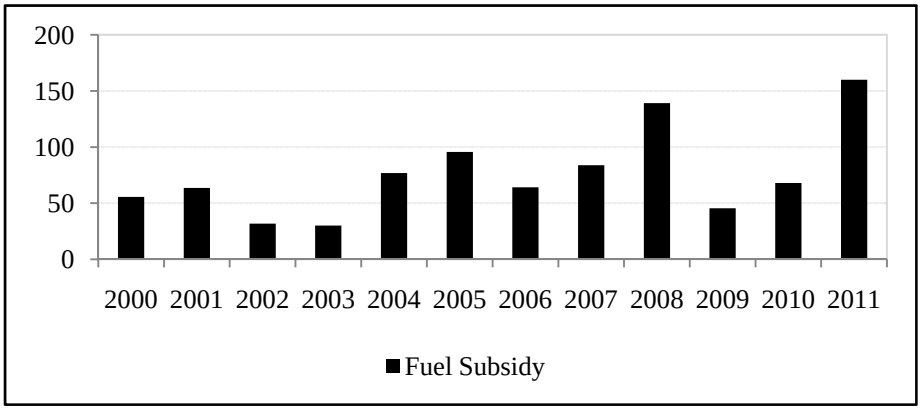
This research aims to analyze the impacts of fuel subsidy removal on Indonesian economy. Social Accounting Matrix (SAM) is applied to simulate the impact. The simulation shows that removal of fuel subsidy affected income distribution of households, firms, and governments. The impact of reallocation of subsidy to four targeted sectors- i.e. Agriculture; Trade; Food, Beverage, and Tobacco Industry; and Education and Health- would be relatively smaller than that of fuel subsidy removal. Some policy implications can be withdrawn. First, for the reasons of long-term efficiency, competitive advantage and manageable economic, social and political instability, the Goverment of Indonesia (GoI) should have clear, long-term, "sceduled" and "gradual" program of fuel subsidy reduction, not the "big-bang" total removal of the fuel subsidy. Second, the GoI could consider the certain amount of subsidy which is adjusted with the increase of goverment fiscal capacity, and let the domestic fuel price fluctuated as the ICP fluctuated. Societies (both domestic consumers and producers) will learn rationally and adjust logicly with the fluctuation of domestic fuel price. Third, the GoI should not consider the "sectoral approach" to reallocate the fuel subsidy. The GoI should consider programs such as "targeted fuel subsidy" to correct the misallocation the fuel subsidy ("subsidy is for the poor").

1. Introduction

This research starts with evidence that fuel subsidy has been a poor policy tool for the Government of Indonesia (henceforth, GoI). *First*, the fuel subsidy scheme enacted since 1967 is implemented to particular goods, i.e. fuels, as opposed to subsidy transferred to targeted households or industries (Pradiptyo & Sahadewo, 2012a). *Second*, there has been no restriction on the purchase of subsidized fuel in retail outlets. Every household, both poor and rich, has equal chance to buy subsidized fuel (IEA, 2008).

Figure 1: Fuel Subsidy in Indonesia, 2000-2011 (IDR trillion).



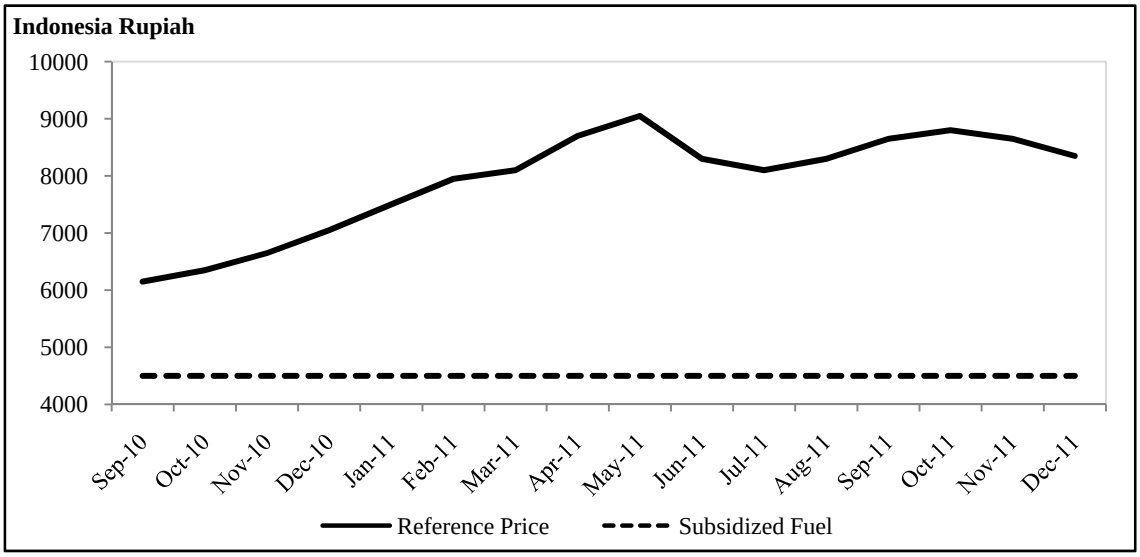
Source: Calculated from Ministry of Energy and Mineral Resources (2010) and APBN-P 2011.

The consequence of this policy, in terms of efficiency in resource allocation, has been unequal distributive effects. The Coordinating Ministry for Economic Affairs of Indonesia (2008) and the World Bank (2009, 2011a, 2011b) showed that the subsidy has been a crowd pleaser for particular socio-economic groups; the distribution of fuel subsidy is skewed to wealthy households.

Fuel subsidy has also imposed persistent pressure on GoI fiscal aspects (Pradiptyo & Sahadewo, 2012a). The Ministry of Energy and Mineral Resources (2010) recorded increasing trends in gasoline subsidy expenditure in the last decade (Figure 1 and 2). The revised expenditures for subsidy in 2011 accounted for 129.7 Indonesian rupiah (henceforth, IDR) trillion, higher than the planned IDR 95.9 trillion. The realization of

fuel subsidy expenditure at the end of 2011, however, amounted to an estimated IDR160 trillion.

Figure 2: The Price of Subsidized and Non-subsidized Fuel, 2010-11.



Source: Calculated from Pertamina (2012) and Ministry of Energy and Mineral Resources (2010).
Notes: Reference price refers to Pertamax recorded every month in the 15th day

Fuel subsidy also hinders the ability of ministries to expand their expenditure function to some extent. Tables 1 and 2 show that fuel subsidy expenditure is 8.5 times (or 850% higher than) food subsidy expenditure in 2011. The ratios are even starker in comparison with other types of subsidy including agriculture related subsides, Public Service Obligations (PSO), and Credit Assistance for micro and small enterprises Which are proactive in improving the conditions of poor and low-income households.

Fuel subsidy also imposes adverse effects on energy allocation and investment. Fuel subsidy drives excessive consumption and inefficient use of energy. Price difference between subsidized and non-subsidized fuel creates opportunities for smuggling. BPH Migas reported that 10 to 15 percent of subsidized fuels are redistributed illegally to industry particularly in industrial zones and mining area (GSI, 2011). These phenomena lead to distortion in the efficient allocation of energy and resources. The low prices of fuel due to the subsidy create disincentives for investment in energy diversification. Mourougane (2010) suggested that subsidy hinders investment in infrastructure for energy infrastructure.

Table 1: Subsidy Expenditure in Indonesia, 2005-2012.

Subsidy Expenditure	2005	2006	2007	2008	2009	2010	2011 APBN-P	2012 APBN
Energy								
Fuel subsidy (A)	95.6	64.2	83.8	139.1	45	82.4	129.7	123.6
Electricity	8.9	30.4	33.1	83.9	49.5	57.6	65.6	45
Total Energy (1)	**104.5**	**94.6**	**116.9**	**223**	**94.5**	**140**	**195.3**	**168.6**
Non-energy								
Food	6.4	5.3	6.6	12.1	13	15.2	15.3	15.6
Fertilizer	2.5	3.2	6.3	15.2	18.3	18.4	18.8	16.9
Plant seed	0.1	0.1	0.5	1	1.6	2.2	0.1	0.3
Public Service Obligation	0.9	1.8	1	1.7	1.3	1.4	1.8	2
Credit assistance	0.1	0.3	0.3	0.9	1.1	0.8	1.9	1.2
Tax subsidy	6.2	1.9	17.1	21	8.2	14.8	4	4.2
Other subsidy	0	0.3	1.5	0.3	0	0	0	0
Total Non-Energy (2)	**16.2**	**12.9**	**33.3**	**52.2**	**43.5**	**52.8**	**41.9**	**40.2**
Total Subsidy Expenditure (3=1+2)	**120.7**	**107.5**	**150.2**	**275.2**	**138**	**192.8**	**237.2**	**208.8**
Ratio (%) Fuel Subsidy/Total Subsidy (=A/3)	**79.2**	**59.7**	**55.8**	**50.5**	**32.6**	**42.7**	**54.7**	**59.2**

Source: Calculated from Coordinating Ministry of the Economy and Bank Indonesia, 2011.

Note: Subsidy expenditures from 2005 to 2010 are obtained from LKPP (Central Government Financial Report) where subsidy expenditure in 2011 is obtained from Revised APBN (National Revenue and Expenditure Budget).

It is envisaged that the government will eliminate fuel subsidy due to increasing fiscal pressure in coming years. This reform will certainly bring structural changes in the economy both for the government and for households. These structural changes should be evaluated to determine the extent of the impact on the economy.

Short-run impact of fuel subsidy removal to the economy is quite complex. Price levels will increase as prices of goods and services adjust. Output will also adjust given certain groups of households will reallocate their spending to compensate extra spending on fuel. Firms will keep their output level and prices will remain unchanged but firms will receive fewer margins per output produced.[1]

Fuel subsidy removal will certainly improve government budget. Expenditure-wise, the government will have more room for various fiscal policies from subsidy removal. The government should reallocate this extra budget to each sector accordingly.

[1] Assuming monopolistic competition in standard microeconomic foundation for macroeconomics.

The government, however, must simulate the effect on the economy of subsidy removal. Evidence obtained from impact simulation will be essential in providing guidelines regarding reallocation scheme. Unfortunately, there has been little research undertaken on the effect of the fuel subsidy removal to inform policy consideration. Specifically, there has been a paucity of consideration regarding the counterfactuals of phasing or removal of the fuel subsidy.

Table 2: Ratio of Fuel Subsidy to Other Subsidies, 2005-2012.

Ratio of Fuel Subsidy to Other Subsidy	2005	2006	2007	2008	2009	2010	2011 APBN-P	2012 APBN
Food	14.9	12.1	12.7	11.5	3.5	5.4	8.5	7.9
Fertilizer	38.2	20.1	13.3	9.2	2.5	4.5	6.9	7.3
Plant seed	956.0	642.0	167.6	139.1	28.1	37.5	1297.0	412.0
Public Service Obligation	106.2	35.7	83.8	81.8	34.6	58.9	72.1	61.8
Credit assistance	956.0	214.0	279.3	154.6	40.9	103.0	68.3	103.0
Tax subsidy	15.4	33.8	4.9	6.6	5.5	5.6	32.4	29.4

Source: Calculated from Coordinating Ministry of the Economy and Bank Indonesia, 2011.
Note: Subsidy expenditures from 2005 to 2010 are obtained from LKPP (Central Government Financial Report) where subsidy expenditure in 2011 is obtained from Revised APBN (National Revenue and Expenditure Budget).

The objective of this research is to construct general equilibrium analysis based on Indonesian Social Accounting Matrix (SAM). This analysis will be utilized to simulate the impacts of existing fuel subsidy scheme on the distributional broad-spectrum macroeconomic and microeconomic variables (Defourny & Thorbecke, 1984)—such as output, national income sectoral multiplier, employment, and household income in both agricultural and non-agricultural sector Output, Gross Domestic Product (GDP) and Income. Further, the analysis will also be utilized to simulate the impact of fuel subsidy removal on the distributional aspect of macro- and microeconomic variables.

The report is organized in five sections. The second section reviews relevant literatures subsequent to the introduction in the first section. The third section discusses data and methodology of constructing Social Accounting Matrix. The fourth section considers the results of the analysis. The fifth section is dedicated for discussions regarding the results of the analysis.

2. Literature Review

2.1. Fuel subsidy in Indonesia

Subsidy for consumption of energy is a common feature in developing countries. Such subsidy is defined as "any government action that lowers the cost of energy production, raises the revenue of energy producers, or lowers the price paid by energy consumers" (IEA, OECD, and World Bank, 2010, cited in GSI, 2011). In the case of Indonesia, energy subsidy is defined as government action that lowers the price paid by consumers thus referred to as consumer subsidies.

Energy subsidies would be theoretically justified if the subsidies improved social welfare (Elis, 2010). The GoI first implemented the fuel subsidy scheme owing to high revenue generation from the oil sector. The GoI felt that the people should receive benefit from the common resources by implementing the fuel subsidy (Pradiptyo & Sahadewo, 2012b). The scheme was also implemented to promote economic growth.

Fuel subsidy scheme in Indonesia, at least in the last eight years, is no longer sustainable. First, since 2004 Indonesia was no longer a net oil-exporting country. Thus, an increase in international crude price (ICP) would create oil trade deficit. The fuel subsidy scheme also distorts the efficient allocation of resources (GSI, 2011; Pradiptyo & Sahadewo, 2012a). GSI (2011), in particular, emphasized that the fuel subsidy encourages overconsumption and inefficient use of fuel.

The cost of the fuel subsidy scheme to the economy is tremendous particularly considering the increase of risk in the GoI's fiscal condition. *First*, the accounting cost of the subsidy to the GoI budget, as shown in Table 1, had increased tremendously as Indonesia has become a net fuel importer. The subsidy schemes impose budgetary pressures owing to vulnerability in ICP, and political difficulties and economic constraints in increasing the price of subsidized fuel. *Secondly*, the subsidy schemes impose opportunity cost to strategic poverty alleviation programs and infrastructure developments, as well as investment in renewable fuel alternatives.

The GoI pursues fuel subsidy reform in order to minimize the distortions and budgetary pressures. The reform, particularly removal of fuel subsidy, would be difficult as fuel prices are embedded in households and firms' optimization problem.

Removal of subsidy would impose negative impacts particularly to poor and medium-income households.

2.2. Previous Attempts to Phase Out or Eliminate Fuel Subsidy in Indonesia

Since its independence in 1945, subsidies have been a common feature in Indonesia‘s economy (Beaton & Lontoh, 2010). Beaton & Lontoh (2010) note that since the first presidential reign of Soekarno, the GoI has always attempted to stimulate economic development by prompting the private sector—using public sector spending. Other spending, which include transfer payment such as subsidies (typically on energy and rice), were used as a way to protect people from the effects of inflation. The amount of subsidy, especially fuel subsidy, had always been large. Beaton & Lontoh (2010) state that, in 1965, fuel subsidies represented approximately 20% of the country’s total spending.

In 1966, the rise of the New Order, led by Suharto, did not herald an end to the heavy subsidizing regime (Beaton & Lontoh, 2010). The new reign continued to oversee prices for fuel, electricity, urban transport and drinking water. Beaton & Lontoh (2010) reported, that as goods’ price increases did not match rises in costs, government had to bear a high fiscal pressure. Having to stimulate growth even more, Beaton & Lontoh state that government then started to solicit foreign aid and loans, and liberalize capital flow by offering investors generous incentives on investment packages in the Foreign Investment Act in 1967.

Following the Asian crisis in 1998, Soeharto was forced to sign up to an agreement with the IMF in order to qualify for an emergency loan. Beaton & Lontoh (2010) note that the agreement included dismantling of state and private monopolies and the reduction of subsidies to basic commodities. At the beginning of May 1998, the GoI announced large price increases for fuel and electricity. However, even after the New Order regime collapsed, subsidy was not easily phased out. There are several constraints restricting the GoI efforts to phase out subsidies: economic (e.g., inflation and hoarding), political, social, and behavioral.

2.2.1. Constraints in implementing policy to phase out fuel subsidy

There has been wide and prolonged debate on whether governments should reduce or remove fuel price subsidies. Removing fuel price subsidies, according to Burniaux &

Chateau (2011) would bring both economic and environmental benefit. In their study, Burniaux & Chateau (2011) suggested that if non-OECD countries were removing fuel price subsidy, most countries or regions exemplify welfare gains ranging from 0.3%, while the oil-exporting countries gains more than 4% by 2050. They added that the welfare gains associated with subsidy removal are accompanied, in most cases, by a more efficient allocation of resources across sectors. Bacon & Kojima (2006) conveyed that, while subsidy on fuel prices helps the poor, it is at a large cost to government and society. They also suggested that it is crucial for government to search for policies to move away from fuel price subsidies as rapidly as possible and switch to policies targeting assistance to the poor.

The four main constraints in removing fuel price subsidy such are prices hike, hampered growth, speculation and hoarding, and political turmoil. In Indonesia, the GoI has constantly encountered these problems. When deciding to reduce fuel subsidy in October 2005, Bacon & Kojima (2006) report that it resulted in extra purchasing and hoarding—with a significant drop in purchasing immediately after the price rise took effect. Because the October 2005 price increase was signaled beforehand, the extra purchasing and hoarding perniciously affected prices even before the policy was being implemented. Regarding speculation and hoarding, Bacon & Kojima (2006) also mentioned that, while short-term price elasticity of fuel demand is low, fuel hoarding and smuggling responds instantly to price changes.

Bacon & Kojima (2006) suggest that large fuel price increases exacerbate the gap between non-subsidized prices and subsidized prices, and when the gap is sufficiently large, causes localized shortages and black market pricing of subsidized fuels. Furthermore, because petroleum products are easy to store and transport, another problem arises where a neighboring country charges lower prices; phasing out fuel subsidy creates strong incentive to smuggle in the subsidized fuel from abroad for resale at domestic higher prices.

Apart from inflation, phasing out subsidy has always been a dilemmatic, as growth may be hampered. Because growth is necessary, governments understand that fuel and other energy must be affordable. In other words, they have to be cheap because fuel is critical to modern economies. Fuel is an essential component of a modern functioning economy. In Indonesia, this view seems to be plausible as subsidy removal reduces real

output by 2% in the short-term (Clement, *et al.*, 2007). However, these research findings are contradictory to research conducted by Hope & Singh (1995) which indicates that a reduction of fuel subsidy stimulates higher growth. Other research conducted by IEA (1999 cited in Mourougane, 2010) suggests that Indonesia would actually gain a 0.24% increase in GDP if fuel subsidy were removed.

As inflation, hoarding, and slower growth might hurt the economy in a direct fashion, fuel price increases have also, historically, sparked large and sometimes violent social and political turmoil. The public has always responded negatively to plans regarding subsidy removal. Rampant protests are not common during the policy initiation. Analysts described fuel demonstrations as being symbolic of a wider public dissatisfaction with the GoI, particularly with regard to corruption and inefficiency perceived to permeate political and bureaucratic life in Indonesia (Bacon & Kojima, 2006). Bacon & Kojima (2006) suggest that society views and judges subsidy reductions against the background of other government decisions, which appeared to favor powerful interests and thus become difficult to administer.

2.2.2. Benefit of subsidy removal

Bacon & Kojima (2006) argue that six months after the fuel price increase in October 2005 the fuel consumption declined. They add that the higher price of fuel and dramatic fall in the vehicle sales is certain to have an effect on the growth of fuel consumption. The reduction in fuel consumption and subsidy eased fiscal pressure endured by government. However, Burniaux & Chateau (2011) note that for countries to achieve gains originating from an increase of consumer welfare, they should use more efficient resource reallocation policies. Similarly, Bacon & Kojima (2006) argue that government should develop policies which target poor households.

Further, not only reducing fuel consumption inefficiencies, phasing out fuel subsidies also have profound environmental benefits. The environmental benefit of reducing or removing fuel price subsidies can be seen from two aspects. *First*, phasing out fossil fuel subsidies would cut emissions—which would be beneficial for air quality and thus human health. At the G20 Leaders Summit in September 2009, summit leaders proclaimed that they would commit to "rationalize and phase out over the medium term inefficient fossil fuel subsidies that encourage wasteful consumption" (Burniaux &

Chateau, 2011). Burniaux and Chateau (2011) added that this commitment was conveyed after joint research by OECD and IEA, which had reached conclusions that the phasing out fossil-fuel subsidies[2] in some non-OECD countries would reduce world Greenhouse Gas (GHG) emissions by 10 percent in 2050.

Second, phasing out fuel subsidy would level the playing field of renewable energy. As stated in several articles, a large discrepancy between fossil fuel and renewable energy price creates disincentives on renewable energy. Reducing or removing fuel price subsidy would then allow for rapid transition from fossil fuel to renewable energy (Guerrerio, 2010). Guerrerio (2010) added that funds arising from fuel subsidy could be redirected to clean energy subsidy and other environmental programs designed to mitigate environmental degradation.

2.3. The Economics Modeling Approaches

Elis (2010) suggests two economic modeling approaches to study the impact of subsidy reform: partial- and general-equilibrium modelling. Von Moltke, *et al.* (2004) suggest that partial-equilibrium model considers the changes in energy markets, such as changes in price, demand, and production, because of subsidy reform. Such a model is not suitable for the case of Indonesia since the price of fuel is pegged at certain level and, therefore, not enough variation in price for the model to capture any correlation with demand and production.

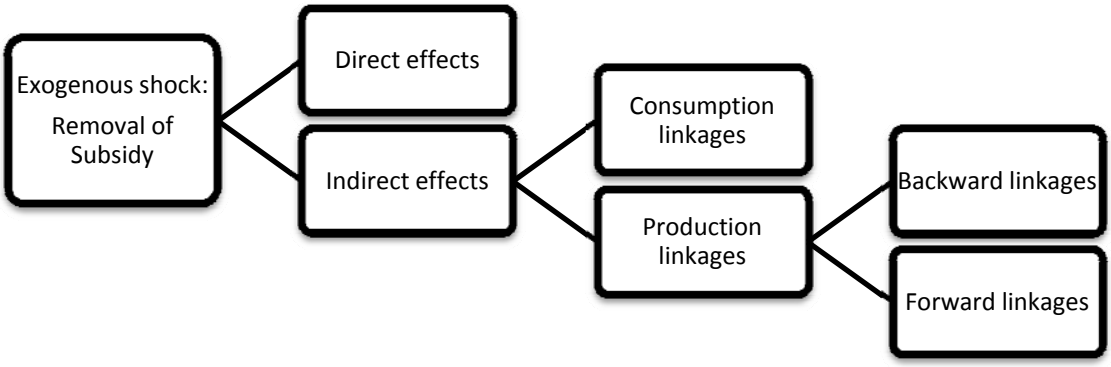
General-equilibrium modeling would be a more accurate approach to observe the changes in market for inputs and goods across sectors. An example of a general-equilibrium model is the Social Accounting Matrix, which can be extended to Computable General Equilibrium (CGE). Although CGE is a more powerful tool to simulate any shock, the accuracy of the result is heavily dependent on the quality and accuracy of the assumptions and data (Elis, 2010).

The strategy to phase out or remove fuel subsidy would certainly impose economic effects on the economy, specifically on output, national income, employment, as well as sectoral multiplier. Breisinger, *et al.* (2010) suggested that any exogenous shock would impose direct and indirect effects. Direct effects explain the effects to the sectors,

[2] Amounted USD 557 billions in 37 non-OECD countries and almost five times the yearly bilateral aid flows to developing countries in the form of Official Development Assistance (ODA).

directly affected by the shock. Hypothetically, removal of fuel subsidy would have direct impact on the land transportation sector. Indirect effects of the removal would be the correlation between transportation sectors with other sectors in the economy. Breisinger, *et al.* (2010) showed that the measure of the removal multiplier effect is the sum of direct and indirect linkages. (Figure 3)

Figure 3: Direct and Indirect Effects of an Exogenous Shock.



Source: Modification from Breisinger, *et al.* (2010).

The production linkages in the analysis of SAM include backward and forward linkages (Breisinger, *et al.* 2010). Backward linkages explain the decrease in demand of inputs as producers supply less goods and services owing to removal of fuel subsidy. Forward linkages on the other hand record the decrease in supply of inputs to upstream industries as the GoI removes the fuel subsidy. The stronger the forward and backward linkages, the larger are the multipliers. Unlike multipliers provided by input-output analysis, SAM multipliers capture both production and consumption linkages (Breisinger, *et al.* 2010).

Increase in the price of fuel owing to removal of the fuel subsidy, leads to first-, second-, and subsequent round linkage effects. The first-round linkage effect explains that decreases in production in the transportation sector leads to production disincentives in the transportation equipment industry. The subsequent second-round

linkage effect explains that decrease in production of transportation equipment industry would affect other sectors. The multiplier effects in SAM analysis record the total effects of economic linkages over a period of time (Breisinger, *et al.* 2010).

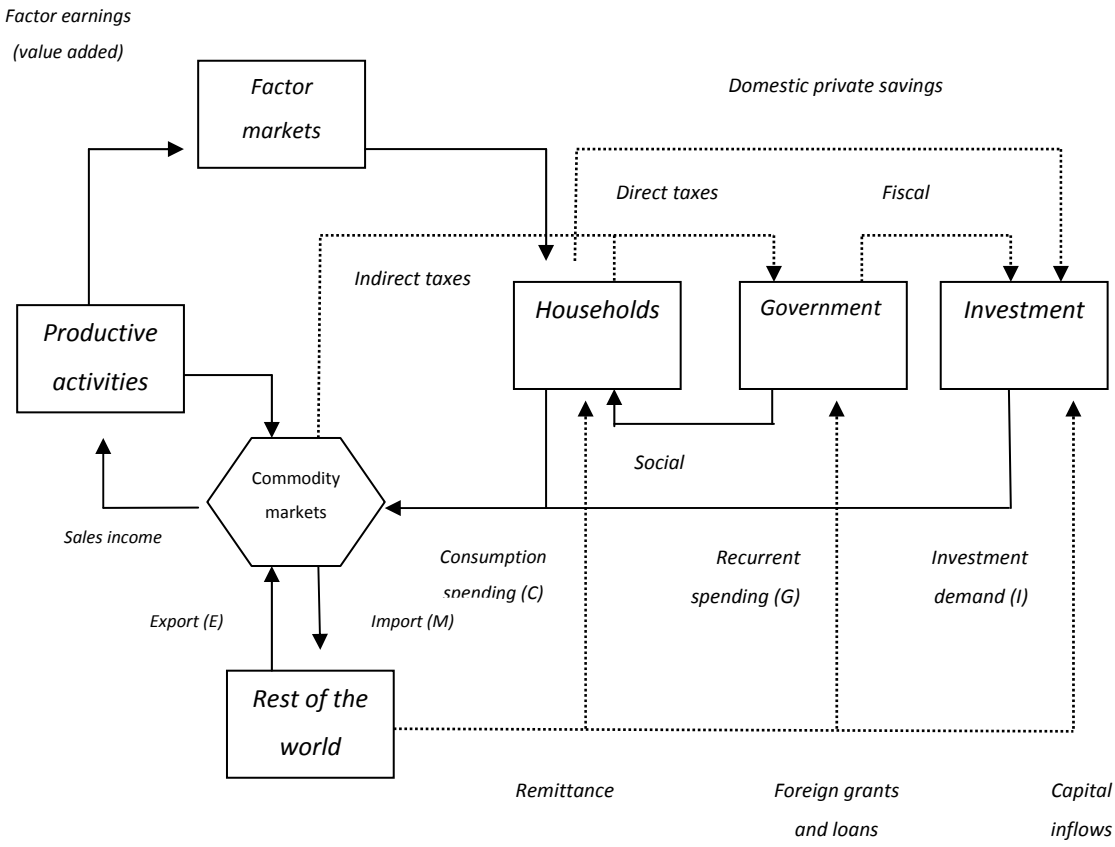
SAM analysis is widely used for economic-wide analysis in developing countries. Iqbal & Siddiqui (1999) studied the impact of fiscal adjustment on Pakistani income distribution. The fiscal adjustment studied was reduction in government expenditure including reduction in subsidy and public expenditure. Nganou, *et al.* (2009) analyzed the impact of oil price shocks on poverty and households' income distribution.

3. Data and Methodology

This study utilizes Indonesian SAM, published by the Central Bureau of Statistic (BPS), to construct the applied general equilibrium model. SAM is a skeletal system data presented in matrix form, which gives a broad overview of the economic and social conditions of society and the interrelationship between the two in a comprehensive, consistent and integrated form (Thorbecke, 2003). BPS (2010) explains that as a system framework of comprehensive and integrated data, SAM covers a wide range of economic and social data. This data is consistent because it ensures that the balance of transactions in each balance sheet is contained in it (Figure 4).

SAM is essentially a square matrix that describes monetary flows from a variety of economic transactions. The columns on the SAM represent spending (expenditures) while the rows describe the recipients (Table 3). Daryanto & Hafizrianda (2010) explained that one of the fundamental characteristics of SAM is its ability to present comprehensive and consistent information about the economic relations at the level of production and factors, as well as the government, households and firms (private sector). Specifically, analysis of SAM decomposes multiplier effects within and between domestic sectors in the process of economy-wide income generation (Trap, *et al.* 2002). Analysis of SAM also permits the examination of policy or external shocks impact on households' income distribution in rural and urban area (Iqbal & Siddiqui, 1999).

Figure 4: Flow Diagram of Circulation Economy.



Source: Breisinger, *et al.* (2010)

The basic framework SAM Indonesia includes 4 main balance sheets, namely (Civardi, *et al.* 2010):

1. The balance sheet of factors of production;
2. The balance sheet of the institution;
3. The balance sheet of the production sector, and
4. The balance sheet consisting of exogenous capital account and the rest of the world (ROW).

Each sheet is occupied rows and columns. The intersection between balance sheets with other balance sheet gives a special meaning (Table 3).

Table 3: Social Accounting Matrix Framework

Recipients	Spending				
	Production Factor	**Institution**	**Production Sector**	**Other Sheet**	**Total**
Production Factor			Allocation of added value to production factors	Income of production factors from abroad	Income distribution by production factors
Institution	Income allocation from production factor to institution	Transfer among institutions		Transfer from abroad	Institutional income distribution
Production Sector		Final demand	Intermediate demand	Export and investment	Total Output
Other Sheet	Income allocation from production factor to abroad	Saving	Import, indirect tax	Transfer and other balances	Total receipt
Total	Spending distribution of production factor	Institutional spending distribution	Total input	Total other spending	

Source: BPS (2010)

The Balance sheet of institutions includes households, enterprises, and governments. Households are classified into groups of mutually distinct socioeconomic levels. In Indonesian SAM 2008 data, the households were divided into eight groups. The households income is derived from the factors of production transfer both inter-household transfers, transfers from government and from companies and from abroad. Household expenditures are devoted to the consumption of goods and income taxes as well as some incorporated to saving in the capital account. Institutional income of the company comes from the profits and a portion of the transfer. Government expenditure in the form of consumption of goods and services, transfers to households and firms as well as some form of saving.

Fuel subsidy is assumed to be an exogenous account in the Indonesian Social Accounting Matrix. It is then injected into the Indonesian Social Accounting Matrix to observe its effects on other endogenous variables. The fuel subsidy in this study includes: Premium (with RON92) and Solar (automotive diesel oil or ADO). We

assume that reduction in fuel subsidy is implemented uniformly to these two types of subsidized fuel. This assumption is sensible since fuel subsidy reductions in 2005 and 2008 were implemented uniformly.

4. Results

4.1. Impacts of Fuel Subsidy Removal

The analysis regarding impacts of fuel subsidy removal, which is the exogenous shock, starts with two basic scenarios. The impact of the removal, derived from these scenarios, would be defined as the change of multiplier before and after the exogenous shock. The scenarios include: 1) baseline multiplier analysis of Indonesia SAM and; 2) multiplier analysis of Indonesia SAM with IDR1 billion fuel subsidy reductions in the total subsidy. The output of this analysis is the multiplier impact of the shock in economy-wide variables including output, GDP, and production factors' income. The outputs of the analysis also include distribution of impact across production sectors, commodities, as well as households' distribution.

Table 4 shows that the fuel subsidy removal induces decreases in the values of the economy such as output, GDP, and production factors' income. The simulation shows that removal of the fuel subsidy by IDR 1 billion decreases the output, GDP, and income by approximately IDR 0.1639 billion, IDR 0.088 billion, and IDR 0.1119 billion respectively. A relatively higher change in output shows that removal of the fuel subsidy affects production sectors in Indonesia.

Table 4: Multiplier Analysis of SAM on Output, GDP, and Income.

Simulation	Output	GDP	Income
Baseline (A)	-2.5459	-1.6093	-2.0895
Scenario (B)	-2.7098	-1.6973	-2.2014
Impact in billion rupiah (C = B – A)	-0.1639	-0.088	-0.1119

Source: calculated from SNSE (2008)

Note: Sign (-) shows that the removal of fuel subsidy will have negative impacts on Output, GDP and Income. The impact (C) corresponds to removal of the fuel subsidy by IDR1 billion

Changes in the output multipliers in each production sector owing to fuel subsidy removal are specifically shown in Table 5.

Table 5: Multiplier Analysis of SAM on Production Sectors and Domestic Commodities.

Production Sector	Impacts in billion IDR	
	Impacts on Production Sectors	Impacts on Domestic Commodities
Chemical and cement industry	-0.0449	-0.0160
Electricity, gas, and drinking water	-0.0264	-0.0032
Food, beverage, and tobacco industry	-0.0117	-0.0148
Trade	-0.0115	-0.0119
Coal, metal, and oil mining	-0.0107	-0.0112
Paper, printing, transportation tools, metal products, and other industries	-0.0081	-0.0097
Crop farming	-0.0068	-0.0080
Government, defense, education, health, film, and other social services	-0.0067	-0.0067
Restaurant	-0.0039	-0.0038
Air Transportation and Communication	-0.0039	-0.0041
Livestock and Livestock products	-0.0038	-0.0051
Bank and insurance	-0.0036	-0.0037
Individual, households, and other services	-0.0036	-0.0036
Land transportation	-0.0035	-0.0034
Other crop farming	-0.0034	-0.0037
Real estate and service firms	-0.0034	-0.0035
Fishery	-0.0026	-0.0035
Garment, textile, clothes, and leather industry	-0.0021	-0.0024
Construction	-0.0013	-0.0013
Wood and wood products industry	-0.0008	-0.0010
Transportation supporting services and warehousing	-0.0005	-0.0005
Other mining industry	-0.0003	-0.0004
Forestry	-0.0002	-0.0003
Hotels	-0.0002	-0.0002

Source: calculated from SNSE (2008)
Note: Sign (-) shows that the removal of fuel subsidy will have negative impacts.

Each sector, in general, responded uniquely as shown by the difference in multipliers for each sector. The range of impact of IDR1 billion removal of subsidy is between IDR 2 million to IDR 0.0449 billion. The chemical and cement industry as well as electricity, gas, and drinking water sectors would experience the highest impact

of fuel subsidy removal. The multiplier analysis of SAM shows that a IDR 1 billion removal of fuel subsidy will decrease the output of chemical and cement industry and electricity, gas, and drinking water sector by approximately IDR 0.0449 billion and IDR 0.0264 billion, respectively.

In practical terms, these sectors would be hit hardest as the industry utilizes a relatively high amount of subsidized fuel in their respective production processes. A relatively high decrease in output would also be evident in food, beverage, and tobacco industry, trade, as well as coal, metal, and oil mining. It is interesting to note that the magnitude of the impact on land transportation is not relatively high. An IDR 1 billion removal of subsidy would decrease production by only IDR 35 million.

This presents an avenue to conduct further study to follow up the result regarding the magnitude of the impact on land transportation. Sensible explanation for this result is that there are not many alternatives to land transportation for people particularly in urban areas. There would be time lag until the government establishes necessary public transportation. People, therefore, would still be using existing land transportation.

The multiplier analysis of SAM on domestic commodities shows relatively similar results to that on production sectors (Table 5). Removal of the fuel subsidy would affect domestic commodities produced by the chemical and cement industry and electricity, gas, and water sectors the most. Results in Table 5 also suggest that the GoI should address concerns to the trade sector. The trade sector and domestic trade commodity are also highly affected by the removal of fuel subsidies.

Table 6 shows the changes in multiplier on income of factors of production, which include labor and capital, owing to removal of fuel subsidy. The results of the simulation show that the impact on the labor multiplier is higher than that on capital. Specifically, an IDR 1 billion removal of subsidy would decrease labor income by IDR 0.0882 billion, about IDR 0.0374 billion higher than capital income. A more detailed analysis shows that labor in administration, sales, and services sector as well as production and unskilled labor would be affected the most. On the other hand, high-income labors as well as labor in the agriculture sector would, relatively, be the least affected by removal of the fuel subsidy.

Table 6: Multiplier Analysis of SAM on Income of Factors of Production.

		Baseline (A)	Scenario (B)	Impacts in billion rupiah (C = B– A)
Factors of Production	Agriculture	-0.1309	-0.1396	-0.0087
Labor	Production, operators of transportation means, unskilled labors.	-0.1555	-0.1671	-0.0116
	Administration, sales, and services	-0.1955	-0.2079	-0,0124
	Leaders, military, professional, and technicians	-0.0787	-0.0834	-0,0047
Non-labor (Capital)		-1.0487	-1.0995	-0.0508

Source: calculated from SNSE (2008)
Note: Sign (-) shows that the removal of fuel subsidy will have negative impacts.

Table 7 summarizes the multiplier analysis of SAM on income distribution of different types of household, firms, and the government.

Table 7: Multiplier Analysis of SAM on Income Distribution.

				Baseline (A)	Scenario (B)	Impacts (C = B– A)
HOUSEHOLDS	**Agri-culture**		Labor	-0.0425	-0.045	-0.0025
			Enterpreneurs	-0.1837	-0.1947	-0.0110
	Non-Agriculture	**Rural**	Low-income enterpreneurs, administration officer, unskilled labor, and individual services	-0.1163	-0.1232	-0.0069
			Non labor force	-0.0421	-0.0447	-0.0026
			High-income enterpreneurs, non-agricultural enterpreneurs, managers, military, professional, and technicians.	-0.1284	-0.1359	-0.0075
		Urban	Low-income entrepreneurs, administration officer, unskilled labor, and individual services	-0.1729	-0.1834	-0.0105
			Non labor force	-0.0644	-0.0682	-0.0037
			High-income entrepreneurs, non-agricultural entrepreneurs, managers, military, professional, and technicians.	-0.225	-0.2379	-0.0129
FIRMS				-0.7799	-0.8177	-0.0379
GOVERNMENTS				-0.3343	-0.3508	-0.0165

Source: calculated from SNSE (2008)
Note: Sign (-) shows that the removal of fuel subsidy will have negative impacts.

An IDR 1 billion decrease in the fuel subsidy would decrease the households' income by IDR 0.576 billion. The results shows that households in non-agriculture sector would be affected the most by removal of the subsidy. Specifically, urban

households, particularly managers, military, professionals, and technicians, would experience the highest impact of the removal. This type of household would also experience the highest impact in the rural area. Households in agriculture sector are also relatively affected by removal of the subsidy particularly entrepreneurs. These results are sensible since these types of household are most likely to own a car(s) thus they consume a relatively high amount of subsidized fuel.

Removal of the fuel subsidy also imposes pressure on firms' income. The impact of an IDR 1 billion removal of the fuel subsidy would decrease firms' income by IDR 0.379 billion. Firms' income decreases as their supply of goods and services decline owing to decrease in the final demand. The decrease in firms' income would trickle down to sectors through economic linkages. The government would also experience decrease in income owing to the removal of the fuel subsidy. Although the government's subsidy expenditure decreases, the magnitude of decrease in tax revenue is relatively greater. The removal of the fuel subsidy would therefore reduce government income.

4.2. The Impact of Fuel Subsidy Reallocation to the Economy

The main benefit of fuel subsidy removal is the availability of government's endowment to be reallocated to other sectors. This endowment should be reallocated to strategic programs that would create multiplier effect both in the short- and long-run. For example, the endowment could be reallocated to enhance the existing poverty alleviation programs such as Rice for the Poor (*Raskin*) and Community Empowerment Based Poverty Reduction Program (*PNPM*). The endowment could also be reallocated to strategic programs intended for development of human quality such as Health Insurance for the Poor (*Askeskin*) and School Operating Grants (*BOS*). Further impact evaluation studies should be conducted to observe the optimum programs for these.

This study will provide the impact of reallocation to output, GDP, and income distribution using the analysis of SAM. The sectors are chosen based on several parameters available in Indonesia SAM. These parameters include consumption expenditure, number of workers, and average labor's wage. Consumption expenditure parameters include those in agriculture as well as rural and urban non-agriculture sector. Table 8 shows the priority sectors chosen based on the highest value for each parameter.

Table 8: Priority Sectors for Reallocation.

Parameter	Sector
Consumption expenditure in agriculture sector	Food, Beverage, and Tobacco Industry
Consumption expenditure in non-agriculture sector	
Rural	Food, Beverage, and Tobacco Industry
Urban	Food, Beverage, and Tobacco Industry
Average labor's wage	Trade
Number of workers	Agriculture

Source: calculated from SNSE (2008)

Table 9 shows the impact of IDR 1 billion reallocation of fuel subsidy to output, GDP, and multiplier through four different sectors. The simulation shows that the results of reallocation through different sectors vary. Reallocation to food, beverage, and tobacco industry provide the biggest impact to the economy. The impact is relatively lower than that of fuel subsidy removal shown in Table 4. The results suggest that fuel subsidy has greater backward and forward linkages relative to these sectors thus implying a higher multiplier.

Table 9: Impact of Reallocation to National Output, GDP, and Income Multiplier.

Simulation: Impact of Reallocation to a Sector	Output	GDP	Income
Agriculture	0.1141	0.0613	0.0779
Trade	0.1179	0.0633	0.0805
Food, Beverage, and Tobacco Industry	0.1205	0.0647	0.0823
Education and Health	0.1186	0.0637	0.0810

Source: calculated from SNSE (2008).

We can observe that the overall benefit of fuel subsidy removal is negative, calculated from results shown in Table 4 and Table 9. There are two possible explanations for our result. First, the reliance of sectors to fuel subsidy is very high thus multiplier effects of removal is higher than that of any direct reallocation scheme. Second, this result does not take into account the reduction in inefficiencies, such as traffic congestion, excessive use of personal vehicle, and unequal distribution of subsidized fuel among sectors, created by fuel subsidy scheme. This assumption may understate the effect of fuel subsidy removal and/or reallocation to other sectors.

The impacts of reallocation to output multipliers in each production sector are specifically shown in Table 10.

Table 10: Sectoral Reallocation Impact to Multiplier on Production Sectors.

		Impacts in billion IDR			
		Agriculture	**Trade**	**Food Beverage and Tobacco Industry**	**Education and Health**
PRODUCTION SECTORS	Chemical and cement industry	0.0313	0.0323	0.033	0.0325
	Electricity, gas, and drinking water	0.0184	0.019	0.0194	0.0191
	Food, beverage, and tobacco industry	0.0081	0.0084	0.0086	0.0085
	Trade	0.008	0.0082	0.0084	0.0083
	Coal, metal, and oil mining	0.0075	0.0077	0.0079	0.0077
	Paper, printing, transportation tools, metal products, and other industries	0.0056	0.0058	0.006	0.0059
	Crop farming	0.0047	0.0049	0.005	0.0049
	Government, defense, education, health, film, and other social services	0.0047	0.0048	0.0049	0.0048
	Livestock and livestock product	0.0027	0.0028	0.0028	0.0028
	Restaurant	0.0027	0.0028	0.0029	0.0028
	Air and water transportation and communication	0.0027	0.0028	0.0029	0.0029
	Bank and insurance	0.0025	0.0026	0.0026	0.0026
	Individual, households, and other services	0.0025	0.0026	0.0026	0.0026
	Other crop farming	0.0024	0.0024	0.0025	0.0024
	Land transportation	0.0024	0.0025	0.0026	0.0025
	Real estate and service firms	0.0024	0.0025	0.0025	0.0025
	Fishery	0.0018	0.0019	0.0019	0.0019
	Garment, textile, clothes, and leather industry	0.0014	0.0015	0.0015	0.0015
	Construction	0.0009	0.0009	0.001	0.001
	Wood and wood products industry	0.0005	0.0006	0.0006	0.0006
	Transportation supporting services and warehousing	0.0004	0.0004	0.0004	0.0004
	Forestry	0.0002	0.0002	0.0002	0.0002
	Other mining industry	0.0002	0.0002	0.0002	0.0002
	Hotel	0.0001	0.0001	0.0001	0.0001

Source: calculated from SNSE (2008)

Each sector, in general, responded uniquely to reallocation of fuel subsidy through different sectors. The sectoral distribution of the impact of reallocation is relatively different from that of fuel subsidy removal. The sectors that pertained the highest

impact are: 1) chemical and cement industry; 2) electricity, gas, and drinking water; 3) food, beverage, and tobacco industry; 4) and trade. The impact of reallocation is also relatively lower than that of fuel subsidy removal shown in Table 5.

The impacts of reallocation of fuel subsidy to the distribution of income vary across households. The impact mostly benefits urban households in the non-agricultural sector particularly high-income entrepreneurs, managers, military, professional, and technicians. Urban households would experience the highest impact of reallocation owing to greater backward and forward linkages of economic activities in urban areas. Entrepreneurs in the agriculture sector would also experience a great multiplier impact owing to production and consumption linkages to other sectors (Table 11).

Table 11: Impact of Reallocation on Income Distribution Multiplier

				Agriculture	Trade	Food Beverage and Tobacco Industry	Education and Health
HOUSEHOLDS	Agri-culture		Labor	0.0017	0.0018	0.0018	0.0018
			Entrepreneurs	0.0077	0.0079	0.0081	0.0080
	Non-Agriculture	Rural	Low-income entrepreneurs, administration officer, unskilled labor, and individual services	0.0048	0.0049	0.0051	0.0050
			Non labor force	0.0018	0.0018	0.0019	0.0019
			High-income entrepreneurs, non-agricultural entrepreneurs, managers, military, professional, and technicians.	0.0052	0.0054	0.0055	0.0054
		Urban	Low-income entrepreneurs, administration officer, unskilled labor, and individual services	0.0073	0.0075	0.0077	0.0076
			Non labor force	0.0026	0.0027	0.0028	0.0027
			High-income entrepreneurs, non-agricultural entrepreneurs, managers, military, professional, and technicians.	0.0090	0.0093	0.0095	0.0093

Source: calculated from SNSE (2008)

4.3. Distributional Effect of the Reallocation: Structural Path Analysis (SPA)

This research applies Structural Path Analysis (SPA) to trace the sectoral interactions in the Indonesian economy. The SPA provides information on how the impacts of fuel subsidy removal and subsidy reallocation are transmitted from one sector to the others. By using SPA, elements of multipliers can be decomposed into three impacts: direct influence (DE), total influence (TE) and global influence (GE).

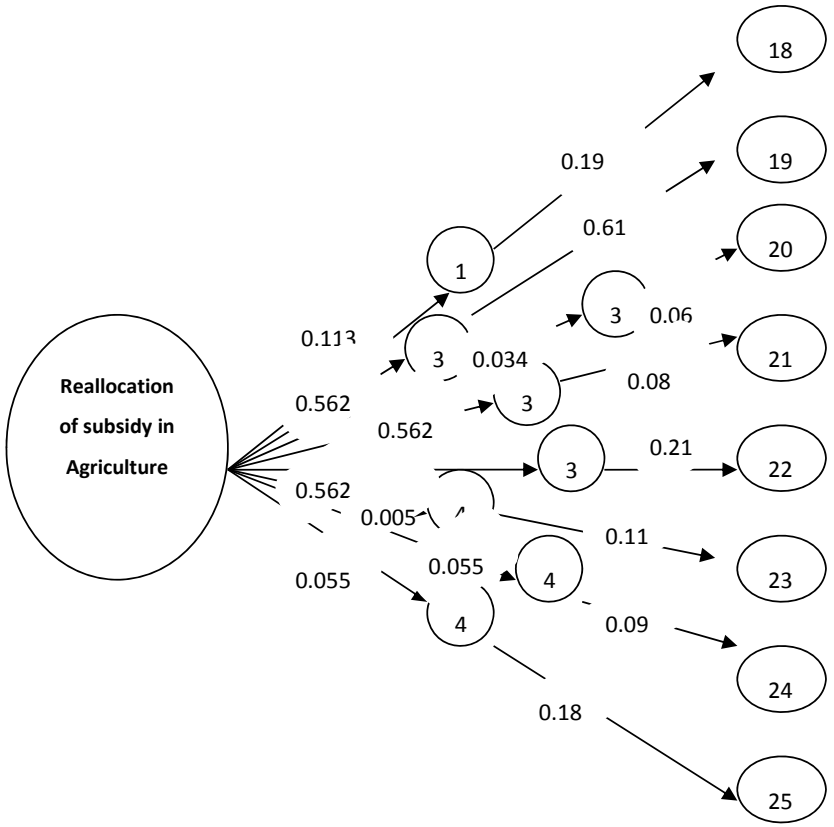
Direct influence (DE) of sector *i* on sector *j* represents the changes in sector *j*'s income or production due to the 1 unit output change in sector *i* (holding the other income and production constant). Total influence (TE) of sector *i* on sector *j* shows the changes in sector *j*'s income or production due to the output change in sector *i* through both elementary and circuit paths. Global influence (GE) of sector *i* on sector *j* represents the overall changes in sector *j*'s income or production due to the 1 unit output change of *i*.

Figure 5 shows the distributional impacts of the fuel subsidy removal and Figures 6 to 9 shows subsidy reallocation on agriculture; trade; food, beverage, and tobacco; and health and education sector, respectively. Figure 5 shows that the distributional effect of reallocation will affect the urban class most, followed by the rural class. The urban and rural classes include upper class entrepreneurs, nonagricultural entrepreneurs, managers, military, professionals, technicians, teachers, workers and sales, administrative staff. This result is sensible since the numbers of households in urban areas are relatively higher than those in rural areas.

Figure 6 shows the distributional effect of subsidy reallocation on the agriculture sector. Households in rural areas will be benefited most from the reallocation owing to their dependence on agricultural activities. Distributional effects of reallocation on trade sector, on the other hand, benefit the urban class most (Figure 7). These results also show that the urban class depends mostly on trade while the rural class depends mostly on the agriculture sector.

Figure 8 and 9 shows the effect of reallocation on food, beverage, and tobacco and education and health sectors respectively. Household groups who will be benefited the most from reallocation to food, beverage, and tobacco sector are those who work in urban areas as low-class employers, administrative staff, mobile vendors, transportation sector workers. On the other hand, urban households working as upper class entrepreneurs, nonagricultural entrepreneurs, managers, military, professionals, technicians, teachers, and sales administrative, will be benefited the most by reallocation to education and health sector.

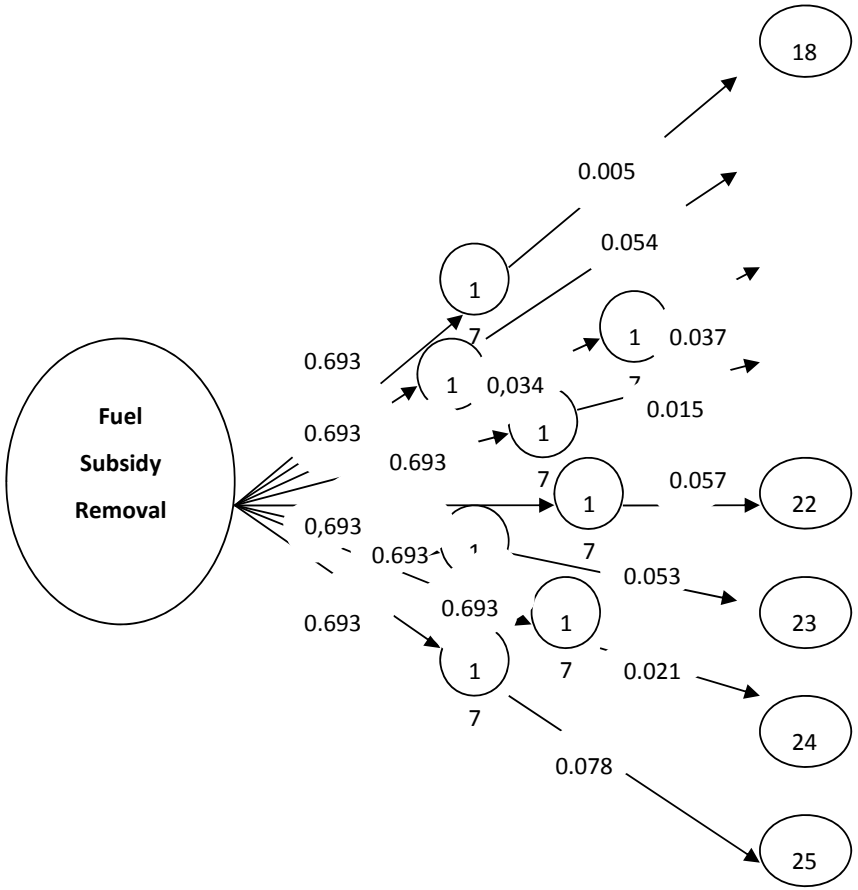
Figure 5: Distributional Effect of the Fuel Subsidy Removal



	%GE	GE	DE
18	24.9%	0.120	0.022
19	71.9 %	0.695	0.345
20	26.5%	0.188	0.034
21	57.3 %	0.115	0.049
22	58.4%	0.295	0.121
23	4.9 %	0.191	0.006
24	9.6%	0.073	0.005
25	5.7%	0.266	0.010

Notes:
1: Labor in agriculture as wage and salary earner in the village
3: Labor in agriculture as non wage and salary earner the village
4: Labor in agriculture as non wage and salary earner the city
18: Labor
19: Agricultural Employers
20: Employers are free of low class, administrative staff, mobile vendors, free transport sector workers, personal services, manual labor (rural)
21: Not the labor force and the group is not clear (rural)
22: Entrepreneur free upper class, not the agricultural entrepreneurs, managers, military, professionals, technicians, teachers, workers and sales, administrative staff, upper class (rural)
23: Employers are free of low class, administrative staff, mobile vendors, free transport sector workers, personal services, unskilled laborers (urban)
24: Not the labor force and the group is not clear (urban)
25: Entrepreneur free upper class, not the agricultural entrepreneurs, managers, military, professionals, technicians, teachers, workers and sales, administrative staff, upper class (urban)

Figure 6: Distributional Effect of the Reallocation: Agriculture


Fuel
Subsidy
Removal
0.693
0.693
0,693
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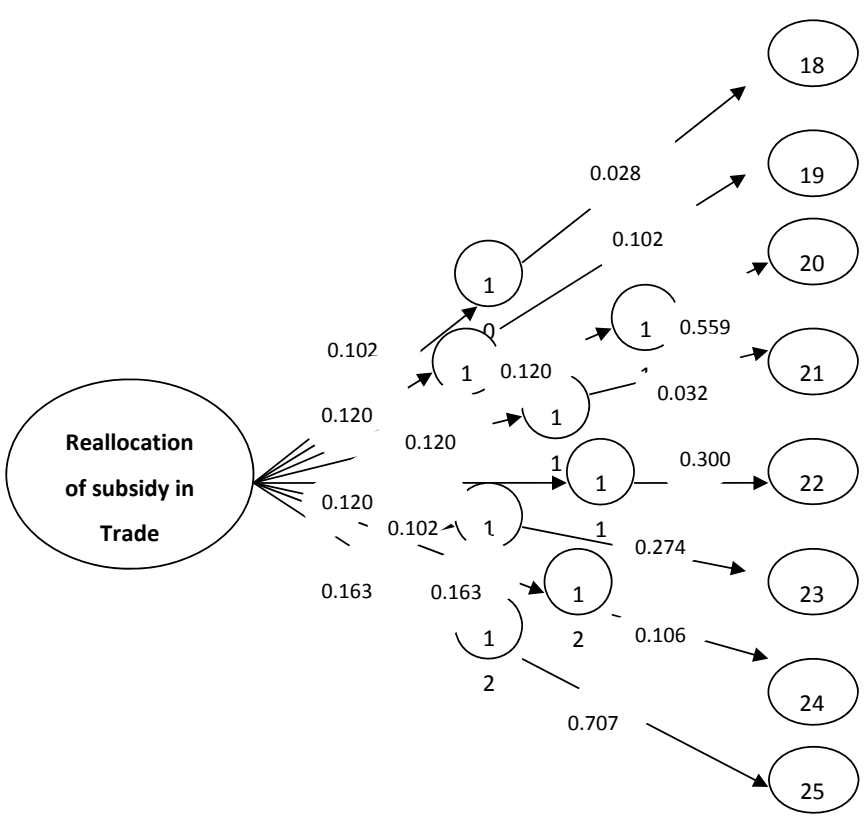
0.

Figure 7: Distributional Effect of the Reallocation: Trade



	%GE	GE	DE
18	6.9%	0.058	0.003
19	7.5%	0.253	0.012
20	45%	0.206	0.067
21	9.3%	0.055	0.004
22	26%	0.194	0.036
23	15.9 %	0.264	0.028
24	22.1%	0.105	0.017
25	38.5%	0.432	0.115

Notes :

10: Clerical labor, sales, services and salary wage earners in the city

11: Clerical labor, sales, services are not receiving wages and salaries in the village

12: Clerical labor, sales, services are not receiving wages and salaries in the city

18: Labor

19: Agricultural Employers

20: Employers are free of low class, administrative staff, mobile vendors, free transport sector workers, personal services, manual labor (rural)

21: Not the labor force and the group is not clear (rural)

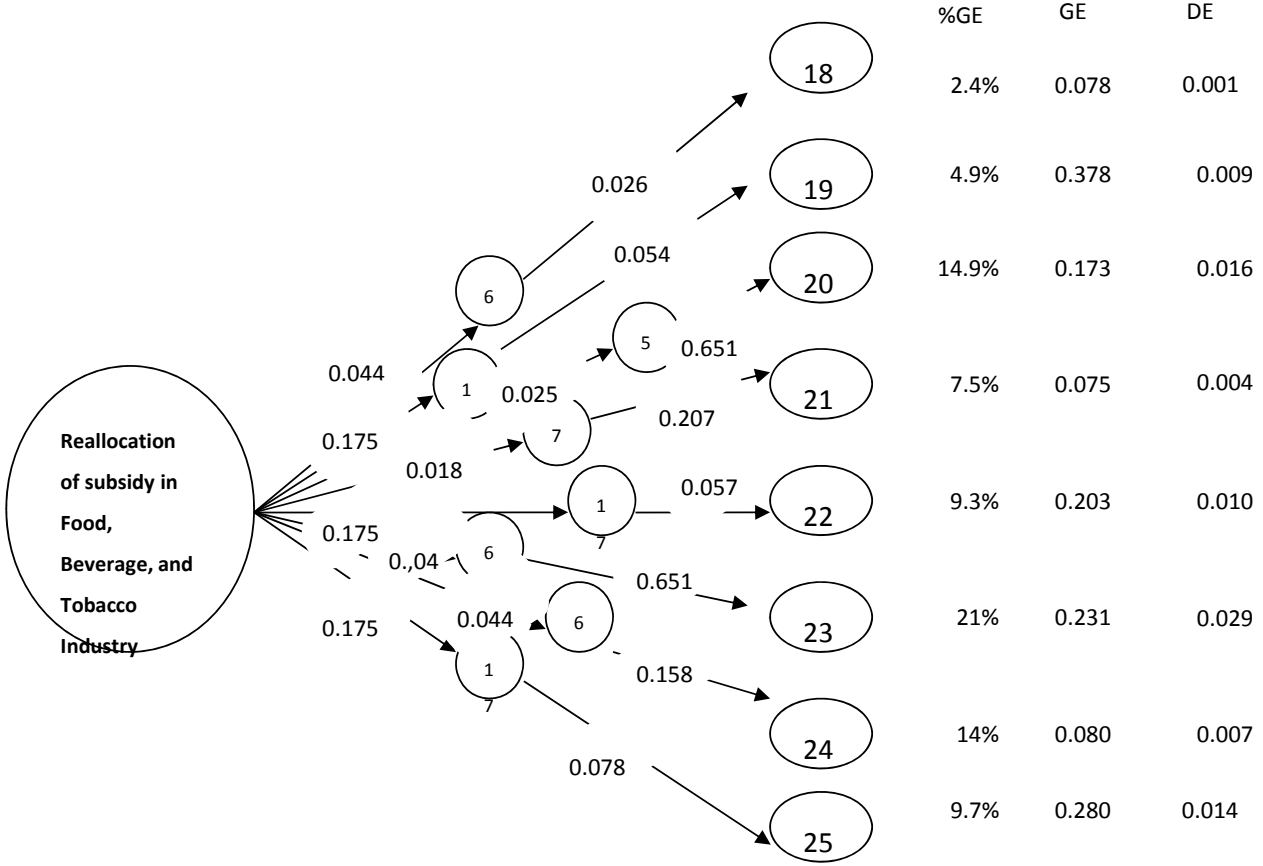
22: Entrepreneur free upper class, not the agricultural entrepreneurs, managers, military, professionals, technicians, teachers, workers and sales administrative staff, upper class (rural)

23: Employers are free of low class, administrative staff, mobile vendors, free transport sector workers, personal services, unskilled laborers (urban)

24: Not the labor force and the group is not clear (urban)

25: Entrepreneur free upper class, non agricultural entrepreneurs, managers, military, professionals, technicians, teachers, workers and sales administrative staff, upper class (urban)

Figure 8: Distributional Effect of the Reallocation: Food Beverage and Tobacco Industry



	%GE	GE	DE
18	2.4%	0.078	0.001
19	4.9%	0.378	0.009
20	14.9%	0.173	0.016
21	7.5%	0.075	0.004
22	9.3%	0.203	0.010
23	21%	0.231	0.029
24	14%	0.080	0.007
25	9.7%	0.280	0.014

Notes :

5: Production, service, transportation, and manual labors receiving wages and salaries in the village

6: Production, service, transportation, and manual labors receiving wages and salaries in the city

7: Production, service, transportation, manual and unskilled labors are not receiving wages and salaries in the village

17: Capital

18: Labor

19: Agricultural Employers

20: Employers are free of low class, administrative staff, mobile vendors, free transport sector workers, personal services, manual labor (rural)

21: Not the labor force and the group is not clear (rural)

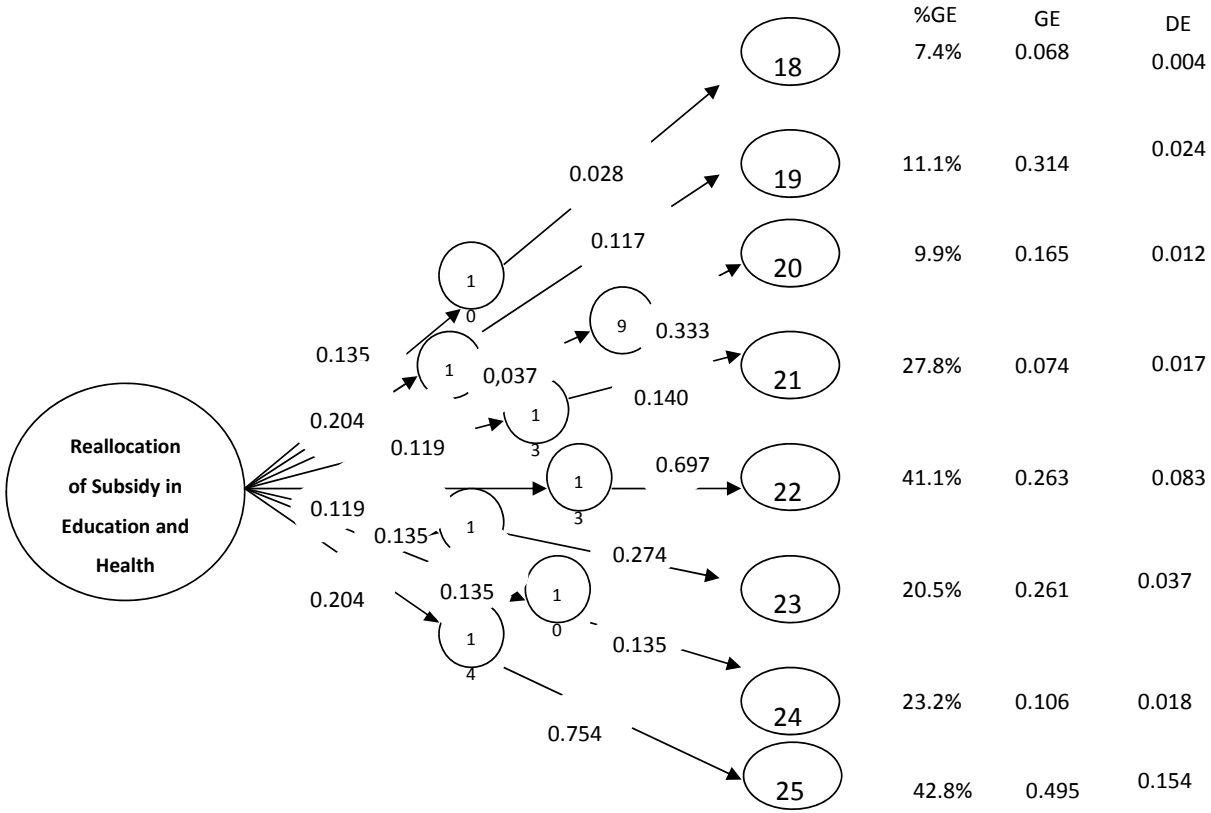
22: Entrepreneur free upper class, not the agricultural entrepreneurs, managers, military, professionals, technicians, teachers, workers and sales administrative staff upper class (rural)

23: Employers are free of low class, administrative staff , power, mobile vendors, free transport sector workers, personal services, unskilled laborers (urban)

24: Not the labor force and the group is not clear (urban)

25: Entrepreneur free upper class, not the agricultural entrepreneurs, managers, military, professionals, technicians, teachers, workers and sales administrative staff upper class (urban)

Figure 9: Distributional Effect of the Reallocation: Education and Health



	%GE	GE	DE
18	7.4%	0.068	0.004
19	11.1%	0.314	0.024
20	9.9%	0.165	0.012
21	27.8%	0.074	0.017
22	41.1%	0.263	0.083
23	20.5%	0.261	0.037
24	23.2%	0.106	0.018
25	42.8%	0.495	0.154

Notes

9: Clerical labor, sales, services and salary wage earners in the village

10: Clerical labor, sales, services and salary wage earners in the city

13: Leadership labor, management, military, professional and technical wage earners and salary in the village

14: Leadership labor, management, military, professional and technical wage earners and salary in the city

18: Labor

19: Agricultural Employers

20: Employers are free of low class, administrative staff, mobile vendors, free transport sector workers, personal services, manual labor (rural)

21: Not the labor force and the group is not clear (rural)

22: Entrepreneur free upper class non agricultural entrepreneurs, managers, military, professionals, technicians, teachers, workers and sales administrative staff upper class (rural)

23: Employers are free of low class, administrative staff power, mobile vendors, free transport sector workers, personal services, unskilled laborers (urban)

24: Not the labor force and the group is not clear (urban)

25: Entrepreneur free upper class, non agricultural entrepreneurs, managers, military, professionals, technicians, teachers, workers and sales administrative staff upper class (urban)

5. Conclusions

The analysis of impact using SAM yields useful information regarding sectoral impact and provides analysis regarding country-wide impact of the removal of fuel subsidy. Simulation of Indonesia SAM shows that fuel subsidy removal would affect economy-wide variables such as output, GDP, and production factors' income. Simulation also shows that removal of fuel subsidy would affect income distribution of households, firms, and governments. Analysis of reallocations of fuel subsidy to four targeted sectors—i.e., agriculture; trade; food, beverage, and tobacco industry; and education and health—shows that the economy would be positively affected. However, the impact of reallocation would be relatively smaller than that of fuel subsidy removal.

Some policy implications can be drawn. *First,* the removal of fuel subsidy can affect the Indonesian economy through aggregate demand side (consumption. investment, government expenditure and net-export, which may result in demand-pull inflation) and aggregate supply side (cost of production, which may cause cost-push inflation). For the reasons of long-term efficiency, competitive advantage, and manageable economic, social and political instability, the GoI should have a clear long-term "scheduled" and "gradual" program of fuel subsidy reduction, and not the "big-bang" total removal of the fuel subsidy. *Second,* the GoI could consider a certain amount of subsidy which is adjusted with the increase of government fiscal capacity and let the domestic fuel price fluctuated as the ICP fluctuated. Societies (both domestic consumers and producers) will learn rationally and adjust logically with the fluctuation of domestic fuel price. *Third,* the GoI should not consider the "sectoral approach" to reallocate the fuel subsidy. Our analysis proves the impact of reallocation to four targeted sectors would bring relatively smaller positive effect than the negative effects of fuel subsidy removal. The GoI should consider programs such as "targeted fuel subsidy" to correct the misallocation the fuel subsidy (i.e. subsidy for the poor). As the poor will be affected most, the GoI should consider

continuing compensation programs for the poor (example: *Bantuan Langsung Tunai* (BLT) or direct transfer) which take into account regional perspectives.

It is important to note some shortcomings of SAM output for policymaking. The multipliers are derived under a specific structure of the economy and dependencies between industry and sectors (Slee, *et al.* 2001). Schwarz (2010) notes that these dependencies vary between economies, and between regions within an economy. He also emphasized that the multiplier is derived using a dataset of transactions in a particular year. The multipliers, therefore, do not take into account the dynamics occurring within a year. The impacts of an equivalent removal of the fuel subsidy by IDR 1 billion will vary widely across year. Furthermore, overestimation of impact is imminent as substitution effects are not taken into account owing to fixed prices (Round, 2003). However, in the research we emphasize that the SAM model is not solving an optimizing equilibrium. We compare the multipliers of the initial condition where fuel subsidy exists (original SAM) – "distorted equilibrium" or disequilibrium)- with those of the new condition where fuel subsidy is removed and reallocated (simulated SAM) – another "distorted equilibrium" or disequilibrium. Therefore, the simulation is not appropriate to address efficiency issues.

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Appendix

Sectoral Reallocation Impact to Multiplier on Domestic Commodities.

		Reallocation Impacts in billion IDR			
		Agriculture	**Trade**	**Food Beverage and Tobacco Industry**	**Education and Health**
PRODUCTION SECTORS	Chemical and cement industry	0.0111	0.0115	0.0118	0.0116
	Food. beverage. and tobacco industry	0.0103	0.0106	0.0109	0.0107
	Trade	0.0083	0.0085	0.0087	0.0086
	Coal. metal. and oil mining	0.0078	0.0081	0.0082	0.0081
	Paper. printing. transportation tools. metal products. and other industries	0.0068	0.007	0.0072	0.0071
	Crop farming	0.0056	0.0058	0.0059	0.0058
	Government. defense. education. health. film. and other social services	0.0047	0.0048	0.0049	0.0049
	Livestock and livestock product	0.0035	0.0037	0.0037	0.0037
	Restaurant	0.0028	0.0029	0.003	0.0029
	Other crop farming	0.0026	0.0027	0.0027	0.0027
	Air and water transportation and communication	0.0026	0.0027	0.0028	0.0027
	Individual. households. and other services	0.0026	0.0026	0.0027	0.0027
	Bank and insurance	0.0025	0.0026	0.0026	0.0026
	Real estate and service firms	0.0025	0.0025	0.0026	0.0026
	Fishery	0.0024	0.0025	0.0026	0.0025
	Land transportation	0.0024	0.0024	0.0025	0.0024
	Electricity. gas. and drinking water	0.0022	0.0023	0.0023	0.0023
	Garment. textile. clothes. and leather industry	0.0016	0.0017	0.0017	0.0017
	Construction	0.0009	0.001	0.001	0.001
	Wood and wood products industry	0.0007	0.0007	0.0007	0.0007
	Transportation supporting services and warehousing	0.0004	0.0004	0.0004	0.0004
	Other mining industry	0.0003	0.0003	0.0003	0.0003
	Forestry	0.0002	0.0002	0.0002	0.0002
	Hotel	0.0002	0.0002	0.0002	0.0002

Source: calculated from SNSE (2008)