Global Financial Crisis, Poverty, and Income Distribution in Indonesia: A Financial Computable General Equilibrium Approach

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ABSTRACT

This paper examines the impacts of the global financial crisis (GFC) on Indonesia's poverty and income distributions and how the Indonesian authorities respond to the crisis employing thefinancial computable general equilibrium (FCGE) model. The 2008 GFC had affected not only the US, but also the rest of the world as the world economy had become more integrated in the recent years. This suggests that asubstantial shock in one country would definitely affect the others significantly including emerging markets like Indonesia whose economy depend heavily on advanced countries.In order to analyze the effects of a financial crisis on poverty and income distribution, one needs a macro-micro approach since most of macro models often neglect micro problems such as poverty and income distribution. This paper simulates two macroeconomicshocks associated with the GFC (i.e., an increase in capital outflow and a decrease in export). The direct results are a decrease in labor demand and depreciated Rupiah, leading to a higher poverty rate. However, the income distribution improves since the decline of incomes of the poor is less than that of incomes of the non-poor. Furthermore, fiscal and monetary expansionary policies are also simulated to examine the effects of policy responses on socio-economic variables. Based on the simulation results, all expansionary policies lead to higher output yet they also result in higher price level, leading to an increase on the number of the poor and worsening income distribution. In terms of GDP, the policy mix (both fiscal and monetary policy) yields in the highest GDP compared to individual policy. However, it is important to note that the poverty line and the income distribution experience the highest increases with this policy mix.

Key words- FCGE, CGE, GFC, Poverty, Income Distribution, Fiscal Policy, Monetary Policy.

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INTRODUCTION:

In his New York Times column, Paul Krugman, Nobel Laureate in Economics, wrote:

"*We're suffering from the paradox of thrift: saving is a virtue, but when everyone tries to sharply increase saving at the same time, the effect is a depressed economy. We're suffering from the paradox of deleveraging: reducing debt and cleaning up balance sheets is good, but when everyone tries to sell off assets and pay down debt at the same time, the result is a financial crisis".*

This was exactly what happened in the US in 2008. People's confidences were at record low and most people think the pain of crisis would be long lasting and the effect would be permanent. According to the Time magazine recent survey of 1,000 Americans, only 12% expect the economy would recover in six months, half believe it would be another year or two, and 14% believed it was at the start of a long-term decline. Therefore, individuals tended to be more cautious, changed their overspending habit and saved more due to gloomy future expectation. The question was not how the financial crisis started rather how people could cope with this crisis and what people could change to mitigate the effects of the crisis. There was no doubt that unlike any other downturn since 1930s, this particular one had affected everyone not only in the US but also in the world as the world economy had become more integrated in the recent years, suggesting that one big shock in one part would surely affect the other parts significantly including emerging market like Indonesia whose economy depend heavily on advanced countries like US and European Union.

In the past few years, Indonesia had seen its economy grew substantially, 4.5% to 6%.The World Bank reported that unlike other countries, Indonesia did not experience a growth slowdown over the first half of 2008 and its growth was broadly based. The main driver of growth was domestic demand, particularly private investment, rose to almost 20 percent of GDP. Furthermore, data show that Indonesia's balance of payment continued to be in surplus for a third consecutive year and reserves built up significantly to USD 60 billion before falling to USD 50 billion. By October 2008, total external debt fell below 35 percent of GDP.In addition, based on the national poverty line, Indonesia's poverty rate fell to 15.4 percent in March 2008. Both urban and rural poverty rates declined in 2008 and given robust growth in the last two years, poverty would have fallen even further, perhaps by as much as an additional two percentage points had it not been for the nearly 16 percent rise in food prices between April 2007 and April 2008 (World Bank 2008). According to the national labor force survey (SAKERNAS) 2008, the employment rate, the share of the labor force in non-farm employment, as well as the share of the labor force jobs in the formal sector had all been rising, while open unemployment had been falling. However, since mid-September, the situation had been completely reversed and Indonesia began to suffer from the effects of the global turmoil.

In order to analyze the effects of financial crisis on poverty and income distribution, one needs a macro-micro approach. A financial crisis is obviously a macro event that has effects on economy through aggregate variables such as interest rates, the exchange rate and the balance of payments.

However, macro models often neglect micro problems such as poverty and income distribution at the household level. A computable financial general equilibrium approach that I am going to use in this paper provides the bridge between macro variables and micro variables.

Therefore, in this paper, I intend to analyze the effects of current crisis on Indonesia's poverty and income distributions and how the Indonesian authorities respond to the crisis using FCGE model. The paper is divided into four sections, starting with a brief overview about the mechanism of how the financial crisis may affect the poor. This is followed by a discussion of poverty and income distribution. The third section consists of the measurements of poverty and income distribution. Fourth, the model simulation results will be analyzed and is followed with a conclusion.

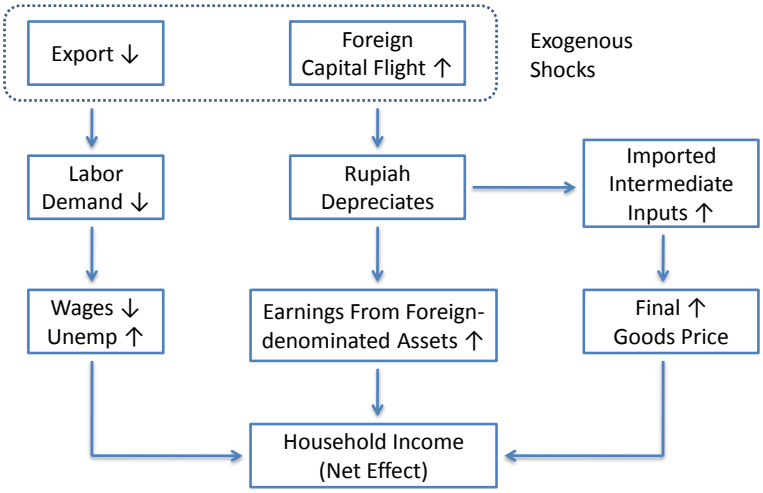
SIMPLE MECHANISMS FROM EXOGENOUS SHOCKS TO POVERTY AND INCOME DISTRIBUTION

Two major effects of the current financial turmoil are an increase in capital outflow and a decline in export demand. Both affect household incomes and prices (poverty line), which are variable of interests. The mechanism is as follows. Due to the need of liquidity in their home countries, foreign investors are withdrawing their investments especially in the financial sector in Indonesia. This exogenous shock put pressure on Rupiah as the demand for Rupiah decrease. As a result, Rupiah has been depreciated significantly against US dollar or other major foreign currencies. One would argue that this would lead to higher demand of Indonesian products abroad since those goods are now much cheaper. However, this is not the case since the importing countries like US, Japan and Singapore, which are Indonesia's major export partners,simply reduce their demands due to the contraction in their economy. On the other hand, the depreciation of Rupiah provides additional income gain to households that have savings in foreign currency, potentially leading to a widening income inequality. Moreover, the weakening exchange rate tends to have a negative impact on prices that the poor households (or all households) must pay since imported intermediate inputs and composite goods are now more expensive. Studies show that most of producers in Indonesia use high percentage of imported intermediate inputs in producing final goods. Higher prices of imported intermediate inputs will likely put pressure on producers to increase their final goods' prices or simply reduce their outputs. However, increasing prices does not seem like good option since the domestic and foreign consumptions have declined.

Another mechanism is through a decline in export especially in manufacturing and agriculture sectors, the first and second largest share of non-oil and gas exports respectively. This is directly translated to a decline in Indonesia's demand for labor. In January 2009, Indonesia's exports went down by 36% compared to those of in January 2008. Export-oriented firms were reducing their output and, therefore, cutting the number of their workers in order to cope with the declining demand. Holding the supply of labor in Indonesia constant, we would expect that the demand for labor is less than the labor supply, resulting in a deficient aggregate demand unemployment in which the economy is not able to generate enough jobs for those who want to work. As a result, households are expected to see their wage earnings decline (YF in the model) or vanish (high unemployment rate), affecting their incomes. These two mechanisms are summarized in the figure below. Note that, however, we will not observe incomes from foreign currency denominated financial assets. I will discuss this in the next section.

FIGURE 1: Mechanism from Exogenous Shocks to Household Income

Source: Author's Illustration



POVERTY AND INCOME DISTRIBUTION

Poverty has been defined as the inability of an individual or a family to command sufficient resources to satisfy basic needs (Fields 2001). One of the poverty measures is poverty line in which a basket of basic needs reflecting the consumption pattern of households near the presumed poverty line and yielding threshold caloric requirements is defined and costed out. Given this figure in Rupiah, we classify a household as poor if its income is below the cutoff amount. In this model, as a proxy of poverty line, we use a formula as follows.

$$PQPL = \frac{\left(PQ(\text{"AGRI"}) * Q(\text{"AGRI"})\right) + \left(PQ(\text{"}MANU\text{"}) * Q(\text{"}MANU\text{"})\right) + (PQ(\text{"}OTHR\text{"}) * Q(\text{"}OTHR\text{"}))}{Q(\text{"AGRI"}) + Q(\text{"MANU"}) + Q(\text{"OTHR"})}$$

The poverty line above is the weighted average of quantity of composite goods in three sectors in FSAM: AGRI (rice), MANU(textiles) and OTHR(housing and non-food goods)reflecting basic needs times prices of those composite products. Therefore, the poverty line is determined endogenously in the model.

Using this particular FCGE, however, we are not able to determine how many households below poverty line. Rather, we can compare the rate of income of the poor changes with the rate of poverty line changes. For instance, an expansionary policy would generate higher income of the poor but it would also lead to a higher poverty line. The net effect on incomes of the poor depends on which of the two changes is larger. Thus, we can estimate whether the poverty incidence increases or decreases.

Furthermore, in the model, household incomes consist of only two components: factor incomes (first bracket) and transfers (second bracket) from other institutions such as government, bank, nonbank, other households and rest of the world.

$$YHH_h = (\sum_f factoin_{h,f} * YF_f) + (\sum_{in} ITRAN_{h,in})$$

The downside of this equation is that we cannot capture the effect of returns and interest income from foreign currency-denominated financial assets on households' incomes. For example, if Rupiah depreciates, households that own dollar time deposits and dollar cash may enjoy additional incomes. Nevertheless, in this simple model, we cannot measure those changes. Therefore, any simulation results of household incomes must be evaluated carefully since they do not reflect all sources of household incomes. The difference between income of the poor and the rich are likely to be higher in reality than that of in the model, suggesting higher inequality. We will specifically look at incomes of the poor and their changes relative to incomes of the non-poor. In fact, we measure the income distribution in this model by comparing incomes of the poor in rural and urban areas with those of the non-poor in rural and urban.

Since the factor income is an important determinant of household incomes, we need to carefully specify labor market. Thorbecke (1991) finds that prices of value-added (PV), labor

productivity growth, and the inflation rate determine sectoral wage rates in Indonesia, implying that changes on these three variables will affect sectoral wages. Therefore, sectoral wage rates are endogenously derived in this model:

$$WAGES_P = PINDEX^{VP} * \left(\frac{PV_P}{PV0_P}\right)^{(1-VP)} * \left(\frac{X_P \Big/ \sum_P FACDEM_{P,fl}}{PDL0_P}\right)^{\pi p}$$

Where FACDEM and PDL0 are factor (labor) demand and labor productivity at the initial period respectively. A key implication that underlies the form of the wage equation is the prevalence of labor market segmentation with wages being strongly sector-specific (Azis 2002). Meanwhile, the average wage rates for each labor category (only 1 in this model) are arrived at the basis of the above sectoral wage rates and the wage shares of each type of labor in each sector (wsharep,fl):

$$WF_{fl} = WF0_{fl} * \sum_P WAGES_P * wshare_{p,fl}$$

During a crisis, it is likely that a reverse migration, labor migrates from urban to rural, emerges, especially when the urban sector takes the hardest hit (Azis 2002). Empirical studies show that a major reverse migration occurred in Indonesia during 1998 financial crisis. This happens because of the flexibility of Indonesia's labor market and strong ties between urban workers and their extended families in rural areas.

Unlike in a standard CGE model, investment in sector p is a function of value added (VA), loan interest rates (RLoan) and exchange rate (EXR), (Azis 2002):

$$INV_p = \lambda_p VA_p^{\lambda_{1p}} (1 + Rloan)^{\lambda_{2p}} (EXR)^{\lambda_{3p}}$$

Where λs are constant. The size of λ_3 depends on the sensitivity of investment on exchange rate fluctuations. This equation reflects the financing behavior of agents and balance sheet constraints. If the exchange rate depreciates substantially, agents' ability to make investment is adversely affected.

The three equations above are specific only for Indonesia's CGE model based on a number of empirical studies. They may not apply to other countries' CGE model since those equations reflect only Indonesia's economy.

FCGE SIMULATIONS AND ANALYSIS

FCGE provides the bridge between macro variables and income distribution. Other advantages of using FCGE are: 1. It is based on well-developed theory. 2. Prices are endogenous and behavior of producers and consumers are included. 3. It is suitable for complex analysis. 4. It includes financial sector that is a key component of a country's economy (although many financial assets in this model are exogenous).

Having the FCGE model set up, I shocked the model by increasing capital outflow by 40% and reducing export quantity simultaneously. The model uses FSAM 2005 as the main input data thus the baseline is Indonesian's economy in 2005. Assuming the structure of Indonesian's economy does not change from 2005 to 2008, we can do the simulation in order to see the effects of increasing capital outflow and lower export demand. While shocking the capital outflow (FSAV in the model) is not a problem, shocking export might undermine the results due to instability of the parameter. The CET equation for export and domestic goods is as follows:

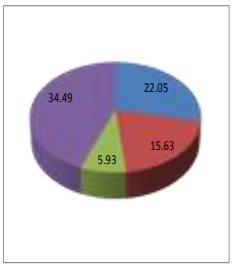
$$X = A[bxD^{-\rho} + (1 - bx)E^{-\rho}]^{\frac{-1}{\rho}}$$

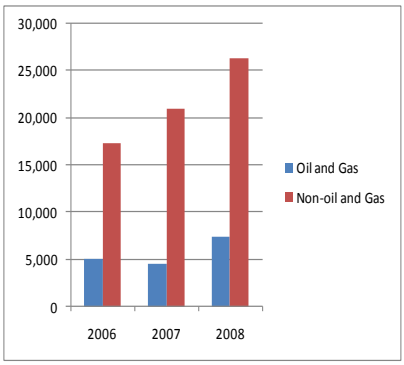
In this exercise, we increase the parameter bx by 20 percent, resulting in a decline in export quantity. However, if we increase $bx$by more than 20 percent, errors will occur in the model although the solution is found. Moreover, in this model, we cannot set how much the export quantity to decline like in the other models such Cameroon model in the GAMS library model (GAMS student version) in which we can change the quantity of export by simply changing the variable export quantity (E). Of course, this model and Cameroon one have different equations related to export and Indonesia's FCGE model are far more complex.Nevertheless, since the manufacturing and agriculture are the first and second highest share of non-oil and gas exports (35% and 22% respectively as in figure 2), I only shocked these two sectors by increasing $bx$by 20 percent.

FIGURE 2: Export Trend and Shares by Sectors Source: World Bank

In million USD

Commodities	2006	2007	2008	Share 08
Oil and Gas	5,150	4,564	7,392	21.90
Oil	2,681	2,681	4,043	11.98
Gas	2,468	2,468	3,349	9.92
Non-oil and Gas	17,303	21,018	26,354	78.10
Agriculture Commodities	3,304	3,882	7,442	22.05
Mining and Mineral	3,335	4,732	5,273	15.63
Forestry Products	1,482	1,841	2,000	5.93
Manufacturing Products	9,181	10,563	11,638	34.49
Total	22,452	25,582	33,746	100.00





We can now test the hypotheses discussed earlier in section 2 with empirical results from the model simulation. I argue that a decline in export demand abroad especially in manufacturing and agriculture sectors will lead to lower labor demand.

TABLE 1
Export Quantity by Sectors (left) and Labor Demand by Export Sectors (right)

	Baseline	Crisis	%CHANGE
AGRI	35109.54	32230.037	-8.20
MINE	127182.6	125135.901	-1.61
MANU	688867.5	667658.486	-3.08
TRAD	20768.08	18447.157	-11.18
TRAN	15895.87	14353.307	-9.70
FINN	16138.87	15806.07	-2.06
OTHR	11647.57	10180.713	-12.59

	Baseline	Crisis	%CHANGE
AGRI	317485.7	293308.975	-7.62
MINE	65900.51	55649.77	-15.55
MANU	331711	293063.222	-11.65
TRAD	330240.5	297123.032	-10.03
TRAN	68988.58	59343.668	-13.98
FINN	45626.1	38158.092	-16.37
OTHR	229247.7	205716.866	-10.26

Source: Author's Calculations

As can be seen in table 1, all sectors' export quantity have declined with the highest decline is in other (OTHR) sector and the lowest decline is in mining(MINE) sector. Meanwhile, labor demands also decrease in all sectors. The highest decrease of labor demand is in financial (FINN) sector whereas the lowest decline is in agriculture (AGRI) sector. However, these results do not confirm the fact that the hardest hit sectors are manufacturing and agriculture. This is probably because we can only change the parameter bx instead of export quantity by sectors (E).

TABLE 2
Sectoral Wages

	Baseline	Crisis	%CHANGE
AGRI	1	1.127	12.7
MINE	1	1.242	24.2
MANU	1	1.107	10.7
TRAD	1	1.107	10.7
TRAN	1	1.148	14.8
FINN	1	1.223	22.3
OTHR	1	1.067	6.7

Source: Author's Calculations

Given a constant labor supply, a decline in labor demand will lead to lower wages. But, this is not the case in Indonesia since sectoral wages depend on the inflation (variable PINDEX) as stated in equation above. Based on aggregate supply (AS) relationship, we can explain this as follows. If wage setters (i.e., firms) expect the price level to be higher (in this case due to higher imported inputs), they set a higher nominal wage. The increase in the nominal wage leads to an increase in

costs, which leads to an increase in the prices set by firms and a higher price level (Blanchard 1997).

TABLE 3

Price of Foreign Intermediate Inputs and Price of Composite Goods

Price of Foreign Intermediate Inputs

	Baseline	Crisis	%CHANGE
AGRI	1	1.137	13.7
MINE	1	1.107	10.7
MANU	1	1.163	16.3
TRAD	1	1.116	11.6
TRAN	1	1.14	14
FINN	1	1.047	4.7
OTHR	1	1.135	13.5

Price of Composite Goods

	Baseline	Crisis	%CHANGE
AGRI	1	1.213	21.3
MINE	1	1.011	1.1
MANU	1	1.18	18
UTIL	1	1.024	2.4
CONS	1	1.112	11.2
TRAD	1	1.099	9.9
TRAN	1	1.081	8.1
FINN	1	1.03	3
OTHR	1	1.106	10.6

Source: Author's Calculations

Due to higher volume of capital flight, Rupiah depreciates substantially resulting in an increase of not only price of foreign intermediate inputs but also price of composite goods as shown in Table 3. As a result, prices are going up or higher inflation (See Table 4), implying higher prices that the poor must pay.

TABLE 4

Selected Variables FCGE (left) and FCGE with Migration Equations (right)

	BASELINE	CRISIS	%CHANGE
GDP	2791971.22	2751012.67	-1.47
RGDP	2791971.221	2439799.36	-12.61
EXR	10377.3	11120.529	7.16
PINDEX	1	1.134	13.40
RLOAN	0.14	0.14	0.00
CDTOT	1868630.287	1621371.177	-13.23
UEMPR	0.106	0.205	93.40
PQPL	1	1.174	17.40
ETOT	915610.1	883811.671	-3.47
FSAV	-3.178	-4.449	39.99
HHR-PR	36513.066	36277.96	-0.64
HHR-NP	557000.799	549676.421	-1.31
HHU-PR	104740.493	104301.996	-0.42
HHU-NP	1496759.328	1475296.176	-1.43
YHHSH	0.097	0.098	1.03

	BASELINE	CRISIS	%CHANGE
GDP	2847466	2796133	-1.80
RGDP	2854452	2614054	-8.42
EXR	10348	10706.0121	3.46
PINDEX	1	1.0879	9.04
RLOAN	0.14	0.14	0.00
CDTOT	1906256	1739130	-8.77
UEMPR	0.086	0.0914	6.90
PQPL	1	1.1275	12.96
ETOT	934293	937596.36	0.35
FSAV	-3.187	-4.4617	40.00
HHR-PR	36800.751	36499.66	-0.82
HHR-NP	565886.7553	556574.27	-1.65
HHU-PR	105239.5899	104711.10	-0.50
HHU-NP	1523676	1495612.00	-1.84
YHHSH	0.0953	0.0966	1.36

Source: Author's Calculations

Inflation (PINDEX) and poverty line (PQPL) have positive relationship, so higher prices means higher prices of goods in the poverty basket. In table 4, incomes of the poor in both rural and urban decline by 0.64 and 0.42 percent respectively yet the price index increases by 13.40 percent, suggesting higher number of poverty incidences in Indonesia. Moreover, the income distribution (YHHSH) is getting better as the decline of incomes of the non-poor is higher than

that of incomes of the poor in urban and rural area. Note, however, that in this model, only factor income and institutional transfer determine the household income. Therefore, the model cannot capture the interest income from foreign currency-denominated time deposits and other financial assets. Incomes of the non-poor may not decline as much as in the table above or may increase because of additional income from foreign financial assets, suggesting higher income inequality or worsening income distribution. Furthermore, like in the US and other countries, domestic consumption declines significantly (down 13.23%) leading to lower demand for commodities.

Table 4 shows the results from FCGE model with and without migration equations. Although the sign of changes are the same, changes in FCGE with migration are not as high as those in FCGE without migration. It seems that the numbers are more realistic in FCGE with migration. For example, the change in unemployment rate is only 6.9 percent in FCGE with migration whereas the change in unemployment rate in FCGE without migration is 93.4%.

In summary, the exogenous shocks of higher capital outflow and lower export demand result in lower labor demand and depreciated Rupiah. Lower labor demand causes higher unemployment. As Rupiah weakens against dollar or other major foreign currencies, imported intermediate inputs and commodities become more expensive. Firms adjust their expected price level and set a higher nominal wage. The increase in the nominal wage leads to an increase in costs, which leads to an increase in the prices set by firms and a higher price level. On the other hand, incomes of the poor have declined due to the crisis but the poverty line has gone up substantially. As a result, poverty will be much higher during crisis. Nevertheless, the income distribution is improving since the decline of incomes of the poor is less than that of incomes of the non-poor (based on household income equation that does not take into account foreign currency-denominated financial assets).

Next, the Indonesian government has responded to the crisis by implementing expansionary policies. Its stimulus package of Rp 73.3 trillion includes tax savings (56.3 trillion), infrastructures and other spending (17 trillion). The large share of the stimulus goes to tax incentives in order to boost consumer and firm spending. In addition, Indonesia's central bank, Bank Indonesia, also implements an expansionary policy by cutting interest rate from 7.5% to 7.25%, hoping that this will increase investments and consumption. Therefore, using this model, we can simulate the following expansionary policies: a decrease in interest rate, an increase in government spending, and a lower household and corporate tax rates. The results are the following.

TABLE 5
Selected Variables of Policy Simulation

	CRISIS	%CHANGE	INT DWN 25 BPS	%CHANGE	G UP 10%	%CHANGE	Y& C TAX DWN	%CHANGE	POLICY MIX	%CHANGE
GDP	2751012.67	-1.47	2763056.17	0.44	2792678.343	1.51	2755944.316	0.18	2809952.948	2.14
RGDP	2439799.36	-12.61	2439134.535	-0.03	2442505.814	0.11	2439864.111	0.00	2441915.462	0.09
EXR	11120.529	7.16	11171.664	0.46	11278.91	1.42	11140.161	0.18	11350.826	2.07
PINDEX	1.134	13.40	1.139	0.44	1.15	1.41	1.136	0.18	1.157	2.03
RLOAN	0.14	0.00	0.136	-2.86	0.14	0.00	0.14	0.00	0.136	-2.86
CDTOT	1621371.177	-13.23	1620106.732	-0.08	1621674.194	0.02	1623010.749	0.10	1622068.369	0.04
UEMPR	0.205	93.40	0.206	0.49	0.204	-0.49	0.205	0.00	0.204	-0.49
PQPL	1.174	17.40	1.18	0.51	1.191	1.45	1.176	0.17	1.198	2.04
ETOT	883811.671	-3.47	883285.676	-0.06	882324.426	-0.17	883671.25	-0.02	881667.459	-0.24
FSAV	-4.449	39.99	-4.449	0.00	-4.449	0.00	-4.449	0.00	-4.449	0.00
HHR-PR	36277.96	-0.64	36340.395	0.17	36503.858	0.62	36304.213	0.07	36594.171	0.87
HHR-NP	549676.421	-1.31	551604.424	0.35	556570.453	1.25	550481.021	0.15	559352.657	1.76
HHU-PR	104301.996	-0.42	104410.09	0.10	104653.026	0.34	104344.461	0.04	104806.1	0.48
HHU-NP	1475296.176	-1.43	1481141.581	0.40	1497144.703	1.48	1477806.18	0.17	1505657.601	2.06
YHHSH	0.098	1.03	0.097	-1.02	0.097	-1.02	0.097	-1.02	0.096	-2.04

Source: Author's Calculations

At a given level of output, an increase in the money level leads to a decrease in the interest rate since money supply will exceed money demand. Given IS curve, monetary expansion by the central bankleads to a rightward shift of LM curve, yielding lower interest rate (2.86% decline), higher output (0.44% increase) and higher exchange rate depreciation (0.46% decrease). However, the price level also increases by 0.44 percent since the real money stock goes up. As a result, poverty line also goes up by 0.51 percent. Meanwhile, incomes of the poor in rural and urban go up by 0.17 and 0.10 percent. The rate of income increase is less than that of the poverty line increase, implying higher poverty incidences. In terms of income distribution, the non-poor enjoy higher increase of incomes than the poor, resulting in higher income inequality both in urban and rural area. Moreover, the downside of this expansionary monetary policy is higher unemployment rate. This policy fails to boost domestic consumption (down 0.08%).

Like monetary expansionary policy above, fiscal expansionary policy's goal is to stimulate the economy and mitigate the effects of global crisis. Both tax incentives and spending on infrastructure are based on "multiplier effect", that is, every Rupiah spent by government will multiply throughout the economy. Yet, the effectiveness of these policies, especially tax incentives, is questionable since most people are more cautious with their money and save more as stated earlier. Therefore, based on the simulation results, we can see the effects of this fiscal policy on domestic consumptions, poverty and income distribution.

The fiscal shocks in this model are 10 percent increase of government spending and 10 percent decrease of individual and corporate taxes. It appears that an increase of government spending leads to a small increase in domestic consumption (0.02%). On the other hand, tax saving policy

leads to higher increase in domestic consumption (0.1%). Interestingly, the rate of income changes due to higher government expenditure is much higher than that of income changes due to tax saving for all households. For example, the effect of higher government expenditure on the income of the rural poor is 0.62% increase whereas the effect of tax incentive on the income of the rural poor is 0.07% increase. However, with more increase in their incomes, all households spend less (see domestic consumption in column G Up and Y&C Tax Down in the table). Usually, we expect that if people see their incomes increase, their expenditures go up as well. But, the results from this model show a higher increase in income leads to less spending. A number of studies show people tend to save more if they get a bulk of money. Also, they tend to be more cautious due to gloomy future expectations.

Moreover, higher government expenditures results in an increase in poverty line by 1.45% whereas tax incentive policy yields in higher poverty line by 0.17%. Incomes of the poor in urban and rural area increase as well. Nevertheless, the increase of income is still less than the increase of poverty line for both policies. It is most likely that more households are below poverty line and classified as poor families. In both policies, the income distribution is worsened because the poor's income increase is less than the non-poor's income increase.

After we discussed the effects of those expansionary policies if each is implemented separately, we now discuss if the government and the central bank implement those policies at the same time. In reality, it is likely that the authorities execute all the monetary and fiscal policies together. First, given the output level, Bank Indonesia increases the money stock, leading to a decrease in interest rate. The LM curve shifts rightward. The lower interest rate and the depreciation both increase demand and output. Furthermore, an increase in government spending shifts the IS curve to the right, resulting in more increase in demand and output. As output increases, so does the demand for money, leading to upward pressure on the interest rate and an appreciation of Rupiah over time. As shown in table, the GDP increases by 2.14 percent, the highest among other policies but Rupiah has still depreciated to 11,350 per US dollar because now government bond is less attractive. In addition, like other expansionary policies, the policy mix leads to higher price level. Under this policy mix, the price index goes up by 2.03 percent. At the same time, the poverty line also increases by 2.4 percent, the highest compared to the poverty line generated from each policy. Unfortunately, incomes of the poor grow less than the poverty line, indicating more households are becoming poor. Although the poor's income increases under this policy mix are higher than the poor's income increases in other policies, they are still less than the non-poor's

income increase. Hence, the income inequality is getting more unequal and the income distribution is the worst compare to those of under other policies.

In conclusion, compare to other expansionary policies, the policy mix results in the highest GDP. The trade-off, however, is that the number of poor households is higher and the income distribution worsens. Clearly, based on the simulation results, all expansionary policies lead to higher output yet this put upward pressure on the price level. As price index increases, so does the poverty line. The increase of the poor's incomes is always less than the increase of the poverty line, resulting in higher poverty incidences. Moreover, the increase of the non-poor's incomes is always higher than the increase of the poor's incomes, indicating the worsening income distribution.

CONCLUSION

The global financial crisis has affected everyone not only in the US but also in the world as the world economy has become more integrated in the recent years, suggesting that one big shock in one part will surely affect the other parts significantly including emerging market like Indonesia whose economy depend heavily on advanced countries like US and European Union. The need of liquidity in those developed countries leads to huge withdrawal of capital from Indonesia. In addition, low consumers' confidences have reduced demand for imported goods from Indonesia and the governments in export destination countries tend to impose higher import tariff which worsen the condition.

This paper demonstrates the use of FCGE to analyze those macroeconomics events (i.e., an increase in capital outflow and a decrease in export) and their effects on poverty and income distribution in Indonesia. These two exogenous shocks are simulated in the model and the direct results are a decrease in labor demand and depreciated Rupiah. A decrease in labor demand results in higher unemployment. As Rupiah depreciates, imported intermediate inputs and commodities become more expensive. Producers expect the price level to be higher and set a higher nominal wage. Thus, the increase in the nominal wage leads to an increase in costs, which leads to an increase in the prices set by firms and a higher price level or higher inflation. However, the simulation results suggest incomes of the poor decline whereas the poverty line increases substantially. Therefore, poverty will be much higher during crisis. Surprisingly, the income distribution is improving since the decline of incomes of the poor is less than that of incomes of the non-poor.

Furthermore, the Indonesian government has responded to the crisis by implementing fiscal expansionary policies: an increase in government spending, and a lower household and corporate tax rates. Meanwhile, Bank Indonesia, also implements an expansionary policy by cutting interest rate by 25 basis points. Using FCGE model, we run simulation to see the effect of each policy and combined policies on poverty and income distribution.

Based on simulation results, all policies lead to higher output yet they also result in higher price level. As price index increases, so does the poverty line. The incomes of the poor increase yet the rate of income increase cannot catch up with the rate of poverty line increase, resulting in higher number of poor households. The income distribution becomes more unequal since the increase of the non-poor's incomes is always higher than the increase of the poor's incomes.

In terms of GDP, the policy mix yields in the highest GDP among other policies. However, the poverty line and the income distribution are the highest increases. Clearly,there is a trade-off between growth and social conditions. If the government only cares about economic growth and ignores social variables such as poverty and income distribution, it would choose the policy mix. In contrast, if the government prioritizes not only economic growth but also social conditions, it would choose the higher government expenditure policy.

Some limitations of this model are as follows. First, in order to shock export quantity, we change parameter bx instead of variable E. As a result, we cannot set how much export quantity to decrease. Second, household income equation does not include additional incomes from foreign currency-denominated time deposits and other financial assets. Many Indonesians own these foreign financial assets and enjoy a windfall gain if exchange rate depreciates. This would lead to higher income inequality and we cannot capture it in this model. Third, many of the financial assets are assumed to be exogenous. In reality, the allocation of financial assets fluctuates widely especially during financial crisis. Fourth, Indonesian FSAM has only one category of labor. Thus, we cannot see the effect of a shock on labor real incomes by labor categories. Fifth, the model assumes perfect competition in all sectors. In reality, not all sectors are classified as perfect competition.

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