

The Impact of Oil Price Behavior on the Poor in Nanggroe Aceh Darussalam Province, Indonesia

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ABSTRACT

This study aims to investigate the impact of oil price increase on the poor at regional level particularly in Nanggroe Aceh Darussalam (NAD) province, Indonesia. Empirically, the occurrence of oil price changes as a result of oil subsidy reduction strategy is a customarily decisive and sticky situation for developing countries such as Indonesian after the economic crisis hit Indonesian economy in 1997. In fact, consequent effect of increasing oil price policy not only reduces government expenditure burden in the future, but also produces harmful effects on all aspects of economic sectors and socio economic households in accordance with welfare-reducing both in rural and urban regions. Since the impact of oil price changes concurrently push the inflation rate to a higher and higher level (spiral inflation), the purchasing power of households as indicated by the rate of households' real income will get worse in the near future. At long last the households which have defenseless income will be trapped into the poverty circle (vicious circle). In turn, it induces poverty rate increase in forthcoming period. To investigate the issue, this empirical study utilizes two methods to capture micro and macro portrayal of the oil price increase effect on poverty; first, Descriptive Analysis Approach (DAA) by using primary data and finally, Computable General Equilibrium (CGE) model by using SAM data in 2002 and 2005. The result of this study shows that oil price shocks in March and October 2005 generate welfare reduction of households both in rural and urban areas. But, at the end of the impact process it will be negatively perceived by the households in rural areas through higher inflation rate, especially the poorest and poor households and trapped them into chronic poverty. Moreover, rural middle income households are more vulnerable to poverty than those are in urban areas.

1. Introduction

Phenomenon of the world oil price fluctuation is one of interesting issues which requires a serious attention of industrial and developing countries owing to its resulting impact on the whole economic outlook. Deriving from sequences of the world oil price shocks for the duration of the years 1940s until 2000s shows that the world oil price was relative stable in the course of 1940s-1970s. During 1970s -1980s, the world oil price relatively increased. The highest world oil price took place at the beginning of 1980s reached 103.76 US Dollar adjusted for inflation. Then, the world oil price significantly decreased and became relative stable through 1985 until at the beginning of 2000s excluding Persian Gulf crisis and war occurred in 1990. A similar prototype of the highest world oil price repeated and reached

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102.45 US Dollar during 2000s adjusted for current inflation³. This upsurge was strongly triggered by the steep decline oil production of some of the world's largest oil fields so that it pushed world oil prices to boost up. These situations illustrate that rise and fall of world oil price is significantly unpredictable. Therefore, some countries which obtain its impact take into account the strategic program aimed at reducing government expenditure related to oil subsidy.

As crude oil exporter as well as net oil importer, Indonesia has been confronting significant consequences of the world oil price fluctuation which undoubtedly affect the macroeconomic stability and socioeconomic welfare as indicated by the purchasing power of certain society fell (the quality of living standard drop) under the threshold of poverty line of households who live both in urban and rural areas. Historically, at the first time, when the world oil prices reached the highest rate in 1980s, government revenue from crude oil and petroleum products as one of prominent income sources reduced drastically and affected the basis and prospects of economic growth⁴. The year 1982 represented a remarkable turning point of Indonesian economy for the first time as indicated by declining the role of crude oil and petroleum products as the biggest contribution on prominent government revenue. Unfortunately, at the second time, the same archetype was repeated after the economic crisis in 1997, but relatively different characteristics of bearing. The impact of fluctuation of world market oil price has been shifting the role of Indonesia as one of crude oil exporters to be as a net oil importer of the fuel oil since 2004⁵.

In line with these issues, fluctuation of international oil price have been significantly forcing Indonesian government to formulate alternative policies through some regulations in particular increasing oil prices-reducing subsidies aimed at keeping up the country's revenue and fiscal health⁶. In fact, Indonesian government has been embarking a gradually restructuring program on performing some policy adjustments particularly in determining the domestic oil prices with the aim to increase the efficiency of government expenditure due to significantly rising world oil prices after the economic crisis in 1997.

Consistent with the financial memorandum reports published by Financial Department of Indonesia, government subsidy on oil prices had sharply enlarged since the fiscal year 1997/1998. Before economic crisis occurred and destroyed almost economy of ASEAN

³ As illustrated by Mouawad, 2008 concerning "Oil Tops Inflation-Adjusted Record Set in 1980" in Business, The New York Times.

⁴ Two key features of the Indonesian economy made it potentially vulnerable to shocks originating abroad because of a significantly more dependent on foreign trade (the share of imports to GDP at current prices rose higher than exports, 26.3 % compared to 22.4%, respectively) and an extreme reliance on non-renewable exports such as crude oil, liquefied natural gas, timber products, metals and minerals which accounted for roughly three-fourths of the value of total exports as clarified by Erik Thorbecke, 1992 according to his publication on Adjustment and Equity in Indonesia.

⁵ The configuration of an energy switch in connection with the country's energy mix with respects to oil subsidy will be become a crucial agenda in the future as stated by Anshory and Resosudarmo, 2007.

⁶ Based on the daily reports of Economic Research, Finance, and International Cooperation Bureau, Indonesian Department of Finance regarding economic indicators and Government Income and Expenditure Budget (APBN) reports guided by Law No. 36/2005 concerning Financial Memorandum.

countries in 1996, Indonesian government spending on oil price subsidies accomplished just around 1.42 trillion rupiah (595.89 million US dollars) and non-oil subsidies included fertilizer, basic food items, electricity, the credit interest of program, and others were approximately 0.24 trillion rupiah (100.71 million US dollars). In 1998, the oil subsidies augmented appreciably to be 28.61 trillion rupiah (3,565.11 million US dollars) along with increasing non-oil subsidies were equal to 7.18 trillion rupiah (894.70 million US dollars). Furthermore, the highest increase of the government oil subsidies recorded 68.38 trillion rupiah (6,575.00 million US dollars) occurred in 2001 during the last five years. Conversely, the non-oil subsidies degenerated until the amount of 9.06 trillion rupiah (871.15 million US dollar). Nevertheless, in 2003, both oil and non-oil price subsidies were drastically decreased by 30.04 and 13.86 trillion rupiah (3,548.73 and 1,637.33 million US dollars) respectively. Fatefully, declining government oil subsidy did not keep hold of in the long term due to the government budget burden increases over again in 2005 and even more than the foregoing years, 2001. So, the year 2005 constitutes the culmination of fluctuation of oil price subsidy during the last 10 years in which the oil price subsidies reached the highest level amount of 121.08 trillion rupiah.

In response to the severely government budget burden increase in 2005, Indonesian government immediately increased oil prices as a prominent policy implemented in March and October in conjunction with issuing the Presidential Decree Number 55/2005. So, the year 2005 represented a dreadful period in which the government had launched an increase of oil prices twofold within the same year for three types of oil prices: gasoline, diesel, and kerosene price. In March 2005, gasoline price was raised from 1810 rupiah to 2400⁷ rupiah (32.6%) as well as diesel price increased starting 1630 rupiah to 2100 rupiah (27.3%), but kerosene price was still subsidized completely by the government at that point in time. In subsequent phase, in October, gasoline, diesel, and kerosene prices simultaneously increased in momentous percentage by 87.5 percent (from 2400 rupiah to 4500 rupiah), 104 percent (from 2100 rupiah to 4300 rupiah), and 185.7 percent (700 rupiah to 2000 rupiah) correspondingly. In keeping with implementing an increase of oil prices-cutting subsidies policy in 2005, Indonesian government positively enables to induce the saved money expansion to be 89.2 trillion rupiah (8.99 billion US dollar) in the fiscal year 2005 complemented with pressuring down on the government deficit budget to 24.9 trillion rupiah (2.51 billion US dollar) or approximately 0.9 percent of the Indonesian Gross Domestic Product (GDP)⁸. Actually, earlier than 1999, all oil prices were gravely subsidized. Nonetheless, since January 1999, Indonesian government initiated to allow the oscillation of oil price free in favor of market mechanism⁹.

Consequent effects of oil price changes are concurrently complemented with the higher inflation rate. Chronologically, increasing oil price will generate higher tariffs on transportation services and higher production cost which induce higher prices of the industrial

⁷ According to exchange rate in 2005, one dollar (\$) is equal to 9926 rupiah.

⁸ The development of oil prices reported by PERTAMINA in 2005 (state-owned oil company) based on Presidential Decree (Perpres) Number 55/2005.

⁹ Timeline of Indonesian Oil Pricing Policy in Searching for Equitable Energy Price Reform for Indonesia (Yusuf and Resosudarmo, 2007).

commodities. Finally, these conditions will simultaneously push high inflation rate called cost-push inflation and continuously stimulate a higher and higher inflation rate called spiral inflation¹⁰. It impinges on the households at the middle and the lower income level. Households' real income is stroked down to the lower level (the lower purchasing power) because the households have to disburse at advanced prices of consumption goods and services. The vicious circle of the oil price increase is called spiral effect.

Hence, oil price increase will not only generate a complicated problem in the whole economic dimensions but also worsen human living standards. Household is currently non-poor may end up being poor in the near future which is referred to poverty line and poor households are openly susceptible to be trapped into the chronic poverty or will be being the poorest. Implicitly, highly movements of the poverty rate in the economy are instigated by a higher vulnerability of the households at the medium and lower income level. A tremendous vulnerability of household to poverty is indicated by poor household's real income or consumption level falling down in a certain time below a certain threshold. Poverty line in Indonesia for the period 1996-2005 significantly increased not only in urban regions but also in rural areas. Nevertheless, the urban poverty line was higher than rural poverty line measured by monthly income per capita in Indonesia during 1996-2005. In general, Deaton (1989) brought to light that the reform of prices whether agricultural prices, consumer taxes, subsidies, or tariffs has consequences for individual welfare in addition to for government revenues.

In view of phenomena discussed previously, this study makes an effort to investigate the impact of oil price changes on the poor at regional level in Nanggroe Aceh Darussalam (NAD) province of Indonesia. There are two important reasons why Aceh will be focused on this study. First, Aceh is one of provinces in Indonesia which has been producing a large amount of oil and natural gas in addition to having some a wide range of particular industries in which play important role in determining the mostly aspect of the Aceh's economy. Hence, the uncertainty of these firms' existences will provide generous effect on the whole aspect of economy of Aceh in general. Second, it is one of wealthier provinces which face a higher poverty rate (CBS, 2005). In contrast, government's fiscal income and expenditure of Aceh both province and districts remarkably increased yearly¹¹.

2. Oil Prices Increase, Inflation, and Poverty

Generally, main causes of inflation can be classified into demand pull inflation and cost push inflation. Some sources of demand pull inflation are an increase in the nominal money stock

¹⁰ Cost-push inflation or supply-shock inflation is a type of inflation caused by large increases in the cost of important goods or services where no suitable alternative is available. It is argued that this inflation resulted from increases in the cost of petroleum imposed by the member states of OPEC. Since petroleum is so important to industrialized economies, a large increase in its price can lead to the increase of most products, raising the inflation rate. This can raise the normal or built-in inflation rate, reflecting adaptive expectations and the price/wage spiral, so that a supply shock can have persistent effects, Wikipedia (Encyclopedia).

¹¹ Aceh is one of wealthier regions in Indonesia as indicated by the capacity of fiscal revenues since 1999 increase sharply, on the contrary it has the fourth largest number of the poor in Indonesia as emphasized by The World Bank's report in terms of Public Expenditure Assessment of Aceh: Expenditures for Reconstructing and Poverty Alleviation, 2006.

in the economy, increase in government spending exceeds government revenue printing more money or borrowing called as the government budget deficit, cutting indirect and direct taxations, as well as a depreciation of the exchange rate. Those are as expansionary policies in which move the aggregate demand curve to the right and directly generate increasing price level goes beyond the capacity of the output level. It implies that for a given level of the nominal money supply, high prices mean a low real money supply because of the value of the number of available cash is low. In addition, the sources of cost push inflation are stimulated by an adverse supply shock such as an increase in factors prices e.g. oil price increase, rising labor costs exceeds any increase in productivity, and higher indirect taxation or the removal of subsidies. The immediate effect of the supply shock is thus a rise in the price level and a reduction in the level of output. So, an adverse supply shock is doubly unfortunate: it causes higher prices together with lower output as indicated by shifting the aggregate supply curve to the left¹².

It is understandable prototype of relationship between the effects of adverse supply shock on poverty as instigated by increasing level of prices through inflation (Cardoso, 1992; Easterly and Fischer, 2000; and Braumann, 2001). Cardoso (1992) emphasized that inflation affects poverty mainly through its impact on real wages with specific disposition such as wages increase more slowly than prices for the duration of episodes of rising inflation. Moreover, to reduce inflation by the implementation of income policy has not helped the poor. In line with this issue, Easterly and Fischer (2000) stressed that the poor suffer more from inflation than the rich do based on pooling data for 31869 households in 38 countries. Furthermore, they underlined with regards to direct measures of improvements in well-being for the poor-the change in their share of national income, the percentage decline in poverty, and the percentage change in the real minimum wage- are negatively correlated with inflation. It means that high inflation tends to lower the share of the bottom quintile and the real minimum wage and tends to increase poverty. Besides, another comprehensive elucidation of this relation investigated by Braumann (2001) using CGE as mainly instrument brought to light that real wages fall sharply during periods of high inflation. Inflation reduces real wages through (1) a decline of the capital stock and (2) a shift in relative prices. The two effects are additive and make decline in real wages exceed the decline in per capita GDP. This mechanism may contribute to rising poverty during periods of high inflation.

It highlights that there is highly relationship among oil price changes, inflation in proportion to the price level in which constitutes the accumulation of past inflation¹³, and poverty in conjunction with the vulnerability to poverty realized not very simple feature. But it takes a complex configuration relating to the resulting impact that will have an effect on the all markets in the economy encompassed the commodity market, financial market, factors market, as well as foreign market¹⁴. A better framework of a hypothetical relationship of those

¹² Aggregate Demand and Aggregate Supply: Wages, Prices, and Unemployment in Macroeconomics by Rudiger Dornbusch, Stanley Fischer, and Richard Startz, 2004.

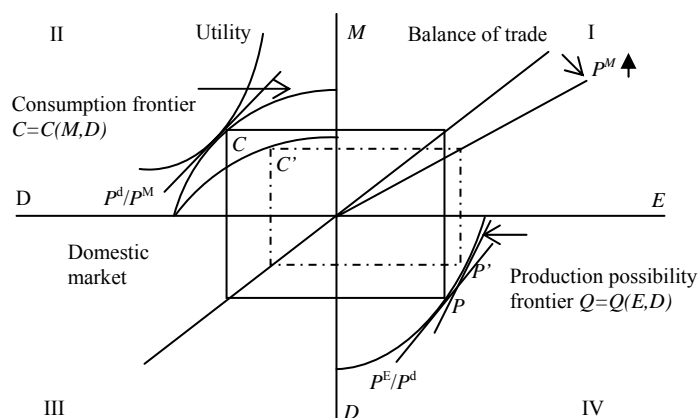
¹³ The discussion of the relation between inflation and price level is described in Macroeconomics on the topic of inflation and prices (p.38) by Rudiger Dornbusch, Stanley Fischer, and Richard Startz, 2004.

¹⁴ CGEs are fundamentally equilibrium model. Thus the proper time frame in which to apply them is the time span that it takes for all markets to reach new equilibrium after being hit by a shock as stated by Elisabeth Sadoulet and Alain de Janvry in Quantitative Development Policy Analysis, 1995.

in general equilibrium prototype is represented by the following Figure 2.1 accompanied by a number of previous empirical studies pertaining to these issues.

Theoretically, what would happen if an adverse terms of trade shock signified by an increase in the world oil price. This is demonstrated through a rotation of the balance of trade line on account of the imported good price increase such as oil. The impact of this transformation will generate a new equilibrium for the whole economy. The consumption of both import and export goods decrease which reach a new equilibrium at point C' , but the change of consumer demand behavior crucially depend on the elasticity of both goods. On the production side, a new equilibrium is at point P' . Subsequently impact of the world oil price has forced the higher volume of exports with aimed at generating foreign exchange to provide financial support towards the more expensive import together with a higher price ratio P^E/P^d in attracting resources away from D to E . In line with managing real depreciation of the exchange rate, the government initiates to implement another alternative such as reducing oil subsidies through increasing oil prices domestically in order to save healthy government's fiscal revenues in the future.

Figure 2.1 Changes in World Oil Price and Reducing Oil Subsidy



Source: Sadoulet and Janvry, 1995

Empirically, there are a number of related researches by means of applying CGE model as a primary model to recognize the impact magnitudes of higher oil prices particularly on the economy including macroeconomic over and above microeconomic components (Löfgren, 1995; Hunt, et al, 2001; Barwell et al, 2007; and UNDP, 2005). Löfgren (1995) concluded two critical points by using different simulations in the short-run equilibrium effects; raising the price of domestic oil products to international level and the impact of removing consumer subsidies that is slimming down in terms of the strongest fall in real GDP, household income diminution, the household consumption fall was relatively limited for food due to low income and price elasticity; most of the consumption cut affected other industrial goods and services, as well as employment. Hunt, et al (2001) investigated that the macroeconomic effects of oil price shocks by means of distinguishing between temporary, more persistent and permanent shocks and the channels mechanism of them. He emphasized that oil price increases can pass through into core inflation, a possible explanation of the asymmetric relationship between oil prices and economic activity, the role of monetary policy credibility, the implications of

delayed policy responses, and the relative merits of leaning in different directions when the correct policy response is uncertain.

The impact of energy prices puts upward pressure on the prices of energy-intensive goods and services as well as affects both aggregate demand and potential supply side of the economy (Barwell et al, (2007)). The adjustment of prices and quantities in the labor market is particularly important in this regard that have allowed a more muted impact of higher energy prices on the economy than previously in the UK economy. Ultimately the impact on inflation will depend on monetary policy and the behavior of inflation expectations. And the latest energy price increases will require further adjustment in real consumption wages which may have implications for wage pressures going forward if employees resist further erosions in their real take-home pay.

In 2005, UNDP investigated the impact of higher oil prices on low income countries and on the poor. Their findings showed that a sustained US\$10 a barrel price increase would deliver a shock equivalent to a loss of GDP 1.47 percent for the poorest countries (those with GDP per capita less than US\$300). Even the highest income group (over US\$9000 per capita GDP) would suffer a loss of GDP 0.44 percent. Some lowest income countries suffer a shock of up to 4 percent of GDP, and were oil prices to stay US\$20 a barrel higher, and then the effect on GDP would be doubled. Besides, households, which are consumers of certain petroleum products (kerosene, LPG and gasoline) and who also purchase other goods whose costs are impacted by oil product prices (diesel for transportation) will feel the effect of higher oil prices in their household expenditure, unless the government controls product prices and does not let them rise (thus increasing any subsidy element). In line with these issues, small and medium size enterprises are also likely to suffer from higher fuel costs, and the size of the price rise, coupled with the volatility of oil prices in general points to a possible barrier to the sustainable development of these sources of growth. Last but not least, in countries where petroleum products are subsidized, the impact of higher oil prices will not be directly felt by households, but the worsening of the government's fiscal position.

Furthermore, some empirical studies are examined by economists concerning the impact of increasing oil prices on the macro economy, employments, and poverty conducted in Indonesia by using general equilibrium framework (Hope and Singh, 1995; Susilo and Handoko, 2000; Clements, et al., 2003; Azis, 2006, Yusuf and Resosudarmo, 2007). Hope and Singh (1995) analyzed the effects of domestic energy price increases and the economic consequences on the poor, inflation, growth, public revenues, and industrial competitiveness in developing countries consist of Colombia, Ghana, Indonesia, Malaysia, Turkey, and Zimbabwe. This study draws on the effect on households in various income classes depended on the energy commodity's share in the household budget and the price elasticity of demand. Thus, the effect on industry is generally modest, since the cost shares for energy typically range from 0.5 to 3 percent (with the typical value being 1.5). In addition, many industries are flexible enough to substitute when energy prices increase so that industrial output usually increased even with the higher energy prices. The other side, energy price increase reduces the drain on public resources significantly. The effects on inflation will generally not be severe and inflation may even be reduced in the intermediate to long run, through lowered

public deficit. And income growth rates were higher during the years of price increases than before in about half of the case-study countries.

Clements, et al. (2003) looked into the impact of higher petroleum prices on the aggregate price level, real growth, and income distribution appraised using a multisectoral CGE model in which applied and calibrated for Indonesia with the Keynesian and non-Keynesian scenarios. The results showed that although petroleum production will be unaffected-assuming higher exports replace falling domestic production-the output of other sectors declines, owing to falling incomes and higher prices spurred by the reduction in subsidies. As expected, the impact on household consumption and poverty is much greater under the Keynesian scenario. Under that scenario, about two-thirds of the impact of subsidy reform on household consumption is due to second round effects, underscoring the need to consider the impact of subsidy reform in a general equilibrium context. Specifically, poor households in the urban areas are particularly vulnerable to the subsidy reduction, owing to its effect on both prices and output. Even when subsidy reform and lower budget deficit trigger higher private sector investment (the non-Keynesian scenario), the poor experience a reduction in real consumption. Generally, this study showed that a reduction in the government subsidy raises petroleum prices and production costs throughout the economy. Consumer demand, production, and income decline as output prices increase and consumer purchasing power decreases. Then, the stimulated results predict a slight increase in price level and a slight decrease in output. An important result is that urban household groups will be the most significantly affected by the subsidy reduction.

Handoko and Susilo (2000) observed the impact of oil subsidy reduction on the economic sectors (industries) and regional economic performances in Indonesia with respect to the short run and the long term analysis by using Applied Computable General Equilibrium Indorani Model (ACGE-IM). This empirical study utilizes value added, domestic price, energy price, and employment as prominent variables to depict the performance of economic sectors in term of the aggregate output as well as employment as the regional economic performance indicator. The results of the study concluded that if oil subsidy reduces 40%, it will give a greater negative effect on the economic sectors and regional economic performance in the long run period. Oil subsidy reduction decreases value-added and employment performance, but increases the domestic price in almost all economic sectors. Moreover, refinery sector, transportation, as well as medium and big scale manufactures received a greater influence than many others. According to regional economic performance as indicated by Gross Regional Domestic Product (GRDP), South Sumatra, Riau, and East Kalimantan provinces received the greatest negative impact of oil subsidy reduction in the short run period in the amount of 2.33 percent, 1.82 percent, and 2.53 percent respectively. However, in the long run period these provinces got the subsidy reduction effect approximately 4.48 percent, 3.40 percent, and 4.53 percent, respectively. Nevertheless, the smallest impact (0.3%) impinged on DKI Jakarta in the short run period and 2.49 percent in the long run period.

The further empirical study investigated in a comprehensive way allows looking the different description of cutting the fuel subsidies policy in Indonesia was examined by Azis (2006) using Financial Computable General Equilibrium (FCGE) model with a poverty module to

analyze alternative policy scenarios. He summarized that the Indonesian government has some alternative policies in managing the government budget pressure due to rising expenditures related to all sorts of subsidies, including those for the banking sector and domestic fuel consumption. In this case, the Indonesian government has opted to cut only the fuel subsidies in which such policy is ill-advised. A partial reduction, not an enormous cut, would have been sufficient if it is complemented with a fractional cut of sovereign domestic debt payments. Based on a set of simulations on a FCGE model, it is shown that slicing subsidies for the banking sector, providing that the saved money are spent on agricultural-related infrastructures, could produce a favorable outcome in terms of income distribution and poverty conditions without deteriorating the macroeconomic stability or injuring the investors' confidence. Compared with the fuel oil subsidies cut, the number of population affected by such a policy will also be much smaller. Thus, a drastic and massive reduction of fuel subsidies is unnecessary, especially considering the adverse socio-economic and political repercussions of it. Moreover, Yusuf and Resosudarmo (2007) looked into searching for equitable energy price reform for Indonesia by using CGE model based on ORANI-G model. The simulations illustrated that the reform could have been progressive if it only increases vehicle fuel prices. However, if at the same time it also increases the price of domestic fuel (kerosene), it tends to increase inequality, especially in urban area.

In line with the theoretical reviews and preceding studies as discussed above, this study formulates a hypothesis that increasing oil price as consequences of reducing government oil subsidies give significant impact on poor households and the vulnerability of the households to poverty both in urban and rural region in NAD Province.

3. Research Methodology

To analyze the impact of increasing oil prices-cutting oil price subsidies on the poor in Aceh, the study uses two approaches with the aim of obtaining the comprehensive and cohesive insights on the pattern of poverty changes as well as the vulnerability of households to poverty in Aceh. They are Descriptive Analysis Approach (DAA) and CGE-based model.

Descriptive Analysis Approach

The sources of data required in the study can be classified into primary data (cross-sectional data) and secondary data. To observe the characteristics of the poor and also to rummage around the vulnerability of households to poverty in Aceh, the study employs the primary data conducted through in-depth interview by preparing questionnaire (field observation relating to local community conditions in Aceh in urban and rural areas). There are 744 respondents (222 respondents in urban areas and 522 respondents in rural areas) in which widely spread at 21 regencies and 151 districts carried out in 2005-2006 by implementing Simple Random Sampling Method. This model is complemented with the National Socioeconomic Survey (SUSENAS) and consumer price index (CPI) published by CBS of NAD Province as well as other data sources related to the focal objectives of the study.

Descriptive Analysis Approach aims at making simple information from a primary data and in turn, preparing them through qualitatively simple performances such as a graphical and tabular description. It is expected to capture the characteristics of poor households such as

household size, income scheme of the households, education level of household head, the economic condition, and main profession of household head, behavior of oil price changes, and the other issues in view of this study's assessment. Identifying these important variables are looked forward to providing a snap shot of the situation under study which usually consists of rural and urban level information taking into consideration the behavior of respondents in facing some variables shocks such as government policy changes in particular the oil price increase-oil subsidy reduction as well as other external variables (non government policy).

Computable General Equilibrium (CGE) model

To find out the specific effect of increasing oil prices at a macro level on the poor together with the vulnerability of households to poverty, this study utilizes CGE-based model by means of Aceh's SAM Data in 2002 and 2005. In most cases, SAM data framework comprises of the structure of production activities that is similar to input output table; domestic commodities; factors of production sorted out into labor (formal and informal labor) and non labor (i.e. capital); institutions consisted of households, firm and government (see Table 3.1). To investigate the impact of oil price changes on the poor in rural and urban areas, households are classified into five categories namely the poorest, poor, middle, rich, and the richest households. Classification of households into five groups is strongly based on the poverty line indicators (CBS of Indonesia, 2005). Moreover, a set of SAM data also presents the other accounts as exogenous variables: capital balance, indirect taxes minus subsidies, as well as rest of the world. In addition, this model is strongly supported by the other macroeconomic data and SUSENAS of Aceh issued by CBS of Indonesia and NAD Province and PERTAMINA (National State-Owned Oil Company) in Aceh in formulating and applying CGE model.

Table 3.1 Classification of Micro SAM sectors of Aceh

Production sectors	Agriculture, Plantation, & Livestock, Mining & Quarrying, Manufacturing, Liquid Natural Gas, Gasoline, Diesel, Kerosene, Electricity, Gas, & Water Supply, Construction, Trade, Hotel, & Restaurant, Transportation & Communication, Financing, Real estate, & Business Services, and Services
Domestic Commodities	Agriculture, Plantation, & Livestock, Mining & Quarrying, Manufacturing, Liquid Natural Gas, Gasoline, Diesel, Kerosene, Electricity, Gas, & Water Supply, Construction, Trade, Hotel, & Restaurant, Transportation & Communication, Financing, Real estate, & Business Services, and Services
Production Factors	Formal labor, informal labor, capital
Institutions	Household (Rural & urban poorest, rural & urban poor, rural & urban middle income, Rural & Urban rich, rural & urban richest), Company, and government
Exogenous Accounts	Capital balance, Indirect taxes minus subsidy, and Rest of the World

Source: CBS of Aceh and Indonesia, 2002 and 2005

CGE is often used by the economists owing to its capability to combine features from the different types of models based on the socioeconomic structure of a SAM, with its multisectoral and multi-class disaggregation. They are, in spirit, close to multi-market models, in which agents' decisions are price responsive and markets reconcile supply and demand decisions. They additionally encompass a certain number of macroeconomic components, such as investment and savings, balance of payments, and government budget. Thus they are best chosen for policy analysis when the socioeconomic structure, prices, and macroeconomic

phenomena all prove important (Sadoulet and Janvry, 1995). So, CGE model is a system of simultaneous and non-linear simulations equations model which accommodates price and quantity variables adjustment as input factor market equalizer or commodity market equalizer in economic simulation. So, CGE model simulates the optimal condition of consumers and producers in an economy. Therefore, there is no objective function. Therefore, CGE model is a proficient method to weigh up the effect of shock on the topic of policy variables, namely tariffs, quantitative restrictions, and indirect taxes on trade flows, prices, employment, industrial structure, and economic welfare. From the output of the application of the CGE model can be used to identify how much gain and how much pain an economy sustains as a result of a change in a policy or implementation of a new policy. The trade-off arising from a change in policy or implementation of a new policy can also be identified by CGE model (Lewis, 1991; Sadoulet and Janvry, 1995; and Lofgren, et al, 2000). In this opportunity, this empirical study employs standard CGE model from IFPRI postulated by Lofgren, et al (2000). Generally, the basic characteristics of the structure of CGE model used in this study can be classified into four blocks such as; first, activities, production, and factor market; second, institutions; third, commodity market; and fourth, macro-economic constraints, as follows:

Principally, each producer has the ultimate desired object from each activity in which always generate to maximize profits as defined by the difference between revenue earned and the cost of factors and intermediate inputs employed in the production process. In achieving the maximization of profits are depended on production technology specified by constant elasticity of substitution (CES) of the variation of aggregate mix quantities between value-added and intermediate input or Leontief function of quantities of value-added and aggregate intermediate input. Specifically, producer's maximization behavior in the CGE model, in fact, constitutes a critical activity of production process in which possesses tightly relationship with labor market in determining the marginal revenue product of each factor is equal to its wage (factor price) as well as the commodities produced according to fixed yield coefficients together with deciding whether to put up for sale on the domestic market or to sell overseas on the basis of relative prices. Furthermore, in a CGE model, domestic products and imports are imperfect substitutes and the composition of domestic supply depends on their relative prices.

The second block, institutions are classified into four categories namely households, enterprises, the government, and the rest of the world as specified consistent with SAM data. Households have behavior maximize utility and thus choose their levels of consumption based on income and prices. As discussed previously concerning the schematic Social Accounting Matrix table depicts closely relationships among institutions in the economic activities. Households receive income from the factors of production from enterprises directly or indirectly as using the factors in production activities and transfer from other institutions. Thus, households will spend their income particularly in paying direct taxes, save, consume, and make transfers to other institutions. From consuming marketed commodities at market prices that includes taxes and transaction costs, and also home commodities which are valued at activity-specific producer prices, the enterprises will receive income directly or indirectly from households as well as transfers from other institutions. Then, enterprise incomes are allocated to direct taxes, savings, and transfers to other institutions. Furthermore, the

government collects taxes and receives transfers from other institutions, households and enterprises. And the government uses this income to purchase commodities for its consumption and for transfers to other institutions. Finally, transfer payments between the rest of the world and domestic institutions and factors are all fixed in foreign currency. Foreign savings (or the current account deficit) constitutes the difference between foreign currency spending and receipts.

In the commodity markets, in fact, all commodities comprised domestic output and imports enter markets. At the previous stage, aggregated domestic output is generated by the output produced through different activities domestically. Of course, elasticity behavior of these outputs is imperfect substitution owing to the differences in timing of production, quality of output, as well as distance of activity locations. In turn, a CES function is applied as the aggregation function in this model. Moreover, the demand for the output of each activity is derived from the concept of minimizing the cost of supplying a given quantity of aggregated output subject to CES function. Then again, aggregated domestic output is allocated for two purposes such as exports and domestic sales based on maximizing sales revenue of suppliers subject to CET function (imperfect transformability between exports and domestic sales). In line with prices, export demands will pay according to infinitely elastic at given world prices including transaction cost and export tax. The supply price for domestic sales is equal to the price paid by domestic demanders minus transaction cost. Furthermore, a composite commodity is consisted of domestic sales and aggregate imports consumed by domestic demanders such as household, government, investment, and intermediate use and undertake to minimize cost depending on imperfect substitution behavior between domestic sales and aggregate imports. This relationship is captured as well by a CES aggregation function. Like export commodities, imported commodities are also related to infinitely elastic at given world prices including import tariff and cost of transaction services that will be paid by domestic demanders.

In a standard CGE model implemented in this study, the value of trade elasticity for the Armington functions as well as substitution elasticity for the sectoral CES production functions are determined exogenously rooted in previous study conducted by Wuryanto (1996). The reason is strongly caused by the insufficient data available in providing a meaningful estimation of these parameters and as a result this study relies on using information from the other resources. In fact, Wuryanto (1996) also compiled this information from various publications which concerned the similar works for the Indonesian economy as well as interregional economy such as Thorbecke (1992) and Lewis (1991) at national level as well as Temenggung (1995) at the interregional level. It is reasonable because he classified the regions into two observed areas such as Java comprised Western Java, Central Java, and Eastern Java as well as outside Java according to the five biggest Indonesian islands consisted of Sumatera, Kalimantan, Sulawesi, and Eastern islands. The important thing must be kept in mind that Aceh is a part of Sumatera Island. So, it makes a strong argument to support this study in order to employ Wuryanto's study as essential reference for further considerations on formulating some adjustments of CET functions and CES functions for Aceh.

The last block of structural standard CGE model employed in this empirical study associated with the macro constraints (or closures) presents macroeconomic balances that are

encompassed three macroeconomic balances such as the current account of government, the external balance (the current account of the balance of payments, which includes the trade balance), and the savings-investment balance (Lofgren, et al, 2002). A set of alternative macro economic constraints is recapitulated in Table 3.2. Actually, government savings constitutes the difference between current government revenues and current government expenditures indicated a flexible residual while all direct tax rates are fixed (GOV-1). Moreover, GOV-2 and GOV-3 show that fixed government savings together with the dissimilar direct taxes changes such as for selected institutions by equal percentage point change and for all institutions by changing the tax rates at an equal rate, respectively. The important thing must be kept in mind that government consumption is fixed for these three government constraints. In the context of the current account of balance of payments, there are two different alternatives closures presented by the standard CGE model of IFPRI; fixed foreign savings while real exchange rate is flexible (ROW-1) and real exchange rate is fixed while foreign savings is flexible (ROW-2).

Table 3.2 Alternative Closure Rules for Macro System Constraints

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

Source: Lofgren et al, 2002

Note: (1) For the specified closure rules, the choice for one of the three constraints does not constrain the choice for the other two constraints

(2) MPS is Marginal Propensity to Save

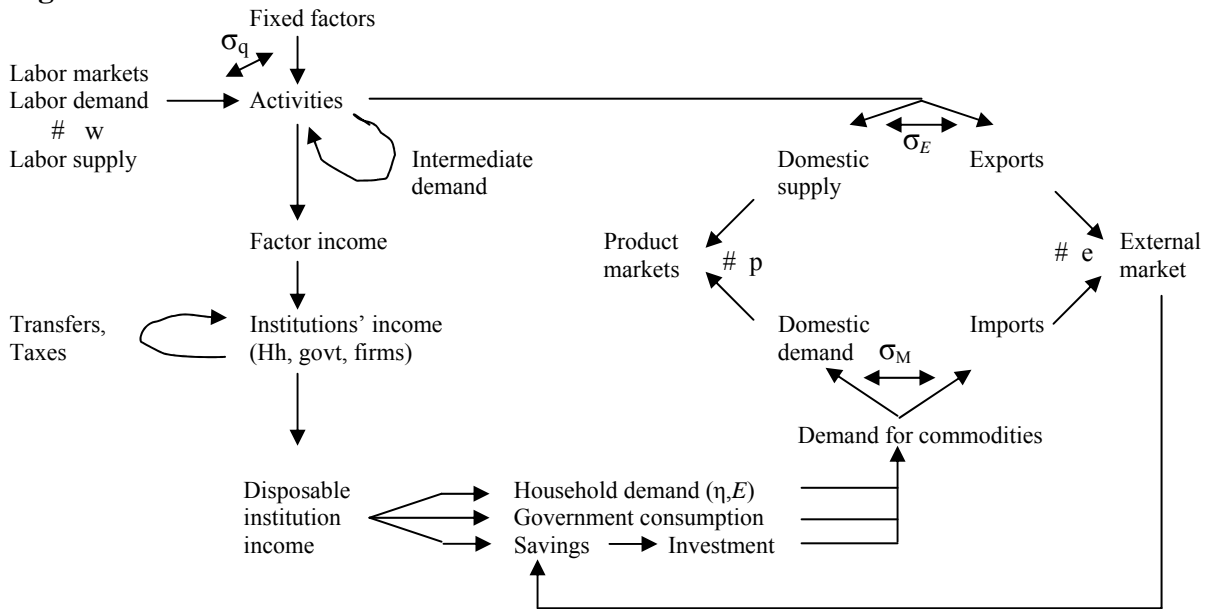
In the following discussion of macro closures is savings-investment balance classified into two categories, investment-driven and savings-driven. Based on Table 3.2, SI-1 and SI-2 illustrate tightly in terms of investment-driven because of fixed capital formation at the initial level and MPS adjusted for selected institutions in an attempt to meet the demand for total savings (the value of savings adjusts). On the contrary, savings driven closure presented by SI-3 describes that total savings are determined by the MPS and total capital formation has follow the supply savings (the value of investment adjusts). Moreover, SI-4 and SI-5 illustrate investment-driven in which the total investments are not fixed at the base year level but they are as fixed share of the total absorption of the model economy. Then, the savings are adjusted accordingly through the MPS.

In an attempt to decide which closure will be applied in this study, it is useful to take a look at the background of economic pattern of Aceh during the time frame of study analysis, 2002 and 2005. The first consideration, this empirical study will just analyze at regional economy level particularly Nanggroe Aceh Darussalam Province. The second consideration, for these periods, Aceh have implemented a new framework of political economy in relation to regional autonomy regulation as well as special autonomy regulation of Aceh respectively (The Law No. 22/1999 and The Law No. 18/2001 replaced by The Law No 11/2006) as started in 2002. There are some important points in which local governments get a huge sovereignty in managing the local political economy of each region excluding foreign politic affairs, national defense and security, justice, as well as monetary and fiscal. Apart from this issue, the appropriate macro closures implemented in this study are; the closure GOV-1 (flexible government savings and fixed direct taxes), the closure ROW-1 (fixed foreign savings and flexible real exchange rate), and the closure SI-1 (fixed capital formation and uniform MPS point change for selected institutions). Lofgren et al (2001) underlined that if a study want to investigate a single-period model, a closure combining fixed foreign savings, fixed real investment, as well as fixed real government consumption; it will be preferable for constructing simulations which aimed at delving into the equilibrium welfare changes of government's policies or avoiding potentially misleading welfare effects due to changes in foreign savings and real investment demand.

Determining macro economic closures will be a crucial framework for further analysis because their behavior influences the results of simulations. Therefore, the typical simulations will be built in structure of this study which focuses on investigating several shocks on increasing oil price on oil products such as gasoline, diesel, and kerosene on the poor that enforce a new equilibrium. Specifically, the first shock will be employed over increasing gasoline and diesel prices simultaneously adjusted according to the government oil prices policy of those (domestic prices) in March 2005 such as 32.5 percent and 27 percent correspondingly. The second type of simulation, the oil prices increase including three of those for instance gasoline, diesel, and kerosene are also determined in keeping with the government oil prices policy in October 2005 amount of 87.5 percent, 104 percent, and 185.7 percent respectively. Finally, the third simulations, the study will put all of those together in one shock, the combination of the government oil prices strategies conducted in March and October 2005.

Actually, a full presentation of the equations of a CGE utilized in this empirical study is enclosed in Appendix. Nevertheless, the following approximately graphical presentation represented by Figure 3.1 illustrates the functioning of a multisectoral CGE model. The model is a system of simultaneous equations expressing the decisions of the agents, which, for the sake of this presentation, that will be decomposed into a succession of decisions and adjustment processes with respect to four blocks discussed previously above such as production activities and factor market; institutions; commodity market; and macro-economic constraints as follows:

Figure 3.1 Flow Chart of CGE Model



Source: Sadoulet and Janvry, 1995

Note : The symbol # p, w, and e represents a market mechanism with equilibrium price p, wage w, and exchange rate e, σ_q are elasticities of substitution between factors of production, σ_M are elasticities of substitution between imports and domestic goods, σ_E are elasticities of transformation between imports and domestic goods, η and E are income and price elasticities of household consumption

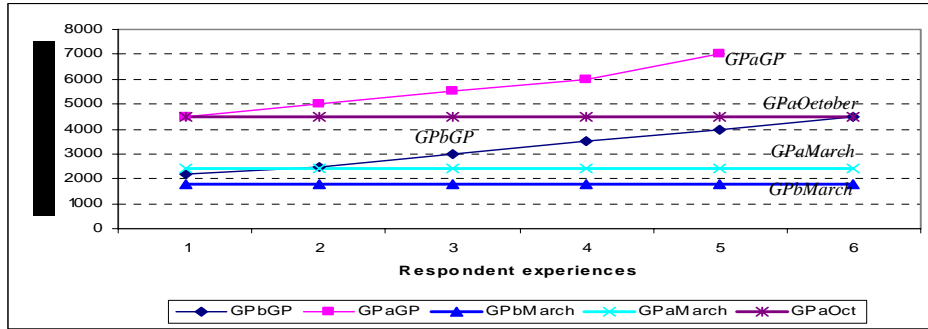
4. Results and Discussions

a. The Characteristics of Oil Price and Inflation Rate in Aceh

Oil price increase is a significant aspect to provide the negative bearing on the socioeconomic condition of society in Aceh as pointed out by increasing number of the poor continuously every year¹⁵. According to field study, people in rural and urban areas confront significant variation of oil prices. Before government implements the new oil price 2400 rupiah per liter in March 2005, gasoline price was 1810 rupiah per liter. Nonetheless, the realistic price of gasoline in the society is higher than the government resolution varied 2200 rupiah per liter up to 4500 rupiah per liter in rural and urban regions. Then, the extremely surging gasoline price in October 2005 amounts to 4500 rupiah per liter has stimulated the actual price in the society 4500 rupiah per liter up to 7000 rupiah per liter. It is paid by 453 respondents consisted of 164 respondents (36.2%) live in the city areas and 289 respondents (63.8) stay in rural areas. This situation clarifies that more than 50 percent household from the total respondents face gasoline price above the government's gasoline price declaration. The illustration of actual gasoline price based on respondent's experiences together with the government price decree on gasoline price is represented by Figure 4.1.

¹⁵ According to CBS of Aceh, 1996-2005 and The World Bank's report in terms of Public Expenditure Assessment of Aceh: Expenditures for Reconstructing and Poverty Alleviation, 2006 and.

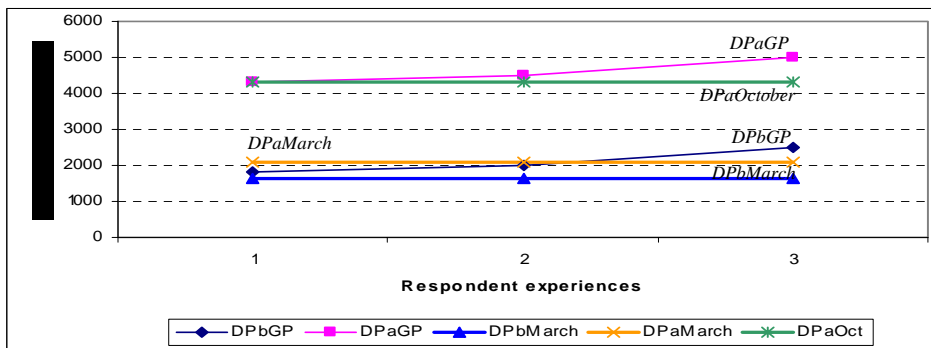
Figure 4.1 Gasoline Prices Before and After Government Oil Price Policy in 2005



Source: Own presentation based on field research in Aceh, 2005-2006
 Note: GPbGP & GPaGP (Gasoline prices before & after government price resolution), GPbMarch & GPaMarch (Government price resolution of gasoline price before & in March 2005), and GPaOct (Government price resolution of gasoline price in October 2005).

On the other hand diesel price is relatively unwavering as compared with gasoline price. Before government employs the new diesel price 2100 rupiah per liter in March 2005, diesel price was 1650 rupiah per liter. Fortunately, diesel price in the field is not extremely different from the diesel price determined by government. In contrast, after government determined diesel price in October 2005 amount of 4300 rupiah per liter, diesel price in the real world increase 4300 rupiah per liter up to 5000 rupiah per liter in rural and urban areas. Comparing with an escalating gasoline price, diesel price increases in the society not beyond doubt varied as high as gasoline price. Percentage of households at middle and lower income level using diesel is very small, 8 respondents from the total respondents. Figure 4.2 illustrates fluctuation of diesel price before and after government resolution together with diesel prices in the society.

Figure 4.2 Diesel Prices Before and After Government Oil Price Policy in 2005



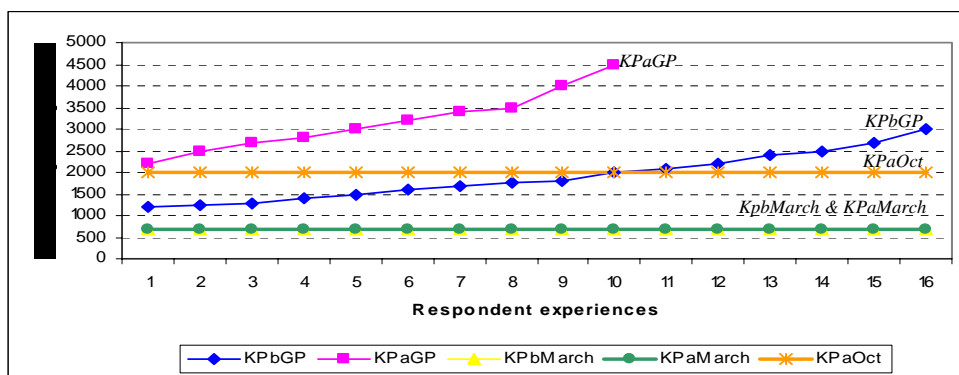
Source: Own presentation based on field research in Aceh, 2005-2006
 Note: DPbGP & DPaGP (Diesel prices before & after government price resolution), DPbMarch & DPaMarch (Government price resolution of diesel price before & in March 2005), and DPaOct (Government price resolution of diesel price in October 2005).

Tremendously expose of increasing oil price is kerosene price in the society. In March 2005, government decided to increase oil price except for kerosene price in which the kerosene price remains at the previous price amount to 700 rupiah per liter, the actual kerosene price in the society increase automatically more than government's kerosene price varied 1200 rupiah per liter up to 3000 rupiah per liter. It is influenced by a strong enough market mechanism

after government changes gasoline and diesel prices. Thus, while government decided to formulate new kerosene price to higher level in October 2005 amount of 2000 rupiah per liter, the households really face the dreadful real prices of kerosene in the real world more than twofold government's kerosene price range 2200 rupiah per liter up to 4500 rupiah per liter. This situation affects negatively the socioeconomic households both in rural and urban areas. Assuming household income is constant, and it was enough to cover living cost at the previous months. However, now, it is not really enough to cover the living cost in the same way as before.

From 744 respondents interviewed in this study, 636 respondents (85.5%) both in rural and urban areas use up kerosene in daily economic and non-economic activities. Whereas, 108 respondents (15.5%) utilize gas or firewood. This condition portrays that the dependency of households especially at the middle and lower income level to consume kerosene is high. Thus, when kerosene price increase extremely, most households at the lower income level receive its harmful impact. Fluctuation of kerosene price recompensed by the consumers in rural and urban areas is depicted by Figure 4.3.

Figure 4.3 Kerosene Prices Before and After Government Oil Prices Policy in 2005



Source: Own presentation based on field research in Aceh, 2005-2006

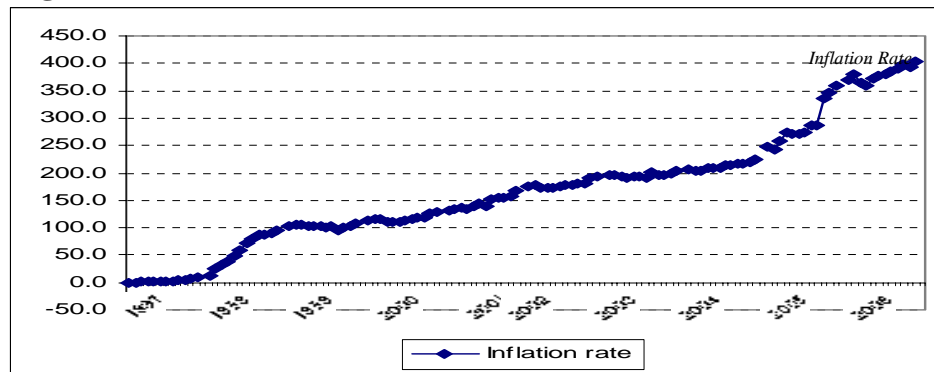
Note: KPbGP & KPaGP (Kerosene prices before & after government price resolution), KPbMarch & KPaMarch (Government price resolution of kerosene price before & in March 2005), and KPaOct (Government price resolution of kerosene price in October 2005).

In addition to the impact of oil price changes as a fundamental issue, the scarcity of gasoline, kerosene, and diesel supply is also a great quandary experienced by households in Aceh generally. Field study explicates that the shortage of oil stock both in rural and urban areas is relatively often, stated by 35.4 percent of 744 respondents. Whereas, 64.6 percent respondents affirm that the paucity of oil supply is seldom. Moreover, the duration of oil shortage is usually around 3 days as strengthened by 31.4 percent of 744 respondents and occasionally only 2 days excused by 24.6 percent, and just 1 day described by 14.8 percent respondents. To stand facing the scarcity of oil stock, mostly households (57.8%) take a crack at looking for the other places, 31.0 percent respondents just wait for the normal situation of oil supply from usual places, and only 11.2 percent respondents make an effort by using another alternative.

Therefore, the consequences of oil price increase will force the poor and the middle income households in rural and urban areas to confront significant variation of oil prices and also face

harmful living cost as a result of higher inflation rate in the economy. It implies that the proliferation of oil price will provide negatively momentous bearing on worsening socioeconomic activities for certain income level households. They are easily trapped into the vulnerability to poverty (vicious circle). Figure 4.4 historically illustrates the expansion of inflation rate in Aceh during 1997-2006 in which the year 1998 and 2005 became steep peak of inflation rate. In 1998, Indonesia faced extremely economic crisis influenced on the whole Indonesian economic aspects. Then, in 2005, Indonesian government launched an increase of oil price twofold within the same year especially three types of oil prices: gasoline, diesel, and kerosene price. These conditions have speeded up increasing inflation rate in Aceh at the significant level.

Figure 4.4 Inflation Rate in Aceh, 1997-2006



Source: Own calculation based on CBS of Aceh

Note: Inflation rate is calculated by using CPI at constant price the year 1996

b. The Characteristics of the Poor Households

Based on primary data illustrates that the moderate income household amount to 99 respondents encompassed 23 respondents (23.2%) live in the cities and 76 respondents (76.8%) in the villages. Moreover, poor households amount to 304 respondents comprised of 60 respondents (19.7%) live in the cities and 244 respondents (80.3%) in the villages, and rich households are 341 respondents which composed of 139 respondents (40.8%) live in the cities and 202 respondents (59.2%) in the villages. The determination of household classifications is highly founded on the nominal income criteria of household head.

Characteristics of poor households with regards to socioeconomic households describe that every household has a quietly large household size on average 3 members up to 7 members in one family. However, a big household size approximately 5 and 4 members in one family amount to 22.2 percent (165 respondents) and 22 percent (164 respondents) respectively. Household size with more than 5 members in a family is dominated by the poor and the rich (see Table 4.1). The biggest number of household size who has a number of 5 members in one family are dominated by poor households that is 23 percent (70 of 304 respondents of total the poor). On the other hand, the moderate and rich households merely have with equal numeral namely 4 members of each family. This illustrates that the dependency ratio of poor households is greater than the moderate and rich households.

Table 4.1 Number of Respondents and Household Size by Household Groups

Regions	Moderate	%	Poor	%	Rich	%	Total	%
Village	76	76.8	244	80.3	202	59.2	522	70.2
City	23	23.2	60	19.7	139	40.8	222	29.8
Total	99	13.3	304	40.9	341	45.8	744	100.0
HH size	Moderate	%	Poor	%	Rich	%	Total	%
1	0	0.0	0	0.0	2	0.6	2	0.3
2	4	4.0	7	2.3	14	4.1	25	3.4
3	17	17.2	19	6.3	56	16.4	92	12.4
4	29	29.3	55	18.1	80	23.5	164	22.0
5	26	26.3	70	23.0	69	20.2	165	22.2
6	9	9.1	65	21.4	58	17.0	132	17.7
7	3	3.0	47	15.5	37	10.9	87	11.7
8	6	6.1	26	8.6	15	4.4	47	6.3
9	4	4.0	7	2.3	2	0.6	13	1.7
10	1	1.0	8	2.6	8	2.3	17	2.3
Total	99	100	304	100	341	100	744	100

Source: Own presentation based on field research in Aceh, 2005-2006

Besides, major profession of respondents relied on the household head's profession are mostly as a farmer 27.6 percent. Poor households have an enormous percentage add up to 41.1 percent of total poor respondents. Moderate and rich households only come to 34.3 percent and 13.5 percent of total respondents (99 and 341 respondents respectively). The second customarily profession of the household heads is 19.1 percent of total respondents as trader (see Table 4.2). In keeping with this proportion, the rich and moderate incomes have a greater number than poor households amount of 29.6 percent and 20.2 percent correspondingly. The poor have a very small percentage who works as a trader indicated by 6.9 percent. At last, the occupation of household heads as civilian government employer is 12.9 percent of total samples decomposed specifically 24.9 percent of rich families, moderate households amount to 9.1 percent and poor households add up to only 0.7 percent.

Table 4.2 Main Profession of Respondents by Household Groups

Main profession (M1)	Moderate	%	Poor	%	Rich	%	Total	%
The death of main income sources	5	5.1	52	17.1	28	8.2	85	11.4
Farmer	34	34.3	125	41.1	46	13.5	205	27.6
Trader	20	20.2	21	6.9	101	29.6	142	19.1
Unskilled industry lab.	0	0.0	2	0.7	2	0.6	4	0.5
Coolie labor	5	5.1	14	4.6	3	0.9	22	3.0
Unskilled farm labor	2	2.0	36	11.8	2	0.6	40	5.4
Services/Trad. Transport.	6	6.1	11	3.6	8	2.3	25	3.4
Civilian Govnt. Worker	9	9.1	2	0.7	85	24.9	96	12.9
Jobless	0	0.0	3	1.0	1	0.3	4	0.5
Others	18	18.2	38	12.5	65	19.1	121	16.3
Total	99	13.3	304	40.9	341	45.8	744	100.0

Source: Own presentation based on field research in Aceh, 2005-2006

Departing from the structural mainly profession of household heads points out that the poor are exceedingly correlated with farming occupation, but the rich as well as moderate income household lead to have two livelihoods of household head's profession as a trader and civilian government employer. Evidently, a profession of household head has a strongly coherent

relationship in accordance with the education level experienced by the household head. Poor households on average have an education level at the primary school by means of the percentage 25.3 percent and no formal education level is approximately 18.1 percent of 304 total poor households. Additionally rich households have higher education level than other households as indicated by a number of rich household heads in senior high school amount to 46.3 percent and even the university level have a significant number explicitly 22.6 percent. Meanwhile moderate income households have a rather higher level of education than the poor mostly on average educated at primary school and secondary school approximately 25.3 percent and 24.2 percent of 99 total respondents of moderate households respectively.

Table 4.3 Education Level of Respondents by Household Groups

Level of education (M1)	Moderate	%	Poor	%	Rich	%	Total	%
The death of main income sources	5	5.1	52	17.1	28	8.2	85	11.4
No formal education	12	12.1	55	18.1	11	3.2	78	10.5
Primary	25	25.3	77	25.3	26	7.6	128	17.2
Secondary	24	24.2	57	18.8	41	12.0	122	16.4
Senior High	31	31.3	60	19.7	158	46.3	249	33.5
University	2	2.0	3	1.0	77	22.6	82	11.0
	99	100.0	304	100.0	341	100.0	744	100.0

Source: Own presentation based on field research in Aceh, 2005-2006

Relying on the socioeconomic background, poor households have specified socioeconomic characteristics, greater household size and mainly profession as a farmer along with a lower education. But, rich households have a slightly different socioeconomic characteristic, relative smaller household size and prominent occupation of household head is trader and civilian government employer over and above having higher education level compared to moderate income and even poor households. This endows with a huge impact on the different income pattern received by each household such the poor, moderate and the rich. Before the spiraling of oil prices in 2005, the nominal income per capita of 40.86 percent of poor households take delivery of income equal to 20000-150000 rupiah per month and 13.31 percent of moderate income level households come to in the region of 150000-200000 rupiah per month as well as 45.83 percent of rich households receive around 200.000-5156250 rupiah per month¹⁶.

Table 4.4 Household Income Level of Respondents Before and After Oil Price Increase in 2005 by Household Groups

Household Income	Nompercap-before	Nompercap-after	Realpercap-before	Realpercap-after
Moderate	99	77	11	8
%	13.3	10.3	1.5	1.1
The Poor	304	252	725	730
%	40.9	33.9	97.4	98.1
The Rich	341	415	8	6
%	45.8	55.8	1.1	0.8
Total	744	744	744	744

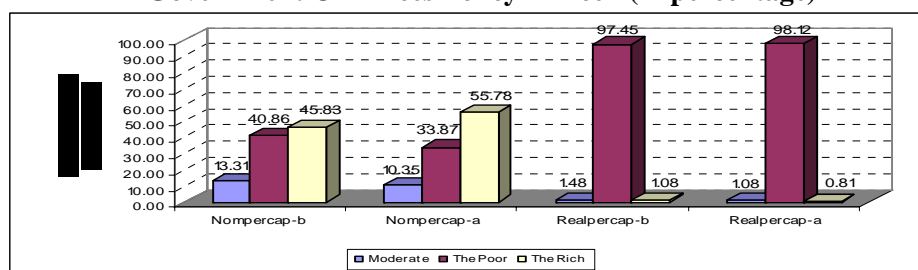
Source: Own presentation based on field research in Aceh, 2005-2006

Note: Nompercap (Nominal income per capita) & Realpercap (Real income per capita) before and after government's price decree.

¹⁶ The classification of income determined in this empirical study based on Poverty Line was published by Central Bureau of Statistics of Indonesia in 2005.

In contrast, after government performed increasing oil prices-slashing oil subsidy policy in March and October 2005, the structure of nominal income per capita per month of households leads to a significant change where a number of moderate families experienced increasing nominal income per capita per month indicated by 2.96 percent of total moderate households. Moreover, 6.99 percent of total poor households experience an increase of nominal income per capita per month. Consequently, a number of the rich percentages become larger 55.78 percent. It means that a number of rich households grow to be a superior number as consequences of the effect of oil price changes on the nominal income per capita of respondents. This is affected by the amount of 9.95 percent respondent experienced increasing nominal income per capita per month especially moderate and poor households. Fatefully, the impact of the spreading out of oil prices does not purely stimulate nominal income per capita per month of households but also significantly bring about decreasing real income per capita on the poor and the moderate households as consequences of prices as generally boost up. Relied on the real income per capita analysis, after rising oil prices, a number of poor and the moderate and even rich households are trapped into the poverty circumstance. So, a number of the poor are to be 97.45 percent of 744 total respondents before the government's oil price policy in 2005. Thus, after the implementation of government's oil price policy in March and October 2005, a number of poor households turn into a bigger number to be 98.12 percent of 744 total respondents (see Table 4.4 and Figure 4.4).

Figure 4.4 Nominal and Real Income Per Capita Before and After Government Oil Prices Policy in Aceh (in percentage)



Source: Own presentation based on field research in Aceh, 2005-2006

Increasing nominal income of poor households is strappingly stimulated by wage rate growth, but the wage upsurge is really not equal to commodity prices increase or inflation rate. Consequently, the poor real income drop drastically (pseudo income effect). Hence, these phenomena induce a number of poor households to be bigger and bigger in Aceh as the negative impact of growing oil prices strengthened through the implication of inflation generally at higher level in spite of the nominal income of households in Aceh turn out to be some improvement as a result of the regional government's administration law change such special regional autonomy¹⁷. In line with socioeconomic condition of households in Aceh

¹⁷ Actually, the real households' income should increase significantly owing to the implementation of decentralization accompanied by the Law No. 22/1999 (regional autonomy) and the Law No. 25/1999 (financial sharing between central government and regional government), Aceh's special autonomy status along with the Law No. 18/2001 which generate an extreme increase in the General Allocation Fund (DAU), a massive rehabilitation and reconstruction fund after tsunami December 26, 2004, and the new Aceh's Provincial Government Administration Law (Special Autonomy Fund) in the company of the Law No.11/2006.

explained beforehand, it indicates that the rate of vulnerability to poverty in Aceh still remains as one of crucial issues in Aceh particularly both in city areas and even village areas.

Fortunately, the rear-ender of oil price increase stimulated response of local government to be in charge of its negative side by way of performing oil increase compensation. Anchored in 744 respondents exemplify that barely 345 respondents (46.4%) receive poor card as government's reimbursement as a result of proliferation of oil price. They are consisted of 58 moderate households (58.6%) from 99 moderate households; 238 respondents (78.3%) from 304 poor households; and 49 respondents (14.4) from 341 rich household respectively. In fact, there are three categories in general of government's compensation such as rice and health support, schooling children assistance such scholarship, and business capital support to maintain the sustainability of small economic activities of appropriately households.

The biggest priority of government relief is rice and health support for households. A number of moderate households receive the government's rice aid 57 respondents (57.6%) of 99 moderate households. Then, poor households are 234 respondents (77.0%) of 304 poor households, and rich households are 42 respondents (12.3%) of 341 rich households. So the total households who obtain the government's assistances amount to 333 households (44.8%) over 744 respondents. Besides government's assistances focused on the family, there is the government assistance for education as well especially for the children in schooling. 46 households (6.2%) of 744 respondents achieve scholarship consisted of 6 (6.1%) moderate households, 25 (8.2%) poor households, and 15 (4.4%) rich households. Thus, the government's aid for encouraging small economic activities of households from the impact of oil price increase are only 1 (1%) of moderate households, 3 (1%) of poor households, and 1 (0.3%) of rich households. So, the total households who receive the government's compensation for capital encouragement concerning the business sustainability are just 5 households (0.7%) of 744 respondents.

The role of local government in encouraging economic condition for the poor as a result of the harmful shock wave of increasing oil price is not sufficient enough to hearten the poor from playing against the uncertainty situation as indicated by not fulfill an appropriate foremost goal of the government policy in maintaining the stability of the socioeconomic of poor households. In reality, a lot enough of poor and moderate households do not receive an appropriate compensation and even not at all obtain the same opportunities from government. In contrast, some rich households receive the government's recompense of oil price increase. This condition exemplifies that the actions of government's reimbursement are not accurately achieved the optimal goal to reduce the vulnerable households to poverty. These are triggered by some reasons; low capability of government especially the local government's management, lack of comprehensive and representative data related to the socioeconomic classification of households both in the rural and urban areas who should precisely receive the government's help, the limitation of government understanding pertaining to the concept of poverty and the vulnerability of households to poverty as dynamic problem, and no serious commitment in combating poverty alleviation in Aceh as indicated by the poverty rate is getting bigger and bigger even though fiscal revenues of Aceh point has been being higher and higher since 1999.

c. The impact of Oil Price Increase on Poverty

Structure of Household Income Distribution in Aceh

Table 4.1 presents the comparison of household incomes between the year 2002 and 2005 in the general equilibrium viewpoint by using two assemblages of SAM data. The results show that the economy of Aceh had been being a whopping amendment during periods 2002 and 2005. The urban and rural household income in 2005 increased appreciably proportionate to the year 2002, especially those who have upper middle income level. Inopportunately, in 2005, nominal income of the poorest households in urban areas and poor households both in rural and urban areas diminished significantly amount of -1.9 percent, -7.7 percent, and -22.9 percent respectively. This implies that the economic condition of certain household income level got more horrible in that time or the vulnerability level of those to poverty was high. In this case, they had a risky probability to be involved towards chronic poverty. In turn, their income reduction would pessimistically give effect on lower consumption rate than the other households. The behavior of lower income level households to control lower consumption expenditure now aims at conserving money at substandard level (MPS) as a guarantee for the supplementary consumption in the future. Implicitly, this action points up that the households' quality of life getting worse in this period.

Table 4.1 The Structural Household Income in Aceh Based on General Equilibrium Perspective in 2002 and 2005 (in billion)

HOUSEHOLDS	HHINC02	HHCONE02	MPS02	HHINC05	HHCONE05	MPS05	%HHINC	%HHCONE	%MPS
HHVPR	4.121	3.636	0.118	6.676	5.833	0.015	62.0	60.4	-87.3
HHVPU	5.179	3.095	0.032	5.082	4.329	0.022	-1.9	39.9	-31.3
HHPRR	6.365	3.548	0.050	5.875	4.948	0.018	-7.7	39.5	-64.0
HHPRU	5.049	2.469	0.059	3.891	3.160	0.027	-22.9	28.0	-54.2
HHMIR	5.297	3.295	0.056	5.845	4.761	0.021	10.3	44.5	-62.5
HHMIU	5.104	2.312	0.035	6.498	5.384	0.023	27.3	132.9	-34.3
HHRPR	4.138	2.255	0.049	5.068	3.932	0.030	22.5	74.4	-38.8
HHRPU	3.688	2.195	0.054	5.556	4.337	0.063	50.7	97.6	16.7
HHVRR	2.924	2.123	0.072	4.270	3.246	0.044	46.0	52.9	-38.9
HHVRU	2.675	2.002	0.070	4.934	3.691	0.072	84.4	84.4	2.9
COMPY	10.445		0.083	35.016		0.107	235.2		28.9
FACTORS	FME02	EcowideW02	FINC02	FME05	EcowideW05	FINC05	%FME	%EcowideW	%FINC
FORML	473.96	0.012	7.298	512.24	0.026	13.935	8.1	116.7	90.9
INFORML	1014.94	0.009	8.377	1113.08	0.018	19.076	9.7	100.0	127.7
CAPFP	17.767	1.331	23.649	35.567	1.979	70.382	100.2	48.7	197.6
GOVERNMENT	YG	EG	GSAV	YG	EG	GSAV	%YG	%EG	%GSAV
	3.960	6.816	-2.857	10.781	10.995	-0.213	172.2	61.3	-92.5

Source: Own calculation by using Computable General Equilibrium (CGE)

Note: HHVPR/U (The poorest household in rural/urban), HHPRR/U (Poor household in rural/urban), HHMR/U (Middle income household in rural/urban), HHRPR/U (Rich household in the rural/urban), HHVRR/U (The richest household in rural/urban), COMPY (Company), PROFF-N (Formal-Informal labor), CAPFP (Capital), HHINC (Household income), HHCONE (Household consumption expenditure), MPS (Marginal propensity to save), FME (Factor market equilibrium), EcowideW (The economy-wide wage (rent) for factor f, FINC (Factor income), YG, EG, & GSAV (Government Income, Expenditure, & Saving).

The other outlook, the poorest households in rural areas really suffer the worst circumstances as compared with the other three groups of households discussed previously. Although their income relatively increased in 2005, but an increase of income was accompanied by higher

consumption expenditure. In sequence, MPS of the households trimmed down drastically by -87.3 percent. It implies that the economic situation of the poorest households in rural areas is under the chronic poverty condition. In addition, households' middle income class in urban areas looked toward a better economic situation in 2005 on the word of their income increase amount of 27.3 percent. Nevertheless, the income growth was not equivalent to an increase of households' consumption expenditure that accomplishes an extraordinary change amount of 132.9 percent. Their consumption expenditure sharply increased probably because of higher living cost, mobility, economic activities, and higher need for education of their children. In general, most of households' middle income class is being in productive age and economic activities. A sharp increase of consumption expenses also stimulated unconstructive effect on MPS by -34.3 percent.

Additionally, rich and the richest households in urban areas, as well as company constituted the households who take delivery of the best expectation of positive performance over the economy of Aceh for the duration of this period as indicated by the optimistic MPS value amount of 16.7 percent, 2.9 percent, and 28.9 percent respectively. The hopeful MPS value was invigorated by means of their revenue increase appreciably amounted to 50.7 percent and 84.4 percent, 235.2 percent correspondingly. In spite of fact, their consumption spending also got considerably higher. It implies that the configuration of economic performance of Aceh during this period represented a highly inequality of income distribution between the rich and the poor in urban and rural development as strengthened by extremely different impact and likelihood received by each group of income in society.

MPS value of some households excluding the rich, the richest and company in urban regions became moderately worse in 2005. The different MPS value describes that the impact of oil price transformation relatively impinged on certain income level households particularly in rural regions. As a result, the marginal propensity to consume (MPC) also boost up enormous enough for exclusive income level household in the rural areas compared with those in urban areas. Furthermore, there is brawny warning that the prototype of consumption stuck between poor and rich households especially in urban areas are far removed from each other in which poor households use most part of their income on using up goods and services more than the rich households do. Normally, the income received by poor households is consumed in non productive goods. On the other hand, rich households used their incomes up in a productive side such as capital investment. Therefore, in the context of macroeconomics view, income multiplier of rich households especially in urban regions will be higher than poor households in the next periods of time. The higher MPC and smaller MPS configuration of the poor explains that the poverty rate in Aceh remains far above the ground.

The pattern of households' MPS both in rural and urban region was enough varied appearances between the year 2002 and 2005. In 2002, the MPS prototype of households was relatively indistinguishable characteristics in term of saving behavior linking households in rural and urban areas. In the year 2005, on the contrary, the archetype of household saving behavior involving the households in rural and urban showed a different comportment especially the rich and very rich households in which the saving performance of households in urban significantly increase and the other households both in rural and urban regions

significantly decrease. This is a noteworthy gesticulation that the role and frequency of economic activities stream concentrate mostly in urban areas which has a big capital formation matched up to rural area. As a result rich and the richest households in urban county as well as company have been taking delivery of privileged multiplier income consequence than those who have relatively small capital formation both in rural and even in urban region. In turn it directly triggered off highly developed MPS rate of them fantastically in 2005 even though the oil price changes influenced on the whole economy of Aceh in March and October 2005.

The improvement of household income in 2005 was influenced by the contradictory policies from government such as swelling oil prices in conjunction with cutting oil subsidy. The policy produced momentous price intensification at higher level. Accordingly, the expansion of household income merely constitutes the nominal income increase but not directly expresses the appreciation of real income of household. It gives the impression that the soaring real income of household was not seriously increase as much as the prototype of nominal income growth as indicated by negative growth of MPS rate of households both in urban and rural areas excluding neither rich and the richest households nor company in urban region.

It implies that an increase of societal income level for the year 2005 compared with the year 2002 constitutes merely as a pseudo income growth. It illustrates that an increase of nominal income of households is strappingly provoked by wage rate growth, but the wage gain is lower than commodity prices increase or inflation rate. As a result, the household real income falls drastically. This situation was signified by the realistic MPS reduction. A worse off income was genuinely experienced by the households who inhabit in rural areas as demonstrated by the MPS value reduction severely compared with the MPS value of those who live in urban areas. A huge dissimilarity of MPS value was tightly influenced by the differences of economic structure and forcefulness. Thus, income characteristic of households in rural areas is more relative stationary compared with of those in urban areas. A reduction of MPS becomes an important gauge to illustrate the factual features in which increasing household income at certain level experienced by society is frequently followed by higher inflation rate. The nominal money income of households will depreciate at certain level on account of tightly affected by higher inflation and also boost concurrently up higher consumption expenditure rate (MPC). It means that the real money income of households turns out to be lower and lower level as highlighted by the purchasing power diminution.

Besides, the prototype of household income in Aceh during the year 2002 shows that the fragment of income was received by a number of informal and formal labor supplies according to the factor market equilibrium skeleton were 1015 units and 474 units correspondingly. Nevertheless, the income formation of capital sources in the factor market equilibrium was 18 units. Furthermore, the number of informal and formal labor source at the factor market equilibrium experienced a significantly proliferation in 2005 compared with informal and formal labor supply in the year 2002, approximately 1113 units (8.1%) and 512 units (9.7%) respectively. During the year 2005, the capital recourse at factor market configuration increased two times reached 36 units (100.2%) from 18 units in 2002.

Realistic configuration of this empirical study points up that factorial income of capital factor in the economy achieves the highest level compared with the other factors such as informal and formal labor in consequences of dissimilar income multiplier among them. It is indicated by factorial income of capital source which received the highest income level from 23.65 units in 2002 to 70.38 units in 2005 (197.6 %). Informal and formal labors obtained 8.38 units and 7.30 units (90.9%) in 2002 as well as 9.08 units and 13.94 units (127.7%) in 2005. The most important differences among those were affected by miscellaneous economy-wide wage (rent) of capital and labors in the economic activity. As a result, this stimulates a greater perforation between the role of informal or formal labor and capital factor on the whole economy of Aceh. Therefore, Aceh thoroughly necessitates an appropriate courses of action to make balancing proportionally between the role of labor intensive and capital intensive standpoints along with determining the appropriate compensation of factors in the development process. It is aimed at reducing a huge aperture between the households who have labor and who have capital factors as production input.

The Aceh economic structure and income distribution were also related to government income and expenditure growth for the period of years 2002 and 2005. In 2002, the government revenue (3.96 billion) was smaller than the government expenditure (6.82 billion). The impact of inequality government revenue and expenditure has stimulated a large deficit in government saving around -2.86 billion in 2002. In contrast, in 2005, the government income increased sharply 10.78 billion (172.2%) together with increasing government expenditure that is a little bit higher 10.99 billion (61.3%), so the government saving goes through decreasing amount of -0.21 billion. It's obligated that the configuration of fiscal policy enables to push economic structure, income distribution, and the formation of poverty in Aceh to be better off.

Simulations and Poverty

In order to capture noticeably an unadulterated shock of increasing oil prices on household income with regards to poverty can be observed by some painstaking simulations by means of general equilibrium standpoint analysis particularly the general algebraic modeling system (GAMS). Table 4.2 describes the realistic narrative anchored in some simulations. In general, the impact of oil price changes pessimistically reduces the household income in the urban areas. The first simulation will emphasize on changing oil price of gasoline and diesel simultaneously about 32.6% and 27.3% respectively. The upshots illustrate that the poorest households in rural areas remain to receive a positive value of income 0.13%. According to second simulation results, when kerosene price increase 185.7% together with an increase of gasoline price 87.5% and diesel price 104.8%, income level of the poorest households in rural areas get worse in spite of its value remains positive 0.05%. In general, the profession characteristics of the poorest in rural areas are unskilled farm labor and coolie labor. When oil price increase, their wage also increase. Fatefully, an increase of their income does not spawn their real income but just increasing nominal income owing to inflation rate also rise significantly more than nominal income level increase. So, this is situation only pseudo income effect experienced by the poorest households in rural areas. As general configuration

of the simulations analysis, the impact of oil prices shock significantly encroach on dropping real income of households in Aceh both in rural and urban regions.

Table 4.2 Household Income Pattern in Aceh Based on Simulations, the year 2005 as Assessment Base (in percentage)

HOUSEHOLDS	2005			Simulation 1			Simulation 2			Simulation 3		
	HHINC	HHCON	MPS	HHINC	HHCON	MPS	HHINC	HHCON	MPS	HHINC	HHCON	MPS
HHVPR	6.676	5.833	0.015	0.13	0.13	0.00	0.05	0.05	0.00	0.08	0.08	0.00
HHVPU	5.082	4.329	0.022	-5.28	-5.28	0.00	-5.38	-5.38	0.00	-5.33	-5.33	0.00
HHPRR	5.875	4.948	0.018	-3.14	-3.14	0.00	-3.22	-3.22	0.00	-3.18	-3.18	0.00
HHPRU	3.891	3.160	0.027	-7.72	-7.72	0.00	-7.82	-7.82	0.00	-7.77	-7.77	0.00
HHMIR	5.845	4.761	0.021	-6.74	-6.74	0.00	-6.83	-6.83	0.00	-6.79	-6.79	0.00
HHMIU	6.498	5.384	0.023	-8.91	-8.91	0.00	-9.01	-9.01	0.00	-8.96	-8.96	0.00
HHRPR	5.068	3.932	0.030	-9.92	-9.92	0.00	-10.02	-10.02	0.00	-9.97	-9.97	0.00
HHRPU	5.556	4.337	0.063	-10.06	-10.06	0.00	-10.17	-10.17	0.00	-10.12	-10.12	0.00
HHVRR	4.270	3.246	0.044	-10.18	-10.18	0.00	-10.29	-10.29	0.00	-10.24	-10.24	0.00
HHVRU	4.934	3.691	0.072	-14.36	-14.36	0.00	-14.48	-14.48	0.00	-14.42	-14.42	0.00
	FME05			FME-Sim1			FME-Sim2			FME-Sim3		
PROFF	512.24			0.00			0.00			0.00		
PROFN	1113.08			0.00			0.00			0.00		
CAPFP	35.567			0.00			0.00			0.00		
	EcowideW05			EcowideW-Sim1			EcowideW-Sim2			EcowideW-Sim3		
PROFF	0.026			-4.10			-4.20			-4.15		
PROFN	0.018			4.27			4.20			4.22		
CAPFP	1.979			-0.26			-0.35			-0.31		
	FINC05			FINC-Sim1			FINC-Sim2			FINC-Sim3		
PROFF	13.935			-2.41			-2.50			-2.45		
PROFN	19.076			3.73			3.66			3.68		
CAPFP	70.382			-0.26			-0.35			-0.31		
	YG05			YG-Sim1			YG-Sim2			YG-Sim3		
GOVERN-Y	10.781			13.33			13.33			13.33		
	EG05			EG-Sim1			EG-Sim2			EG-Sim3		
GOVERN-E	10.995			86.71			86.70			86.71		
	SAVG05			SAVG-Sim1			SAVG-Sim2			SAVG-Sim2		
GOVERN-SAV	-0.213*			-8.31* or 3798.6%			-8.31* or 3798.7%			-8.31* or 3798.9%		

Source: Own calculation by using Computable General Equilibrium (CGE)

Note: - HHVPR/U (The poorest household in rural/urban), HHPRR/U (Poor household in the rural/urban), HHMR/U (Middle income household in the rural/urban), HHRPR/U (Rich household in the rural/urban), HHVRR/U (The richest household in rural/urban), COMPY (Company), PROFF-N (Formal-Informal labor), CAPFP (Capital), HHINC (Household income), HHCON (Household consumption expenditure), MPS (Marginal propensity to save), FME (Factor market equilibrium), EcowideW (The economy-wide wage (rent) for factor f), FINC (Factor income), YG, EG & GSAV (Government Income, Expenditure, & Saving).

- Simulation 1 based on oil price changes in March consisted of Gasoline price (32.5%), Diesel price (22%), Kerosene price (0%), Simulation 2 based on oil price changes in October consisted of Gasoline price (87.5%), Diesel price (104.8%), Kerosene price (185.7%), and Simulation 3 based on oil price changes in March + October consisted of Gasoline price (120%), Diesel price (126.8%), Kerosene price (185.7%).

- * represents not percentage value but the comparison between the true values of GOVERN-Y and GOVERN-E

The other configuration of first simulation shows that factorial income of formal labor and capital reduces -4.10% and -0.35% respectively. While the second and the third simulations represent relatively higher reduction of factorial income. However, informal labor gets hold of a better opportunity of factorial income. This is strongly affected by positive change on the

economy-wide wage (rent) of informal labor. So, they are able to adjust with an increase of oil price spontaneously compared with formal labor. It means that increasing oil price will stimulate an escalation of inflation rate and then the informal labor will react dynamically over the changes. In contrast, formal labors such as government employee which have a moderately static income will be affected severely by increasing inflation rate because of an increase of oil price as indicated by real income reduction.

Conversely, the government revenue performance is better after increasing oil prices as maintained by the constructive value amount of 13.33% (relatively the same values of each simulation of oil price transformations) anchored in the government income in 2005 as judgment base. Besides, the government expenditure based on three simulations experiences a growing presentation on the average increase 86.71%. This situation generates budget deficit of government reach -8.31 billion.

5. Conclusions

There are some critical points should be strictly considered by central government and the local government of Aceh represented by using two approaches as a tool to look at the whole story of consequences of increasing oil price on poor households. Based on DAA results, firstly, there is a great discrepancy of oil prices between government oil price resolution and oil prices in the field. Oil prices in the society are more expensive and even twofold government oil price declaration in particular kerosene and gasoline price. Secondly, the effects of oil price proliferation unacceptably have been inspiring a negative impact on real income rate of poor and middle income households. Because increasing nominal income is followed by higher inflation rate simultaneously. As a result of real income reduction encroaches on the quality of households' life as indicated by the quality of consumption deteriorate drastically in the near future (pseudo income effect).

Thirdly, the government's compensation strategy on account of increasing oil price effect on the poor is not appropriate enough to strengthen the economy of the poorest, poor, and middle income households who received the greatest impact of oil price increase. Consequently, poverty rate in Aceh remains high. The reasons are low capability of government especially the local government's management, lack of comprehensive and representative data related to the socioeconomic classification of households both in the rural and urban areas who should precisely receive the government's help, the limitation of government understanding pertaining to the concept of poverty and the vulnerability of households to poverty as dynamic problem, and no serious commitment in combating poverty alleviation in Aceh as indicated by the poverty rate is getting bigger and bigger even though fiscal revenues of Aceh point has been being higher and higher since 1999.

Besides, the impact assessment of oil price proliferation along with a few simulations of increasing oil price individually and simultaneously on poor households both in rural and urban regions produces a number of important points. First, during the period of year 2002-2005, the household income in Aceh increased appreciably both in rural and even urban areas. Unfortunately, the huge upsurge of household income was significantly accompanied by the proliferation of MPC. Consequently, MPS of households severely trimmed down in 2005

excluding the richest and rich households, as well as company in urban regions. Second, the difference level of upshot affected the poor and the rich in rural areas as well as in urban areas is instigated by the quality and dissimilarity of structural production factor and average price of production factor (economy-wide wage (rent)) among formal labor, informal labor, and capital formation which mostly part belong to some households in urban areas. So this situation directly brings into being the elevated inequality of household income distribution among of them in Aceh. Third, the MPS lessening shock is triggered by the oil prices elevation and in turn accelerates wide-ranging price growth sharply in 2005. Hence, the real household incomes downsize thoroughly (pseudo income effect). Fourth, psychology effect plays a big part in disturbing the frame of seller's mind in Aceh. It means that the upsurge of oil prices will generate uncertainty number of higher general price increase. So, the poorest, poor, and middle households' real income gets worse severely. Finally, based on several simulation results, the oil price shocks generate welfare reduction of households both in rural and urban areas. But, at the end of the impact process it will be negatively perceived by the households in rural areas through higher inflation rate, especially the poorest and poor households and trapped them into chronic poverty. Moreover, rural middle income households are more vulnerable to poverty than those are in urban areas.

Short Run Strategy

1. Improve government control schematically in the direction of the operational management relating to oil price change policy as strengthened by the legitimated law and obviously strength of punishment with expecting to condense psychology pressure of unrealistic oil price increase from "free sellers". Government through PERTAMINA should provide a number of oil stations fulfilled societal needs in rural and urban areas.
2. Maintain the sustainability of oil stock in minimizing the scarcity of oil in society.
3. Regulate the government's compensations of oil prices increase by way of improving public goods such as public infrastructures (public investment) of society for the most part in rural constituencies.

Long Run Strategy

1. Identify precisely a structural demography of society which covers socioeconomic of Aceh with the purpose of bringing into being development planning concept accommodated the societal elementary needs. Consequently, it will generate the structural balancing role of production factors related to labor and capital intensive and in turn stimulate the wage scheme policy with the intention of highly equality.
2. Strengthen potency of regional economy and directly establish inter-linkages among each potential sector economy guided seriously by master plan development of government in order to anticipate precisely the possibilities of government change policies as well as external economic and even political shocks.

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Appendix: General Algebraic Model Description

The Parameter sof the Model

Parameter	Name of Parameter	Parameter	Name of Parameter
α_A^a	shift parameter for top level CES function	$ice_{C,CP}$	trade input of c per unit of com cp exported
α_A^{va}	shift parameter for CES activity production function	$icm_{C,CP}$	trade input of c per unit of com cp imported
α_C^{ac}	shift parameter for domestic commodity aggregation function	$mps01_{INS}$	0-1 par for potential flexing of savings rates
α_C^q	shift parameter for Armington function	$mpsbar_{INS}$	marginal prop to save for dom non-gov inst ins (exog part)
α_C^t	shift parameter for CET function	$qdst_C$	inventory investment by sector of origin
$\beta_{A,C,H}^h$	marginal share of household consumption spending on home commodity c from activity a	$qbarg_C$	exogenous (unscaled) government demand
$\beta_{C,H}^m$	marginal share of consumption spending on marketed commodity c	$qbarin_{VC}$	exogenous (unscaled) investment demand
$cwts_c$	consumer price index weights	$\theta_{A,C}$	yield of commodity c per unit of activity a
δ_A^a	share parameter for top level CES function	ρ_A^a	CES production function exponent
$\delta_{F,A}^{va}$	share parameter for CES activity production function	ρ_A^{va}	CES activity production function exponent
δ_{AC}^{ac}	share parameter for domestic commodity aggregation function	ρ_C^{ac}	domestic commodity aggregation function exponent
δ_C^q	share parameter for Armington function	ρ_C^q	Armington function exponent
δ_C^t	share parameter for CET function	ρ_C^t	CET function exponent
$dwts_C$	domestic sales price weights	$Shif_{INS,F}$	share of dom. inst i in income of factor f
$\gamma_{C,H}^m$	per-capita subsistent consumption of marketed commodity c for household h	$Shii_{INS,INSP}$	share of inst i in post-tax post-saving income of inst insp
$\gamma_{A,C,H}^h$	per-capita subsistent consumption for household h on home com c from activity a	$Supernum_H$	LES supernumerary income
$ica_{C,A}$	intermediate input c per unit of aggregate intermediate	$tins01_{INS}$	0-1 par for potential flexing of dir tax rates
$inta_A$	aggregate intermediate input coefficient	$trnsfr_{INS,AC}$	transfers from inst. or factor ac to institution ins
iva_A	aggregate value added coefficient		
$icd_{C,CP}$	trade input of c per unit of com cp produced & sold domestically		
		Tax rates	
		ta_A	rate of tax on producer gross output value
		te_C	rate of tax on exports
		tf_F	rate of direct tax on factors (soc sec tax)
		$tinsbar_{INS}$	rate of (exog part of) direct tax on dom inst ins
		tm_C	rate of import tariff
		tq_C	rate of sales tax
		tva_A	rate of value-added tax

The Sets of the Model	The Variables in the Model
Model sets	Exogenous Variables
AC global set for model accounts-aggregated MicroSAM accounts	<u>CPI</u> consumer price index (PQ-based)
A_{AC} activities	<u>DTINS</u> change in domestic institution tax share (= 0 for base; exogenous variable) or change in domestic institution tax share
ACES _A activities with CES fn at top of technology nest	<u>FSAV</u> foreign savings (FCU)
ALEO _A activities with Leontief fn at top of technology nest	<u>GADJ</u> government consumption adjustment factor (government demand scaling factor)
C_{AC} commodities	<u>IADJ</u> investment adjustment factor (for fixed capital formation)
CD_C commodities with domestic sales of output	<u>MPSADJ</u> savings rate scaling factor (= 0 for base)
CDN_C commodities without domestic sales of output	<u>OES_F</u> quantity supplied of factor
CE_C exported commodities	<u>TINSADJ</u> direct tax scaling factor (= 0 for base; exogenous variable)
CEN_C non-exported commodities	<u>WFDIST_{FA}</u> wage distortion factor for factor f in activity a (factor wage distortion variable)
CM_C imported commodities	Endogenous variables
CMN_C non-imported commodities	<u>DMPS</u> change in domestic institution savings rates or MPS (= 0 for base; exogenous variable) for selected institution
	<u>DPI</u> producer price index for domestically marketed output (PDS-based)
	<u>EG</u> total current government expenditures
	<u>EH_H</u> consumption spending for household
	<u>EXR</u> exchange rate (LCU per unit of FCU)
	<u>GOVSHR</u> government consumption share in nominal absorption
	<u>GSAV</u> government savings
	<u>INVSHR</u> investment share in nominal absorption

CX_C	commodities with output factors	MPS_{INS}	marginal propensity to save for domestic nongovernment institution institution exogenous variable)
F_{AC}		PA_A	activity price (unit gross revenue) or output price of activity a
INS_{AC}	institutions	PDD_C	demand price for commodity produced and sold domestically
INS_{DINS}	domestic institutions	PDS_C	supply price for commodity produced and sold domestically
$INS_{DNG_{INS}}$	domestic non-government institutions	PE_C	export price (domestic currency)
$H_{INS_{DNG}}$	households	$PINTA_A$	aggregate intermediate input price for activity a
Calibration sets		PM_C	import price (domestic currency)
$CINV(C)$	fixed investment goods	PQ_C	composite commodity c price
$CT(C)$	transaction service commodities	PVA_A	value-added price (factor income per unit of activity)
$CTD(AC)$	domestic transactions cost account	PWE_C	world price of exports
$CTM(AC)$	import transactions cost account	PWM_C	world price of imports
$CTE(AC)$	export transactions cost account	PX_C	aggregate producer price for commodity or average output price
Report sets		$PX_{AC_{AC}}$	producer price of commodity c from activity a
EH_H	consumption spending for HH	QA_A	quantity (level) sales of domestic activity
$FACEQUIL$	factor market equilibrium	QD_C	quantity sold domestically of domestic output
MPS_{INS}	marginal propensity to save for domestic nongovernment institution institution	QE_C	quantity of exports
WF_F	economy-wide wage (rent) for factor f	QF_{FA}	quantity demanded of factor f from activity a
YF_F	income of factor f	QG_C	government consumption demand for commodity
YI_{INS}	income of domestic nongovernmental institution	QH_{CH}	quantity consumed of marketed commodity c by household h
		QHA_{ACH}	quantity of household home consumption of commodity c from activity a for HH h
		$QINTA_A$	quantity of aggregate intermediate input
		$QINT_{CA}$	quantity of commodity c as intermediate input to activity a
		$QINV_C$	quantity of fixed investment demand for commodity
		QM_C	quantity of imports of commodity
		QQ_C	quantity of goods supplied to domestic market (composite goods supply)
		QT_C	quantity of commodity demanded as trade and transport input
		QVA_A	quantity of (aggregate) value-added
		QX_C	aggregated marketed quantity of domestic output of commodity
		$QX_{AC_{AC}}$	quantity of marketed output of commodity c from activity a
		$TABS$	total nominal absorption
		$TINS_{INS}$	direct tax rate on domestic institutions institution
		$TRII_{INS_{INS}}$	transfers from domestic institution i. to i (both in the set INSDNG)
		$WALRAS$	Savings-Investment imbalance (should be zero)
		$WALRASSQR$	Walras squared
		WF_F	average price of factor f (economy-wide wage (rent) for factor f)
		YF_F	income of factor f
		YG	total current government revenue
		YI_{INS}	income of domestic nongovernment institution
		YIF_{INS_F}	income to domestic institution i from factor f

No	Price equation
1	Domestic import price, ($c \in CM$, imported commodities) $PM_c = pwm_c \cdot (1 + tm_c) \cdot EXR + \sum_{c' \in CT} PQ_{c'} \cdot icm_{c'c}$
2	Domestic export price, ($c \in CE$, exported commodities) $PE_c = pwe_c \cdot (1 - te_c) \cdot EXR - \sum_{c' \in CT} PQ_{c'} \cdot ice_{c'c}$
3	Demand price for com c produced and sold domestically (domestic non traded goods), ($c \in CD$, commodities with domestic sales of domestic output) $PDD_c = PDS_c + \sum_{c' \in CT} PQ_{c'} \cdot icd_{c'c}$
4	Absorption (value of sales in domestic market), ($c \in (CD \cup CM)$, commodities in domestic market) $PQ_c \cdot (1 - tq_c) \cdot QQ_c = PDD_c \cdot QD_c + PM_c \cdot QM_c$
5	Marketed output value (value of marketed domestic output), ($c \in CX$, commodities with domestic production) $PX_c \cdot QX_c = PDS_c \cdot QD_c + PE_c \cdot QE_c$
6	Activity price (output price for activity a), ($a \in A$, output for activity A) $PA_a = \sum_{c \in C} PX_{AC_{ac}} \cdot \theta_{ac}$
7	Aggregate intermediate input price, ($a \in A$, aggregate intermediate input for activity A) $PINTA_a = \sum_{c \in C} PQ_c \cdot ica_{ca}$
8	Activity revenue and costs (value-added price), ($a \in A$, value-added for activity A) $PA_a \cdot (1 - ta_a) \cdot QA_a = PVA_a \cdot QVA_a + PINTA_a \cdot QINTA_a$
9	Consumer price index $CPI = \sum_{c \in C} PQ_c \cdot cwts_c$
10	Producer price index for non-traded market output (domestic producer price index) $DPI = \sum_{c \in C} PDS_c \cdot dwts_c$

No	Production and trade equation
11	CES technology; Activity production function (CES aggregate prod fn (if CES top nest)), ($a \in ACES$, activities with a CES aggregate production function at the top of the technology nest)
12	$QA_a = \alpha_a^a \cdot (\delta_a^a \cdot QVA_a^{-p_a} + (1 - \delta_a^a) \cdot QINTA_a^{-p_a})^{\frac{1}{p_a}}$ CES technology; Value-added intermediate-input quantity ratio (CES aggregate first-order condition (if CES top nest)), ($a \in ACES$, value-added intermediate input with a CES aggregate first order condition function at the top of the technology nest)
13	$\frac{QVA_a}{QINTA_a} = \left(\frac{PINTA_a}{PVA_a} \cdot \frac{\delta_a^a}{1 - \delta_a^a} \right)^{\frac{1}{1+p_a}}$ Leontief technology; Demand for aggregate value-added (Leontief aggregate intermediate demand (if Leontief top nest)), ($a \in ALEO$, activities with a leontief function at the top of the technology nest)
14	$QVA_a = iva_a \cdot QA_a$ Leontief technology; Demand for aggregate intermediate input (Leontief aggregate value-added demand (if Leontief top nest)), ($a \in ALEO$, aggregate intermediate input with a leontief function at the top of the technology nest)
15	$QINTA_a = int_a \cdot QA_a$ Value-added and factor demands (CES value-added production function), ($a \in A$, activities with a CES value-added production function)
16	$QVA_a = \alpha_a^{va} \cdot \left(\sum_{f \in F} \delta_{fa}^{va} \cdot QF_{fa}^{-p_a^{va}} \right)^{\frac{1}{p_a^{va}}}$ Factor demand (CES value-added first-order condition), ($a \in A$, $f \in F$, factor f in activities with a CES value-added production function at first-order condition)
17	$WF_{1, \overline{WFDIST}_{fa}} = PVA_a \cdot (1 - tva_a) \cdot QVA_a \cdot \left(\sum_{f \in F} \delta_{fa}^{va} \cdot QF_{fa}^{-p_a^{va}} \right)^{-1} \cdot \delta_{fa}^{va} \cdot QF_{fa}^{-p_a^{va} - 1}$ Disaggregated intermediate input demand (intermediate demand for commodity c from activity a), ($a \in A$, $c \in C$, intermediate input for commodities c from activity A)
18	$QINT_{ca} = ica_{ca} \cdot QINTA_a$ Commodity production and allocation (production function for commodity c and activity a), ($a \in A$, $c \in CX$, production function for commodities c and activity A)
19	$QXAC_{ac} + \sum_{h \in H} QHA_{ach} = \theta \cdot c \cdot QA_a$ Output aggregation function, ($c \in CX$, aggregate commodities c with domestic production)
20	$QX_a = \alpha_c^{ac} \cdot \left(\sum_{a \in A} \delta_{ac}^{ac} \cdot QXAC_{ac}^{-p_a^{ac}} \right)^{\frac{1}{p_a^{ac} - 1}}$ First-order condition for output aggregation function, ($c \in A$, $c \in CX$, aggregate commodities at first-order condition with activity A)
21	$PXAC_{ac} = PX_c \cdot QX_c \cdot \left(\sum_{a \in A} \delta_{ac}^{ac} \cdot QXAC_{ac}^{-p_a^{ac}} \right)^{-1} \cdot \delta_{ac}^{ac} \cdot QXAC_{ac}^{-p_a^{ac} - 1}$ Output transformation (CET) function, ($c \in (CE \cap CD)$, commodities c with domestic sales of domestic output and exported Commodities)
22	$QX_c = \alpha_c^1 \cdot \left(\delta_c^1 \cdot QE_c^{p_c^1} + (1 - \delta_c^1) \cdot QD_c^{p_a^{aa}} \right)^{\frac{1}{p_a^1}}$ Export domestic supply ratio (domestic sales and exports for outputs without both), ($c \in (CE \cap CD)$, commodities c with domestic sales of domestic output and exported Commodities)
23	$\frac{QE_c}{QD_c} = \left(\frac{PE_c}{PES_c} \cdot \frac{1 - \delta_c^t}{\delta_c^t} \right)^{\frac{1}{p_c^t - 1}}$ Output transformation for non-exported commodities (export supply), ($c \in (CE \cap CEN) \cup (CE \cup CDN)$, commodities c with domestic sales of domestic output not in CE and exported Commodities not in CD)
24	$QX_c = QD_c + QE_c$ Composite supply (Armington) function (composite commodity aggregation function), ($c \in (CM \cap CD)$, commodities c with imported commodities and domestic sales of domestic output)
25	$QQ_c = \alpha_c^q \cdot \left(\delta_c^q \cdot QM_c^{-p_c^q} + (1 - \delta_c^q) \cdot QD_c^{-p_c^q} \right)^{\frac{1}{p_c^q}}$ Import-domestic demand ratio (first-order condition for composite commodity cost min), ($c \in (CE \cap CD)$, commodities c with imported commodities and domestic sales of domestic output at first order condition)

	$\frac{QM_c}{QD_c} = \left(\frac{PDD_c \cdot \delta_c^q}{PM_c \cdot (1 - \delta_c^q)} \right)^{\frac{1}{1+p^q}}$
26	<p>Composite supply for non-imported outputs and non-produced imports (comp supply for com without both domestic sales and imports), ($c \in (CD \cap CMN) \cup (CM \cup CDN)$), commodities c with composite supply without both domestic sales and imports)</p> $QQ_c = QD_c + QM_c$
27	<p>Demand for transaction (trade and transport) services, ($c \in CT$, transactions service commodities)</p> $QT_c = \sum_{c' \in C'} (icm_{c'c} \cdot QM_c + ice_{c'c} \cdot QE_{c'} + icd_{c'c} \cdot QD_{c'})$

No	Institution equation
28	<p>Factor incomes, ($f \in F$, factor f of production)</p> $YF_f = \sum_{a \in A} WF_{fa} \cdot \overline{WFDIST}_{fa} \cdot QF_{fa}$
29	<p>Institutional factor incomes (factor incomes to domestic institutions), ($i \in INSD$, $f \in F$, factor f of production to domestic institutions)</p> $YIF_{if} = shif_{if} \cdot \left[(1 - tf_f) \cdot YF_f - trnsfr_{row f} \cdot EXR \right]$
30	<p>Income of domestic, non government institutions (total incomes of domestic non-government institutions), ($i \in INSDNG$, domestic income to domestic non-government institutions)</p> $YI_i = \sum_{f \in F} YIF_{if} + \sum_{i' \in INSDNG} TRII_{ii'} \cdot \overline{CPI} + trnsfr_{i row} \cdot EXR$
31	<p>Intra-institutional transfers (transfers to institution on institution from institution on other institutions), ($i \in INSDNG$, $i' \in INSDNG'$, transfer from institutions to institutions)</p> $TRII_{ii'} = shii_{ii'} \cdot (1 - MPS_{i'}) \cdot (1 - TINS_{i'}) \cdot YI_{i'}$
32	<p>Household consumption expenditure, ($h \in H$, households h in economic activity)</p> $EH_h = \left(1 - \sum_{i \in INSDNG} shii_{ih} \right) \cdot (1 - MPS_h) \cdot (1 - I'INS_h) \cdot YI_h$
33	<p>Household consumption demand for marketed commodities (LES consumption demand by household h for marketed commodity c), ($c \in C$, $h \in H$, demand by household h for marketed commodity c)</p> $PQ_c \cdot QH_{ch} = PQ_c \cdot \gamma_{ch}^m + \beta_{ch}^m \cdot \left(EH_h - \sum_{c' \in C} PQ_{c'} \cdot \gamma_{c'h}^m - \sum_{a \in A} \sum_{c \in C} PXAC_{ac} \cdot \gamma_{ac'h}^h \right)$
34	<p>Household consumption demand for home commodities (LES consumption demand by household h for home commodity c from activity a), ($a \in A$, $c \in C$, demand by household h for home commodity c from activity A)</p> $PXAC_{ac} \cdot QHA_{ach} = PXAC_{ac} \cdot \gamma_{ach}^h + \beta_{ach}^h \cdot \left(EH_h - \sum_{c' \in C} PQ_{c'} \cdot \gamma_{c'h}^m - \sum_{a \in A} \sum_{c \in C} PXAC_{ac} \cdot \gamma_{ac'h}^h \right)$
35	<p>Investment demand (fixed investment demand), ($c \in CINV$, fixed investment demand for commodity c)</p> $QINV_c = IADJ_c \cdot qinv_c$
36	<p>Government consumption demand, ($c \in C$, government consumption on commodity c)</p> $QG_c = GADJ_c \cdot qg_c$
37	<p>Government revenue (total government income)</p> $YG = \sum_{i \in INSDNG} TINS_i \cdot YI_i + \sum_{f \in F} tf_f \cdot YF_f + \sum_{a \in A} tva_a \cdot PVA_a \cdot QVA_a$ $+ \sum_{i \in A} ta_a \cdot PA_a \cdot QA_a + \sum_{c \in CM} tm_c \cdot pwm_c \cdot QM_c \cdot EXR + \sum_{c \in CE} te_c \cdot pwe_c \cdot QE_c \cdot EXR$ $+ \sum_{c \in C} tq_c \cdot PQ_c \cdot QQ_c + \sum_{f \in F} YIF_{gov f} + trnsfr_{gov row} \cdot EXR$
38	<p>Government expenditures ((total government expenditures)</p> $EG = \sum_{c \in C} PQ_a \cdot QG_c + \sum_{i \in INSDNG} trnsfr_{i gov} \cdot \overline{CPI}$

No	System constraint equation
39	<p>Factor market (factor market equilibrium), ($f \in F$, factor f in factor markets equilibrium)</p> $\sum_{a \in A} QF_{fa} = \overline{QFS}_f$
40	<p>Composite commodity markets (composite commodity market equilibrium), ($c \in C$, composite commodity c market equilibrium)</p> $QQ_c = \sum_{a \in A} QINT_{ca} + \sum_{h \in H} QH_{ch} + QG_c + QINV_c + qdst_c + QT_c$
41	<p>Current account balance for rest of the world (in foreign currency)</p> $\sum_{c \in CM} pwm_c \cdot QM_c + \sum_{f \in F} trnsfr_{row f} = \sum_{c \in CE} pwe_c \cdot QE_c + \sum_{i \in INSD} trnsfr_{i row} + \overline{FSAV}$
42	<p>Government balance</p> $YG = EG + GSAV$ <p>Direct institutional tax rates (direct tax rate for institution to institution), ($i \in INSDNG$, direct taxes on domestic non-government</p>

43	institutions) $TINS_i = \overline{tins}_i \cdot (1 + TINSADJ \cdot tins_{01_i}) + DTINS \cdot tins_{01_i}$ Institutional savings rates (marginal propensity to save for institution to institution), ($i \in INSDNG$, marginal propensity to save of domestic non-government institutions)
44	$MPS_i = \overline{mps}_i \cdot (1 + MPSADJ \cdot mps_{01_i}) + DMPS \cdot mps_{01_i}$ Savings-Investment balance
45	$\sum_{i \in INSDNG} MPS_i \cdot (1 - TINS_i) \cdot YI_i + GSAV + EXR \cdot \overline{FSAV} = \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c$ Total absorption
46	$TABS = \sum_{h \in H} \sum_{c \in C} PQ_c \cdot QH_{ch} + \sum_{a \in A} \sum_{c \in C} \sum_{h \in H} PXAC_{ac} \cdot QHA_{ach} + \sum_{c \in C} PQ_c \cdot QG_c + \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c$ Ratio of investment to absorption (investment share in absorption)
47	$INVSHR \cdot TABS = \sum_{c \in C} PQ_c \cdot QINV_c + \sum_{c \in C} PQ_c \cdot qdst_c$ Ratio of government consumption to absorption (government consumption share in absorption)
48	$GOVSHR \cdot TABS = \sum_{c \in C} PQ_c \cdot QG_c$ Objective function
49	WALRASSQR = WALRAS.WALRAS

Notational convention inside equations:

*Parameters and “invariably” fixed variables are in lower case.

*Potentially “variable” variables are in upper case.