5

THE IMPACT OF DIVERTING OF FUEL SUBSIDY TO AGRICULTURAL SECTOR ON POVERTY

THE IMPACT OF DIVERTING OF FUEL SUBSIDY TO AGRICULTURAL SECTOR ON POVERTY

Indra Maipita[1]
Mohd. Dan Jantan[2]
Fitrawaty[3]
Sabar Narimo[4]

บทคัดย่อ

วัตถุประสงค์ของการศึกษาเพื่อต้องการวิเคราะห์ของนโยบายการถ่ายโอนของการอุดหนุนเชื้อเพลิง ของภาคกสิกรรมและพืชที่เกี่ยวข้องต่อระดับรายได้และความยากจนในประเทศอินโดนิเซีย การศึกษาในครั้งนี้ใช้แบบจำลองดุลยภาพครอบคลุม Computable General Equilibrium (CGE) ในการจำลองการวัดความยากจน เช่น การนับหัว ช่วงห่างความยากจน poverty gap, และดัชนีความรุนแรงของความยากจน ดัชนีความยากจนพัฒนาโดย Foster-Greer-Thorbecke (FGT) นำมาใช้ในการวัดความยากจน ผลที่ได้จากการจำลองจะแสดงให้เห็นถึงการถ่ายโอนการอุดหนุนเชื้อเพลิงต่อภาคกสิกรรมและภาคเกษตรชนิดอื่นที่ ทำให้เกิดความยากจนลดลง อย่างไรก็ตามความเบี่ยงเบนของการอุดหนุนเชื้อเพลิงต่อภาคกสิกรรมขนาดเล็กอื่นๆ ส่งผลมากกว่าต่อการลดลงของความยากจนมากกว่าเมื่อเทียบกับการใช้นโยบายอุดหนุนเชื้อเพลงกับภาคกสิกรรม

ผลการศึกษาแสดงให้เห็นว่าการลดลงของการจ่ายเงินอุดหนุนเชื้อเพลิง และเมื่อเทียบเป็นจำนวนเดียวกันเมื่อใช้กับภาคเกษตรจะไม่ทำให้ความยากจนเพิ่มขึ้น ซึ่งในความเป็นจริงแล้วนั้นการศึกษาครั้งนี้พบว่าอัตราความยากจนลดลงนั้นเป็นผลมาจากการจำลองการใช้นโยบายดังกล่าว

Keywords: เงินอุดหนุน ระดับรายได้ ความยากจน

[1] Faculty of Economics, State University of Medan Corresponding author: imaipita@gmail.com

[2] Department of Economics, University Utara Malaysia, Kedah, Malaysia, Corresponding author: djantan@uum.edu.my

[3] Faculty of Economics, State University of Medan Corresponding author: fitra53@gmail.com

[4] Faculty of Teacher Training and Science of Education, Muhammadiyah University, Corresponding author: sabar.narimo@ymail.com

ABSTRACT

The Indonesian government has been spending a big sum of money on fuel subsidy. However, studies show that fuel subsidy failed to hit the target group, i.e. the poor, effectively and at the same time fuel subsidy contributed to a budget deficit. To reduce the budget deficit, the government has started to reduce this subsidy gradually. Thus, the price of fuel has increased and at the same time there is a chain effect on the price of other goods and services. To lighten the burden of the people as a result of an increase in the price level, the government has introduced a direct cash aid to the poor. However, studies show that the transfer of payment to the poor is unable to offset the effect of an increase in the price level. Since majority of the poor lives in the rural area and most of them are farmers, this study explores an alternative policy in which the amount saved from a reduction in fuel subsidy is re-distributed to agricultural sector. Agricultural subsidy can be in the forms of inputs and price subsidy with the objectives of to help the farmers to increase production and efficiency.

Thus, the purpose of this study is to analyze the impact of the transfer policy of fuel subsidy to the food crops and other crops sub-sectors on the level of income and poverty. The major food crops are rice, corn, cassava and soybean. Most of the food crops are consumed domestically. Other crops refer to plantation crops such as oil palm, rubber, sugarcane and cocoa. These crops are exports crops. This study employs a Computable General Equilibrium (CGE) model to simulate poverty measures such as head count, poverty gap, and poverty severity indices. The poverty indices developed by Foster-Greer-Thorbecke (FGT) are used to measure poverty. It is found that the transfer of fuel subsidy to food crops sub-sector show a mixed results. If the percentage of the transfer of the subsidy is big enough, it will be able to increase income for all groups of household, except for the urban poor. Also, the simulation results show that the poverty gap and severity among the rural poor are improved. But, as a result of a decrease in income, the poverty gap and severity among the urban poor become worse off. The transfer of fuel subsidy to other crops sub-sector, i.e. plantation crops, shows an increase in the level of income for all household groups. Thus, the number of rural- and urban-poor households is decreased. Poverty gap and severity among these two groups of households are also improved. However, the diversion of fuel subsidy to other crops sub-sector has a bigger impact on poverty reduction as compared to the transfer of fuel subsidy to the food crops sub-sector.

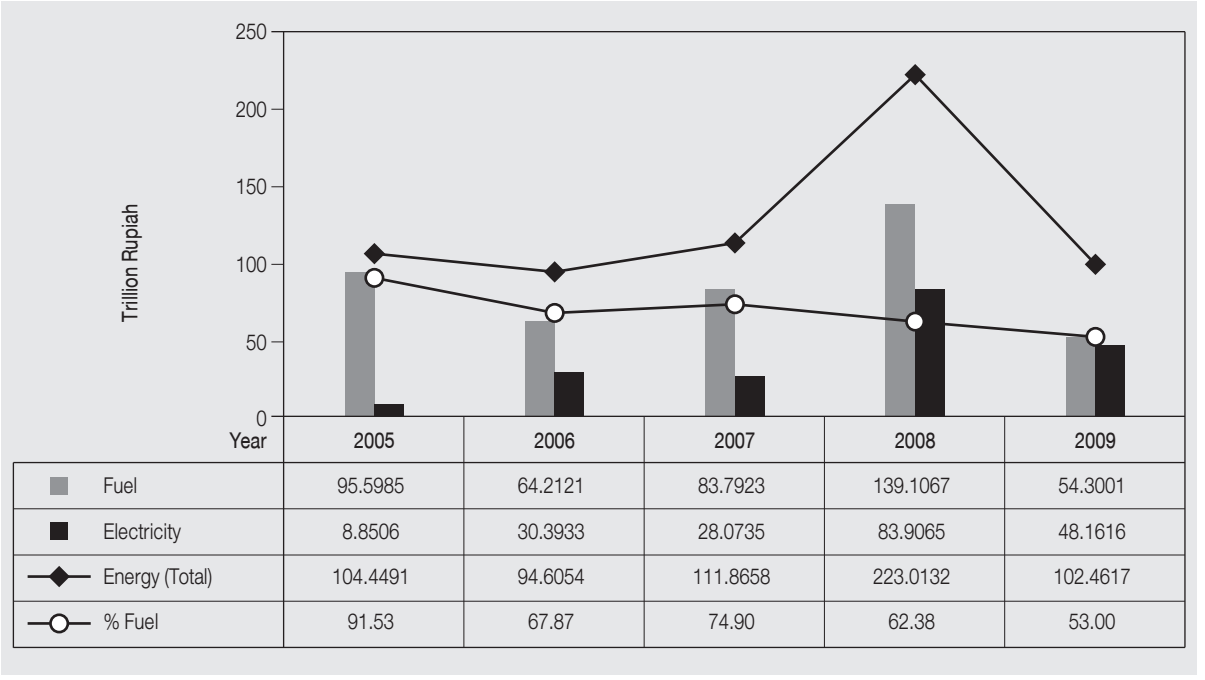
Keywords: Subsidy, Income Level, and Poverty

1. INTRODUCTION

An increase in the price of fuel has an impact on its consumption, as well as on the consumption of other goods and services, either directly or indirectly. There is a chain effect of an increase in the price of fuel to the price of other goods and service. As a result, real income of the general population and poverty are affected. To protect the welfare of the poor and those who are slightly above poverty line, the government needs to intervene against an increase in the price of fuel by providing various types of subsidy. The drastic and continuous increase in the world oil price since 2008 (Reyes, at al, 2009; FAO, 2008) and the shift of Indonesia's position from net exporter to net importer of oil and fuel continue the growing needs to finance the subsidies. Thus, the burden of subsidies keeps growing as shown in Figure 1 and contributes to the government's budget deficit. At the same time, some people believe that fuel subsidy fails to hit the intended beneficiary,

i.e. the poor. The rich gets the benefit of fuel subsidy more than those of the poor. To ease the burden on the budget, the government has taken various fiscal policy measures such as reducing the fuel subsidy gradually as per the Presidential Decree No. 55/2005. Consequently, at the end there will be no more fuel subsidy, although the time is yet to be decided (Word Bank, 2005). It is expected that without fuel subsidy, the price will increase which will also trigger an increase in the price of other goods and service, thus the inflation. The general public purchasing power will be eroded, resulting in an increase in poverty.

Figure 1. Burden of Energy Subsidy (Fuel and Electricity) in National Budget



Year	2005	2006	2007	2008	2009
Fuel	95.5985	64.2121	83.7923	139.1067	54.3001
Electricity	8.8506	30.3933	28.0735	83.9065	48.1616
Energy (Total)	104.4491	94.6054	111.8658	223.0132	102.4617
% Fuel	91.53	67.87	74.90	62.38	53.00

Source: Depkeu, 2010

Poverty is still a crucial issue and a very complex phenomenon for each country (Hung & Makdissi, 2004; Marianti & Munawar, 2006). Poverty alleviation has become a major goal of public policy in almost all industrial societies (Moller, et al, 2003) so as the government in each country seeks to reduce the problem through fiscal instruments.

Reducing fuel subsidy gradually until it reaches zero percent is expected to have a big detrimental impact to the society where the poor becomes poorer, even though it is good to reduce budget deficit. How about if the fuel subsidy is reduced gradually and the "saving" is used to subsidize agricultural sector? Thus, the aim of this study is to determine the impact of the transfer of fuel subsidy to the agricultural sector and analyze its impact on the level of income and poverty in Indonesia. In 2009, a total of 41.6 million (39.7 percent) of the 104.9 million workers were in the agricultural sector.

The reasons underlying the selection of agricultural sector are (1) most poor population is found in rural area relies on agricultural sector, (2) Indonesia's experience during the monetary crisis in 1998 showed that the agricultural sector is one of the few sectors that remained resilient during the crisis, (3) agricultural sector provides food and raw material for industrial and service sectors, (4) labor absorption in the agricultural sector is relatively flexible, so that agriculture can be seen as a safety net (survival sector) during an emergency (Stringer, 2001; Bautista, 2000; Maipita, et al, 2010; Maipita, 2011). Suselo and Tarsidin (2008) found that agricultural sector has relatively high poverty rates and also relatively high elasticity of poverty with respect to economic growth. The new paradigm of agricultural development in Indonesia is *agricultural demand-led industrialization*, as an industrialization strategy that focused on the development programs in the agricultural sector, since it is considered as an appropriate policy to be implemented in a developing country (Susilowati, 2008).

A subsidy is aimed to increase national output and demand for goods and services. It is expected that a subsidy enhances productivity and maintain economic stability, especially the price stability. Through the subsidy, basic goods and services for a society is expected to be available in sufficient quantity and at a stable and affordable price (Handoko & Patriadi, 2005; Norton, 2004; Kasiyati, 2010). A subsidy is a payment by the government to household or firm to achieve a specific goal. For a firm, a subsidy makes it able to produce either in a larger quantity or at a cheaper price than without a subsidy. For a household, a subsidy makes them able to consume a bigger quantity at a lower price that if it is without a subsidy. Then, the objective of a subsidy is to either to reduce the price or to increase the quantity of production and consumption. A subsidy can be in the form of a transfer of payment, such as food stamps and housing subsidies, and in the form of an input and price subsidies such as in the agricultural sector (Ericson, et al, 1998). A subsidy also can be in the form of goods and services provided by the government for a certain quantity for free or at a price lower than the prevailing market price (Handoko & Patriadi, 2005).

In a developing country, a subsidy is a significant fiscal instrument to boost productivity and improve people's welfare (Norton, 2004). A subsidy is an efficient form of government transfer as a mean to redistribute wealth among the citizens as well as between producers and consumers. This is the fundamental importance of a subsidy and even a developed country uses a subsidy instrument to support its private sector. From the institutional side, lower taxes and an increase in a subsidy can increase income and purchasing power of households. An increase in income could support greater household's consumption (Simorangkir & Adamanti, 2010). A negative effect of a subsidy is an inefficient allocation of goods and services because since consumers pay a lower price than the market price, there is a tendency for the consumers not to be thrifty in consuming subsidized goods. In addition, since the subsidized price is lower than the opportunity cost, then there is wasteful in the use of resources to produce the goods. A subsidy that is not transparent and not well-targeted may cause a price distortion, inefficiency and not enjoyed by the intended recipients (Basri, 2002).

The organization of this paper is as follows: In the next section, we offer the methodology and data. Section III discusses the results of the simulations of various policy scenarios. This is followed by the concluding remarks in Section IV.

2. METHODOLOGY AND DATA

To achieve the aim of this study, we construct a Computable General Equilibrium (CGE) model called AGEFIS^{+}. This model is an extension of the AGEFIS CGE model constructed by the Fiscal Policy Office, Ministry of Finance of the Republic of Indonesia in cooperation with the Center for Economics and Development Studies, University of Padjadjaran, Indonesia (BKFDK-RI, 2008a; 2008b). In general, the structure of this model follows the AGEFIS model developed by Yusuf, et al (2008).

The data used in this study is extracted from the Social Accounting Matrix (SAM) of Indonesia for 2005 and the data of poverty indicators in 2005. The Indonesian SAM data are aggregated to 47 x 47 sectors. The aggregated production factors consist of capital, labor and intermediate inputs. There are three institutions —households, firms, and governments—as per Indonesian SAM 2005. For the purpose of the analysis, the households in SAM table are aggregated into four groups, consisting of (1) urban non-poor, (2) urban poor, (3) rural non-poor, and (4) rural poor households. Production sector consists of 27 sub-sectors aggregated from the production sector in SAM table. The grouping of the production sector is based on the Standard Industrial Classification (KLU). The agricultural sector is divided into two sub-sectors, i.e. the food crops and other crops. The main food crops are rice, corn, cassava and soybean and most of these crops are planted on subsistence basis and domestic consumption. Other crops sub-sector consists of plantation crops such as oil palm, rubber, and sugarcane that are mostly exports crops.

Policy simulations are conducted based on two scenarios. The first scenario is the diversion of fuel subsidy to food crops sub-sector, and the second scenario is the transfer of fuel subsidy to other crops sub-sector. Since the government reduces fuel subsidy in stages, each scenario is then run three simulations to reflect the percentage of reduction in fuel subsidy by the government. Simulation “a” is a 12.5 percent reduction in fuel subsidy and the same amount saved by the government is transferred to the agricultural sector. Simulation “b” consists of a 43.2 percent reduction in fuel subsidy and it is transferred to agricultural sector. And, simulation “c” is the abolishment of fuel subsidy and the same amount of saving is transferred to the agricultural sector. This study covers subsidy in general, i.e. diverting of fuel subsidy to agricultural sector. In other words, the agricultural subsidy can be either in the forms of input subsidy or price subsidy. It is assumed that the transaction costs and the efficiency of the government bureaucracy in implementing fuel subsidy and agricultural subsidy remain the same.

The structures of the production function, such as Leontief, Cobb-Douglas, and constant elasticity of substitution (CES), are used to determine the relationship between inputs, outputs and their elasticities. The coefficients of the elasticity can be estimated or they can be gathered from previous studies that are comparable to this current study. The types and values of the elasticity of the parameters used in this study follow the AGEFIS database. The elasticities of the parameter are (1) the Armington elasticity that has a value of two and it is equal across sectors, (2) the factor of production elasticity that has a value of 0.5 and it is equal across sectors, and (3) the expenditure elasticity that has a value of five and it is equal across sectors.

The magnitude of the impact of the policy simulations on the level of household income is estimated using the CGE model. To analyze the impact of the policy simulations on poverty, this study employs the Foster-Greer-Thorbecke (FGT) Index as suggested by Kakwani, Khandker, and Son (2004). If the average

income of the household is increased by ψ, then the income of each household in a group should also increased by ψ. Following this rule, the distribution of income is shifted horizontally in proportion to an increase in income. This rule allows us to compare poverty rate before and after the policy simulation. The FGT equation is presented in equation (1) below:

$$P_{\alpha} = \frac{1}{n} \sum_{i=1}^{q} \left[\frac{g_i}{z} \right]^{\alpha} ; \alpha \geq 0 ; g_i = \frac{Z - y_i}{Z} \quad (1)$$

where y_i is the average income or the average expenditure of the poor, n is the number of individuals or households in the population, q is the number of individuals or households who live below poverty line, g_i is the poverty gap of i^{th} household, z the poverty line, P_{α} is the FGT poverty index α that is an arbitrary number. When α equals to zero, then P_0 is also called the head count index that shows the proportion of population below the poverty line. Head count index is defined as the percentage of poor population to total population. When α equals to one, then we get P_1 index. This index is called poverty gap index and it is used to measure the depth of poverty or poverty gap or the degree of inequality of poverty. This index describes the average size of inequality in expenditure of the poor compared to poverty line or a total gap of all households in the group compared to poverty line. When α equals to two, then P_2 index is obtained and this index is used to measure the level of poverty severity index. The value of g_i equals to zero, if $y_i > z$.

The equations in the model are grouped into seven, namely: (1) domestic-import sourcing, i.e. the equations related to the composition of demand according to the origin of the goods; either domestically produced or imported goods based on the Armington specification, (2) purchaser's price, i.e. the equations that link between producer's price or international price to the buyer's price, (3) demand for commodity, i.e. the equations that relate the demand for goods by various users, (4) production sector that shows the equations related to the production of both goods and services, (5) market clearing that shows the equations related to the market clearing in which the supply of and the demand for goods and services are equal, as well as those of factors of production, (6) institution contains the equations related to earnings (income) and expenditure of the institution such as households, governments, firms, and the rest of the world, and (7) Closure (BKFDK-RI, 2008a). Conventionally, in a CGE model, the number of equations has to be equal to the number of exogenous variables. If they are not equal, then a closure is used to cover this deficiency. A closure is either a short run or a long run closure.

Economic actors seek to optimize the composition of imported and domestically produced goods and services by minimizing the costs subject to constraint as shown by the CES aggregation function in equation (2) below:

$$\text{Minimize} : \sum_{s} PQ(c,s).XD(c,s) \text{ subject to the constraint of}$$

$$XD\_S(c) = CES(XD(c,s) \mid \sigma(c)) = \left[\alpha(c,s) \sum_{s} \delta(c,s)^{-\rho(c)} \right]^{-\frac{1}{\rho(c)}} \quad (2)$$

where $PQ(c,s)$ is the consumer price for commodity c by source s, $XD(c,s)$ is the demand for commodity c, from source s, $XD\_S(c)$ is the demand for a composite commodity, $\alpha(c,s)$ is the economics of scale, and $\delta(c,s)$ is the elasticity of substitution of commodity c, from course s.

The price that is received by the consumer is the net price after taxes and subsidies. Therefore, the price received by the consumer can be written as equation (3). Equation (3) is in the level form.

$$PQ(c, \text{“dom”}) = (1 + TX(c) - SC(c)).\, PTOT(c) \tag{3}$$

where $PQ(c, \text{“dom”})$ is domestic price of each commodity, c, received by the consumer, $TX(c)$ is taxes levied on each commodity c, $SC(c)$ is subsidy received for each commodity c, and $PTOT(c)$ is the price of each commodity, c, received by the consumer. Since domestic price is associated to the international price, tariffs and exchange rates, the equation for the domestic price each imported commodity is shown in equation (4).

$$PQ(c, \text{“imp”}) = EXR.\, (1 + tm(c)).\, PFIMP(c) \tag{4}$$

where $PQ(c, \text{“imp”})$ is the domestic price for each imported commodity c, EXR is the exchange rate, $tm(c)$ is the import tariffs for each commodity c, and $PFIMP(c)$ is the import price for each commodity c.

The demand for each commodity is obtained by minimization of cost with a constrained Leontief production function as below

$$\min : PPRIM(i).\, XPRIM(i) + \sum_{c} PQ\_S(c).\, XINT\_S(c, i) \text{ subject to}$$

$$XTOT(i) = \frac{1}{ATOT(i)} .MIN\left[all, c, com : \frac{XINT\_S(c, i)}{AINT(c, i)}, \frac{XPRIM(i)}{APRIM(i)} \right] \tag{5}$$

Where as equation for its intermediate goods becomes

$$\frac{XINT\_S(c, i)}{ATOT(i)} = XTOT(i) \tag{6}$$

where $PPRIM(i)$ is the price of composite primary factor by industry, $XPRIM(i)$ is the demand of composite primary factor by industry, $XINT\_S(c, i)$ is the demand for commodity by industry, $XTOT(i)$ is the output or supply of commodity, $ATOT(i)$ is the technical change of all factors, and $APRIM(i)$ is the Armington elasticity.

The total demand for composite goods is written in equation (7).

$$XD\_S(c) = sum(i, XINT\_S(c, i) + XHOU\_S(c) + XG\_S(c) + XINV\_S(c) \tag{7}$$

where $XD\_S(c)$ is the total demand for good c, $XINV\_S(c)$ is the total industrial demand for good c, $XHOU\_S(c)$ is the total household demand for goods c, $XG\_S(c)$ is the total government demand for goods c, and $XINV\_S(c)$ is the total demand of goods c for investment.

The demand equation for the factor of production is derived by cost minimization subject to the constraint of the CES production function.

$$\min : \sum_{f} \mathrm{WDIST}(f, i).\ \mathrm{PFAC}(f).\ \mathrm{XFAC}(f, i) \text{ subject to}$$

$$\mathrm{XPRIM}(i) = \left[\sum_{f} \delta_{f} \left(\frac{\mathrm{XFAC}(f, i)}{\mathrm{AFAC}(f, i)} \right)^{-\rho} \right]^{-\frac{1}{\rho}} \quad (8)$$

where $\mathrm{XFAC}(f, i)$ is the demand for factor f by industry i, $\mathrm{PFAC}(f)$ is the price of factor of production f, $\mathrm{WDIST}(f, i)$ is the distortion premium for factor f in industry i, and $\mathrm{XPRIM}(i)$ is the total value added.

In market clearing situation, the total output or supply of a commodity and the total demand for goods are equal. The demand for goods consists of the demand for the domestically produced goods and the demand for the export goods. At this level, the supply of a commodity can be written as equation (9).

$$\mathrm{XTOT}(c) = \mathrm{XD}(c, \text{“dom”}) + \mathrm{XEXP}(c) \quad (9)$$

where $\mathrm{XTOT}(c)$ is the total output of commodity c, $\mathrm{XD}(c, \text{“dom”})$ is the total domestic demand for commodity c, and $\mathrm{XEXP}(c)$ is the exports demand for commodity c.

3. RESULTS AND DISCUSSIONS

The summary statistics of the four groups of household are presented in Table 1. The variation in the maximum income of the household groups ranges from Rp117,259 per month for the rural poor to Rp38,213,000 per month for urban non-poor household. The variation in the minimum income ranges from Rp23,456 per month for the urban poor to Rp151,345 per month for the urban non-poor. The lowest average monthly income for the rural poor is Rp94,673. It is found that 54.62 percent of the total income is received by the urban non-poor, but this group of household consists only 32.73 percent of the total population. The rural non-poor received 42.84 percent of the total income, but they are represented by 50.80 percent of the total population. The rural poor controls 1.68 percent of the total income, but they are consisted of 11.77 percent of population. The urban poor consisted of 4.71 percent of the total population and received only 0.86 percent of the total income.

Table 1: The Income Distribution by Household Groups

Household	Income (Rp/Month)					Population	
	Mean	Max	Min	Total (000)	%	N	%
Urban non-poor	1,108,536	38,213,000	151,345	93,562,688	54.62	84,402	32.73
Urban poor	121,908	150,797	23,456	1,479,600	0.86	12,137	4.71
Rural non-poor	560,245	16,605,113	117,267	73,395,415	42.84	131,006	50.80
Rural poor	94,673	117,259	27,262	2,872,952	1.68	30,346	11.77
Total				171,310,655	100.00	257,891	100.00

Source: Susenas 2005

The Impact of policy scenarios of the transfer of fuel subsidy to food crop sub- sector

The impact of the policy scenarios of the transfer of fuel subsidy to the food crops sub-sector varies for each income level of all households, depending on various simulations as presented in Table 2. As mentioned before, the transfer of fuel subsidy to agricultural sector means cutting fuel subsidy by a certain percentage and the government uses the same amount of money saved to subsidize the agricultural sector. In this study we do not specify the type of subsidy that should be given to the agricultural sector. In other words, this subsidy can be in the forms of input subsidy or price subsidy. The simulation of the transfer of fuel subsidy to food crops sub-sector by 12.35 percent (sim1_a) has a negative impact or a reduction in the level of income for the urban non-poor, urban poor and rural poor households. The only household group that realizes an increase in income is the rural non-poor. The decline in income of the three groups of household can be attributed to the amount of subsidy given to the food crops sub-sector is too small in order to offset the impact of cutting fuel subsidy. While the increase in income of the rural non-poor households is because these households have relatively greater command of resources in the food crops sub-sector. The rural non-poor households consist of land- and capital-owners in this sub-sector. To this group of households, a reduction in fuel subsidy by 12.35 percent and at the same time the amount of money saved by the government is channeled to food crop sub-sector makes them well off.

Table 2: Simulation Results: The transfer of fuel subsidy to the food crops sub-sector on household income levels

Household	Percentage Change		
	Sim1_a	Sim1_b	Sim1_c
Urban non-poor	-0.0416	0.0340	0.8312
Urban poor	-0.2056	-0.5260	-0.4964
Rural non-poor	0.0814	0.4511	1.8091
Rural poor	-0.0226	0.0850	0.9000

Notes: Sim1_a: transfer of fuel subsidy by 12.35%;
Sim1_b: transfer of fuel subsidy by 43.2%;
Sim1_c: transfer of fuel subsidy by 100%.

The simulations of the transfer of a fuel subsidy to food crops sub-sector by 43.2 percent (Sim1_b) and by 100 percent (Sim1_c) show an increase in income of the urban non-poor, rural non-poor, and rural poor households. The only household group that realizes a reduction in income is the urban poor. The increase in income of the non-poor and poor households in the rural area may be attributed to these households heavily involved in this sub-sector and it is a well known fact that this sub-sector mostly located in rural areas. An increase in the income of the urban non-poor households may be attributed to the spillover effect since some of the urban non-poor households have a control on rural agricultural sector as owners of land and capital, as well as sellers and buyers of agricultural inputs and outputs and other agricultural business activities related to food crops. In other words, the effect of the subsidy given to the food crops sub-sector is big enough to offset the effect of an increase in the general price level is realized in simulations 1-b and 1-c. A reduction in income of the urban poor is realized as this group of people has almost nothing to do with food crops sub-sector. Also, most likely the urban poor's market basket is different from those of other groups, thus the impact on diverting fuel subsidy to food crops sub-sector shows a decrease in their real income.

The next effort is to investigate the impact of the change in income to the number of poor people (α equals to zero), poverty gap (α equals to one), and poverty severity (α equals to two). Despite the decline in household income, this does not contribute to an increase in the number of poor households as shown by zero percentage change between simulated results and the base line for all groups of household (Table 3). However, this policy only adds to the poverty gap among the poor and also there is an increase in the severity of poorness as shown by the poverty severity index. The poverty gap index of the rural poor has increased by 0.10 percent compared to those of the urban poor that has increased by 0.84 percent. The poverty severity index of the rural poor has increased by 0.16 percent, but for the urban poor this index has increased by 0.87 percent. The increase in the poverty gap and severity indices for the urban poor is greater than those of the rural poor. It is suspected that the rural poor have more control of the agricultural sector, either as a farmer or as a farm worker, compared to those of the urban poor. So, the transfer of fuel subsidy by 12.35 percent made both the urban and rural poor worse off in terms of poverty gap and severity, but these effects were more severe among the urban poor.

Table 3: The Impact of Policy Simulation: Transfer of fuel subsidy to the food crops sub-sector by 12.35 percent on poverty

FGT Index	Baseline			Sim1_a			Percentage Change		
	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$
Urban non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Urban poor	1.0000	0.1916	0.0577	1.0000	0.1932	0.0582	0.0000	0.8351	0.8666
Rural non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Rural poor	1.0000	0.1926	0.0620	1.0000	0.1928	0.0621	0.0000	0.1038	0.1613

If the reduction in fuel subsidy is 43.2 percent and the same amount of money saved is transferred to food crops sub-sector (Table 4), the number of poor households in the rural area is decreased by 0.42 percent. The poverty gap and poverty severity indices are decreased by 0.36 percent and 0.32 percent. In general, this simulation not only able to increase in the level of household income, but also it is able to reduce poverty gap and poverty severity among rural poor. However, among urban poor this simulation shows that the level of inequality (poverty gap) is increased by 2.19 percent and the severity (poverty severity) is increased 2.43 percent.

Table 4: The Impact of Policy Simulation: Transfer of fuel subsidy to the food crops sub-sector by 43.2 percent on poverty

FGT Index	Baseline			Sim1_b			Percentage Change		
	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$
Urban non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Urban poor	1.0000	0.1916	0.0577	1.0000	0.1958	0.0591	0.0000	2.1921	2.4263
Rural non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Rural poor	1.0000	0.1926	0.0620	0.9958	0.1919	0.0618	-0.4200	-0.3634	-0.3227

The policy simulation of cutting 100 percent of fuel subsidy and transferred the amount saved to the food crops sub-sector yields the same directional effects as those of the effects of the simulation 1_b, but with greater effects on poverty, as shown in Table 5. The results of the simulation show that this policy is able to increase the level of income of all households except for the urban poor households. An increase in income reduces poverty by 4.33 percent among rural poor households. Also, an increase in income reduces the disparity and the severity of poverty in the rural area as shown by a decrease in the poverty gap and poverty severity indices by 3.69 percent and 3.71 percent. Although this policy is able to reduce overall poverty, but for the urban poor this policy have detrimental effects as shown by an increase in the poverty gap index by 2.09 percent and an increase in the poverty severity index by 2.25 percent.

Table 5: The Impact of Policy Simulation: Transfer of fuel subsidy to the food crops sub-sector by 100 percent on poverty

FGT Index	Baseline			Sim1_c			Percentage Change		
	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$
Urban non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Urban poor	1.0000	0.1916	0.0577	1.0000	0.1956	0.0590	0.0000	2.0877	2.2530
Rural non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Rural poor	1.0000	0.1926	0.0620	0.9567	0.1855	0.0597	-4.3300	-3.6864	-3.7097

In summary, among the three simulations, it is found that, simulation 1_c has a greater contribution to poverty reduction in comparison to two other simulations. However, simulation 1_c has a drawback in terms of widening the poverty gap and increasing severity of poverty for the urban poor households. These findings are in tandem with the results of a study by Yudhoyono (2004) who concluded that, in short term, an increase in government spending in the agricultural sector has an impact on rural poverty reduction. Likewise, according to Simatupang and Dermoredjo (2003) an increase in GDP of agriculture sector has an impact on reducing poverty in rural areas.

The Impact of Policy Scenarios of the transfer of fuel subsidy to other crops sub-sector

As we have mentioned earlier, other crops sub-sector consists of plantation crops such as oil palm and rubber. These are major exports crops of Indonesia. Cutting fuel subsidy by a certain percentage and channeled this saving to other crops sub-sector shows an interesting results on the levels of income of the four groups of households as presented in Table 6. It is found that all of them realize an increase in their income. These findings may be attributed to the fact that most households in each group relies on these plantation crops, either as a worker, land owner, supplier of inputs, buyer of outputs, and other downstream and upstream activities related to these crops. Plantation crops such as rubber and oil palm provide big employment, either directly or indirectly. Indonesia is the world's largest oil palm producer and the second largest rubber producer. It is found that rural households realize a larger increase in income compared to those of the households in the urban area. It is a well known fact that the production activity of the other crops sub-sector is taking place mostly in rural areas while some other upstream and downstream activities of this sub-sector are in urban areas. It is also found that the greater the transfer of fuel subsidy to other crops sub-sector, the greater the increase in income levels experienced by each households group.

Table 6: Simulation Results: The transfer of fuel subsidy to the other crop sub-sector on Household Income Levels

Household	Percentage Change		
	Sim2_a	Sim2_b	Sim2_c
Urban non-poor	0.4674	1.2544	16.7885
Urban poor	0.3224	0.5230	11.7780
Rural non-poor	0.5709	1.8104	20.5742
Rural poor	0.4589	1.3746	17.4994

Notes: Sim2_a: transfer of fuel subsidy by 12.35%;
Sim2_b: transfer of fuel subsidy by 43.2%;
Sim2_c: transfer of fuel subsidy by 100%.

Table 7 reveals the results of the simulations of transferring 12.35 percent of fuel subsidy to other crops sub-sector on poverty. It is found that this policy is able to increase the level of income for all household groups and at the same time this policy is able to alleviate poverty, especially for the poor who are placed slightly below poverty line.

Table 7: The Impact of Policy Simulation: Transfer of fuel subsidy to other crops sub-sector by 12.35 percent on poverty

FGT Index	Baseline			Sim 2_a			Percentage Change		
	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$
Urban non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Urban poor	1.0000	0.1916	0.0577	0.9839	0.1890	0.0568	-1.6100	-1.3569	-1.5598
Rural non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Rural poor	1.0000	0.1926	0.0620	0.9782	0.1890	0.0608	-2.1800	-1.8692	-1.9355

The transfer of fuel subsidy by 12.35 percent was able to reduce the number of rural poor by 2.18 percent and those in urban area by 1.61 percent. The transfer of fuel subsidy by 43.2 percent was able to reduce poverty of the urban and rural poor by 2.35 percent and 6.45 percent, as shown in Table 8. The higher the percentage of the transfer of fuel subsidy to other crops sub-sector shows a greater percentage of poverty reduction. It is interesting to note that if the government abolishes, i.e. reduces 100 percent, of the fuel subsidy and use the saving to subsidize other crops sub-sector, the number of urban poor is reduced by 35.57 percent. And, at the same time the rural poor households is reduced by 48.40 percent, as shown in Table 9.

Table 8: The Impact of Policy Simulation: Transfer of fuel subsidy to other crops sub-sector by 43.2 percent on poverty

FGT Index	Baseline			Sim 2_b			Percentage Change		
	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$
Urban non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Urban poor	1.0000	0.1916	0.0577	0.9765	0.1874	0.0563	-2.3500	-2.1921	-2.4263
Rural non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Rural poor	1.0000	0.1926	0.0620	0.9355	0.1820	0.0586	-6.4500	-5.5036	-5.4839

Table 9: The Impact of Policy Simulation: Transfer of fuel subsidy to other crops sub-sector by 100 percent on poverty

FGT Index	Baseline			Sim2_c			Percentage Change		
	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$	$\alpha = 0$	$\alpha = 1$	$\alpha = 2$
Urban non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Urban poor	1.0000	0.1916	0.0577	0.6443	0.1191	0.0336	-35.570	-37.839	-41.768
Rural non-poor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Rural poor	1.0000	0.1926	0.0620	0.5160	0.1007	0.0308	-48.400	-47.716	-50.323

An increase in the households' income can be attributed to the ability of this sub-sector to generate many employments. Several studies show that employment is the key to poverty alleviation and thus reduce income inequality (for example, see Bluestone and Harrison, 2000). If there is someone in a household working for money, it is most unlikely that household is poor (Hills 2004; Lohmann 2009).

The results of the simulations show that the impact on the reduction of poverty in rural area is greater than those of the urban area. It is believed that the rural community has greater access to other crops sub-sector, such as land ownership, supply of labor, and control of inputs, compared to those of urban people. Thus, the rural poor has a relatively higher increase in income. Furthermore, the rural economic structure is simple, and it is relatively easy to find job in the rural area, so that the impact of reduction in fuel subsidy is less stressful to rural folks than those in the urban. According to Wilson (1996) and Brady, et al (2010) the concentration of poverty in the urban area is the result of the disappearance of jobs.

It is also found that a reduction as well as the removal of fuel subsidy and the amount of money saved is used to subsidize other crops sub-sector is able to reduce poverty incidences for all household group. Thus, if the goal of the government is to lighten the burden of fuel subsidy payment and at the same time is to reduce poverty, then the subsidy to other crops is feasible to be undertaken. Other crops sub-sector consists of plantation crops such as oil palm and rubber that are considered as exports crops of Indonesia. This sub-sector is able to generate relatively bigger employment either directly or indirectly through upstream and downstream activities. These findings are in support to Abhimanyu (2000) who found that the agricultural sector, especially rubber plantation activities, provides great benefits to the society. Furthermore, a subsidy is one of the effective ways for poverty alleviation especially among the rural community. The *Lembaga Penelitian* IPB (2002) found that a model for agricultural development called Agricultural Based Development is able to spur high economic growth. This is in support to an earlier work by Arndt, et al (1998) who found that the development of the agricultural sector is able to reduce poverty. Ravallion and Datt (1999) suggest that an increase in the growth of the agricultural sector is one of the most efficient ways to reduce income inequality and poverty. The growth in the manufacturing sector is important for overall growth of a country, but the growth in the agricultural sector is very important for employment and poverty reduction. Bigsten and Levin (2000) suggest several strategic elements that are able to reduce poverty, among others are outward-oriented strategy for export-led economic growth for labor intensive manufacturing, and agricultural and rural development programs. Bautista (2001), Jansen and Tarp (2004), and Susilowati (2008), argued that the concept of agricultural demand-led industrialization, in addition to improving macroeconomic performance, also play a role in reducing income inequality and poverty among rural households. Suselo and Tarsidin (2008) concluded that the most

appropriate measure to reduce poverty is to give more attention to agricultural sector, such as plantation, and fisheries sub-sectors.

4. CONCLUDING REMARKS

From the results of the analysis and the discussion, it can be concluded that the policy of reducing fuel subsidy and transfer the same amount of money saved to food crops sub-sector is able to reduce poverty incidences, especially in the rural area. The greater the transfer of this fuel subsidy to the food crops, the bigger the impact in poverty reduction among the rural poor. However, this policy has a drawback in terms of an increase in the poverty gap and poverty severity indices for poor households in the urban area. In other words, if this policy is to be implemented to reduce poverty, there should be other policy or program for the urban poor so that this group is not left behind.

The transfer of fuel subsidy to other crops sub-sector gives a better impact on poverty reduction as compared with the transfer to the food crops sub-sector. We found that this policy is able to reduce poverty. However, further research to analyze the mechanism of this policy should be undertaken. In general, the transfer of fuel subsidy to the agricultural sector gives a positive impact on rural household groups compared to urban household groups. The policy to transfer fuel subsidy to the agricultural sector, either food crops or other crops sub-sector, may be implemented as an alternative measure to reduce poverty. It is assumed that the transaction cost and the level of government bureaucracy remain the same in implementing fuel and agricultural subsidies.

REFERENCES

Abimanyu, A. (2000) Impact of agriculture trade and subsidy policy on the macroeconomic, distribution, and environment in Indonesia: A strategy for future industrial development. **The Developing Economies**, 38(4), 547-571.

Arndt, C., Jansen, H.T. & Tarp, F. (1998) **Structural characteristics of the economy of Mozambique: SAM based analysis**. http://www.econ.ku.dk/ derg/papers/article.pdf. retrieved on December 6, 2010.

Basri, F. (2002) **Perekonomian Indonesia: Tantangan dan harapan bagi kebangkitan ekonomi Indonesia**. Jakarta: Erlangga.

Bautista, R.M (2000) Agriculture-based development: A SAM perspective on Central Vietnam. **The Developing Economies**, 34(1), 112-32.

Bigsten, A. & Levin, J. (2000) Growth, income distribution, and poverty: A review. **Goteborg University Working Paper in Economics**, 32.

BKFDK-RI (Badan Kebijakan Fiskal Departemen Keuangan Republik Indonesia). (2008a). **Pengembangan model Computable General Equilibrium: Modul pelatihan tahap I, Center for Eonomics and Development Studies (CEDS)**. Bandung: Fakultas Ekonomi Universitas Padjadjaran.

BKFDK-RI (Badan Kebijakan Fiskal Departemen Keuangan Republik Indonesia). (2008b). **Applied general equilibrium model for fiscal policy (AGEFIS): modul pengembangan kapasitas model CGE tahap II, Center for eonomics and development studies (CEDS)**. Bandung: Fakultas Ekonomi Universitas Padjadjaran.

Bluestone, B. & Harrison, B. (2000) **Growing prosperity**. New York: Houghton Mifflin.

Brady, D., Fullerton, S.A & Moren Cross, J.M (2010) More than just nickels and dimes: A cross-national analysis of working poverty in affluent democracies. **Social Problems**, 57(4), 559-585.

DEPKEU-RI (Departemen Keuangan RI) (2010) **I-Account anggaran dan pendapatan belanja negara**. Retrieved from http://www.fiskal.depkeu.go.id/webbkf/apbn/ (April 21, 2011)

Dermoredjo, S.K (2003) Analisis kebijakan hubungan antara sektor perekonomian nasional. **Analisis Kebijakan Pertanian**, 1(4), 345-362.

Eriksson, R.C, Kaserman, D.L & Mayo, J.W (1998) Targeted and untargeted subsidy schemes: Evidence from postdivestiture efforts to promote universal telephone service. **Journal of Law and Economics**, 41(2), 477-502.

FAO (Food and Agriculture Organization). (2008) Soaring food prices: Facts, perspectives, impact and actions required. **Paper prepared for the high-level conference on world food security: The challenges of climate change and bioenergy**, Rome, 3-5 June 2008.

Handoko, R., & Patriadi, P. (2005) Evaluasi kebijakan subsidi non-BBM. **Kajian Ekonomi dan Keuangan**. 9(4).

Hills, J. (2004) **Inequality and the State**. New York: Oxford University.

Hung, N.M & Makdissi, P. (2004) Escaping the poverty trap in a developing rural economy. **The Canadian Journal of Economics / Revue Canadienne d'Economique**, 37(1), 123-139.

Jansen, H.T & Tarf, F. (2004) On the choice of apropriate development strategy: Inside gained from CGE modelling of the mozambican economy. **Journal of Africal Economies**, 13(3), 446-478.

Kakwani, N.C, Khandker, S., & Son, H.H (2004) Pro-poor growth: concepts and measurement with country case studies. **Working Paper No. 2004-1**, Brazil: International Poverty Center.

Kasiyati, S. (2010) Analisis dampak subsidi harga pupuk terhadap output sektor produksi dan tingkat pendapatan rumah tangga di Jawa Tengah. **Journal Organisasi dan Manajemen**, 6 (1), 28-45.

Lembaga Penelitian IPB. (2002) **Studi perumusan structural adjustment program dan model pembangunan pertanian di Indonesia**. Bogor: Lembaga Penelitian, Institut Pertanian Bogor.

Lohmann, H. (2009) Welfare states, labour market institutions, and the working poor: A comparative analysis of 20 European Countries. **European Sociological Review** 25, 489-504.

Maipita, I. (2011) The effect of direct cash aid (BLT) distribution toward income and poverty level in Indonesia. **Journal of Economic and Business, Research Institute Gunadarma University**, 16 (1), 23-36.

Maipita, I., Jantan, M.D & Abdul-Razak, N.A (2010) The impact of fiscal policy toward economic performance and poverty rate in Indonesia. **Bulletin of Monetary Economics and Banking: Bank Indonesia**, 12 (4), 391-424.

Marianti, R. & Munawar, W. (2006) **Moving out of poverty: the case of desa Branta Pesisir, Kabupaten Pamekasan**. SEMERU Research Institute: Jakarta.

Moller, S., Huber, E., Stephens, J., Bradley, D. & Nielsen, F. (2003). Determinants of relative poverty in advanced capitalist democracies. **American Sociological Review**, 68(1), 22-51.

NKAPBN-RI. (2009). **Nota keuangan dan anggaran pendapatan dan belanja negara tahun anggaran 2010**.

Norton, R.D (2004) **Agricultural development policy: Concept and experiences**. West Sussex: FAO and John Willey and Sons.

Ravallion, M. & Datt, G. (1999) **When is growth pro-poor? Evidence from the diverse experiences of India's States**. New York: World Bank.

Reyes, C. M., Sobrevinas, A. B., Bancolita, J. & De Jesus, J. (2009). **Analysis of the impact of changes in the price of rice and fuel on poverty in the Philippines. Philippine Institute for Development Studies**. Discussion Paper Series No. 2009-07.

Simatupang, P., & Demoredjo, S. (2003) Produk domestik regional bruto, harga dan kemiskinan: Hipotesis trickle down dikaji ulang. **Ekonomi dan Keuangan Indonesia**, 51(3), 291-324.

Simorangkir, I. & Adamanti, J. (2010) Peran stimulus fiskal dan pelonggaran moneter pada perekonomian Indonesia selama krisis finansial global: Dengan pendekatan financial Computable General Equilibrium. **Buletin Ekonomi Moneter dan Perbankan Bank Indonesi**. 13(2), 169-192.

Son, H. H. (2004). Measuring the impact of price changes on poverty. **Working Paper International Poverty Centre** United Nations Development Programme, 33.

Stringer, R. (2001) How important are the non-traditional economic roles of agriculture in development. **Centre for International Economic Studies, Discussion Paper** No. 0118, Adelaide University, Adelaide.

Suselo, S.L & Tarsidin. (2008) Kemiskinan di Indonesia: Pengaruh pertumbuhan dan perubahan struktur ekonomi. **Buletin Ekonomi Moneter dan Perbankan Bank Indonesia**, 11(2), 155-194.

Susilowati, S. H. (2008) Strategy agricultural deman led industrialization dalam prespektif peningkatan kinerja ekonomi dan pendapatan petani. **Forum Penelitian Agro Ekonomi**, 26(1), 44-57.

Yusuf, A.A, Hartono, D., Hermawan, W. & Yayan. (2008) **AGEFIS: Applied General Equilibriumfor Fiscal Policy Analysis**. Working Paper in Economics and Development Studies No. 200807. Department of Economics Padjadjaran University.

Wilson, W. J (1996) **When Work Disappears**. New York: Norton.

Word Bank. (2005) **Kajian Pengeluaran Publik Indonesia: Memaksimalkan Peluang Baru**. Jakarta: Word Bank.

Yudhoyono, S.B (2004) **Pembangunan pertanian dan pedesaan sebagai upaya mengatasi kemiskinan dan pengangguran: analisis ekonomi-politik kebijakan fiscal**. Unpublished Ph.D. Dissertation, Bogor Agricultural University.