MACROECONOMIC AND SOCIOECONOMIC IMPACTS OF TAX AMNESTY

POLICY IN INDONESIA: AN ECONOMY-WIDE APPROACH

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MACROECONOMIC AND SOCIOECONOMIC IMPACTS OF TAX AMNESTY POLICY IN INDONESIA: AN ECONOMY-WIDE APPROACH

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This thesis assesses the economy-wide impacts of tax amnesty policy in Indonesia during 2016-2017 on selected economic and social indicators. This paper points out that the impacts of asset repatriation and extra tax revenue collected from tax amnesty can be only measured and analyzed comprehensively if those two amnesty outcomes are being treated as exogenous variables in a price-endogenous model such as FCGE (financial computable general equilibrium). Seven tax amnesty policy scenarios consist of factual and counterfactuals are simulated with the model to assess the effects of those two shocks on 9 economic indicators and 3 social indicators.

The simulations reveal that, in general, tax amnesty generates a slight expansionary effect on the economy at the cost of worsening income inequality. The simulations also show that even though 'targeted' and 'non-targeted' tax amnesties lead the economy to grow, income inequality between the poor and the rich is widened. *Financial income effects* and *forgiveness effect* are held responsible for the worsening income inequality between the poor and the rich in Indonesia. Out of seven simulations, one shows that tax amnesty that is designed to specifically target the rich and corporations but with no salient information on where the repatriated assets have been allocated in the financial market—tend to have contractionary effect on the economy.

BIOGRAPHICAL SKETCH

Andi Kuncoro was born and raised in Bantul, Yogyakarta, in 1985. He started his activism in 1996 when he was in junior high school. In 2002, he received an award for representing his high school, *SMA 8 Yogyakarta*, in the national level Information Technology Olympiad. Since then, coding and graphic design became his hobby. In 2004, he was elected as the regional level secretary for the oldest and the biggest Islamic student movement in Indonesia, *Islamic Students Association* (HMI) for Bintaro area in Jakarta. In 2005 until 2006, he served as the chairman for the same organization. He received a three years fellowship from the Indonesian Ministry of Finance (MoF) in 2004 and graduated from *State College of Accountancy* (STAN) in 2006.

After earned his bachelor's degree, he spent ten years living in Bali island as mandated by the MoF. Officially, he has been working for more than 14 years for the Indonesian central government as tax auditor in the Directorate General of Tax. Among 5,400 tax auditors in the national level, he is ranked the top 1% (rank 37) in 2016. In August 2016, he moved to Ithaca, NY, to pursue MPA degree at Cornell University after 5 years struggle to fight a very stiff bureaucracy that tends to inhibit employee to pursue higher educations. Although facing paternalistic bureaucracy constraints, he chooses to believe that no force in this world is allowed to exist to prevent mankind from expanding knowledge for their welfare. After ups and downs, again, he received FETA fellowship for his two years study at Cornell Institute for Public Affairs.

To my mother, father, my beloved wife,

and our adorable sonny boys:

ꦲꦾꦲꦏꦗꦺꦴꦴꦴꦪꦗꦺꦴꦴꦴ | ꦗꦴꦴꦴꦴꦲ | ꦗꦴꦴꦴꦴꦲ

Shah │ Cornell

"Sugih tanpa banda,

digdaya tanpa aji,

nglurug tanpa bala,

menang tanpa ngasorake."

~Raden Mas Panji Sosrokartono (1877-1952)

ACKNOWLEDGMENTS

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CHAPTER 1

INTRODUCTION

Three months after the 2016 Indonesian tax amnesty program ended in March 2017, President Joko Widodo administration, also known as Jokowi, claimed that the current amnesty program is the largest and the most successful tax amnesty in the history (Figure1). Long before the Indonesian Parliament passed the legal basis for this program in July 2016 (Law No.11/2016), television and news media were dominated by debates over the urgency of tax amnesty and its impacts on the Indonesian economic development and the widening income inequality.
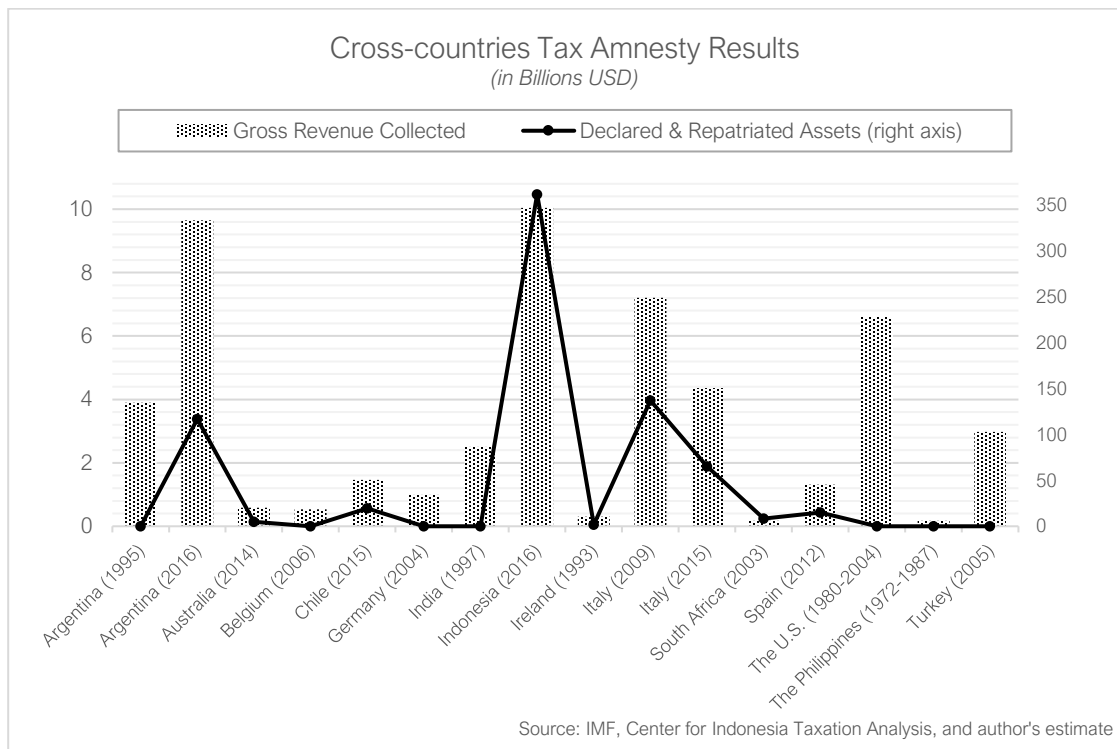
Figure 1 - Cross-countries Comparison of Asset Declared and Penalties Collected during Tax Amnesty

Since its Independence Day in August 1945, Indonesia had launched tax amnesty program three times. The first and the second tax amnesties took place in 1964 and 1984, but unfortunately, both were failed. Under President Soekarno administration, the first Indonesian tax amnesty program in 1965 failed to reach its tax revenue target of 25 billion Indonesian Rupiah (see Kompas Daily in Figure 2 below). The program was extended until November 10, 1965, but no progress has been made as the domestic political unrest triggered by the September 30th Movement (Gestapu) of the Indonesian Communist Party (PKI) took place.

KOMPAS - KAMIS, 5 AGUSTUS 1965 HALAMAN 2

Hari Terachir Pengampunan Padjak 17 Agustus 1965

Figure 2 - Newspaper Page on Tax Amnesty in the Era of President Soekarno in 1965

The second tax amnesty policy took place in 1984 during the era of President Soeharto administration. At that time, Indonesia's economy was in the stage of post-*oil bonanza* and in the middle of economic crisis as shocked by the 1982-1983's worldwide economic recession and by the world's oil prices decline during 1983 until 1986. Under those external pressures, President Soeharto adjusted the large deficit in the government budget by undertaking radical tax reforms and tax amnesty policy to collect alternative income source to replace oil export revenue loss. The 1984 tax amnesty was part of the

Indonesian government's efforts to boost the revenue side of the central budget by targeting underground economy. Although *raison d'être* for this tax amnesty policy is different from that of 1964, the cause of the policy failure is substantially the same i.e. low-level participation of taxpayers.

Thirty-two years later, in July 2016, President Jokowi administration, launched another tax amnesty policy. This time, the policy was more ambitious than its predecessors. Despite haunted by past failure experiences, the target was set high and the legal basis was escalated to the parliament level. Unlike the 1964's and 1984's tax amnesty, the legal basis of this third amnesty policy was not merely a Presidential executive order, but a law passed by the Indonesian Parliament with the expectation that the classic problem of low-levels taxpayer participation could be overcome.

However, to date, neither the Ministry of Finance (MoF) nor the Directorate General of Tax (DGT) has published an official evaluation report on the impact of the 2016's tax amnesty policy on the improvement of tax base and taxpayer compliance—let alone the macroeconomic impact and the socio-economic impact of the policy (i.e. income distribution among different household strata in the economy). The only report published by the Indonesian government is descriptive statistical information containing the Indonesian Rupiah value of the penalties paid and the domestic (including foreign) asset declared or repatriated by the policy participants.

Academic studies that focus on the impact analysis of this amnesty are very limited in numbers. Many of them addressed the controversial legal aspect of the policy if not merely provided cross-countries descriptive comparison studies. Whereas the rest,

emphasize more on the short run government revenue effect and the potential risk of taxpayer distrust with respect to the tax administration's enforcement capacity—which in the long run could incentivize tax evasion and avoidance (moral hazard), or even generates a new pattern of non-compliance behavior among individual taxpayers.

Therefore, it is of great interest to determine the impact of the 2016's tax amnesty policy on the wider aspect of the Indonesia economy, especially on the macroeconomic measures such as consumption, investment, trade balance, domestic liquidity, exchange rate and inflation, as well as poverty and income distribution among the poor and the rich in both rural and urban area in Indonesia. This study is a pilot study attempted to evaluate the full impact of Indonesia third tax amnesty policy (using proxies as mentioned in *Law No.16/2016 on Tax Amnesty*) and to analyze the interdependence among variables and agents in the Indonesian economy.

The result of this study would be potentially quite important and helpful for lawmakers and policymakers, particularly those who deal with economy-wide impact evaluation of tax policy changes. The model used in this study offers not only a partial equilibrium approach, but a more general, comprehensive, and realistic approach to estimate fiscal policy impact on the domestic economic efficiency and equity. Although commonly empirical study is not the only input to be considered in the policy-making process, I hope this study can benefit Indonesia within the next decade or two as a reference for future tax amnesty program or even for bigger reform agenda.

CHAPTER 2

LITERATURE REVIEW

2.1. On the Rationale of Tax Amnesties

There are extensive literature on the economics and politics of tax amnesties. A cross-states econometric analysis by Le Borgne on the determinant of tax amnesty policies in the United States over the period of 1977 to 1998 showed that the policies are more likely to be introduced as a revenue generating source when states' indebtedness is growing (Le Borgne, 2005). Governments around the world also typically perceive tax amnesty as a reliable strategy to generate extra tax revenue, particularly during an economic downturn or budget pressure. Although there have been many concerns about the long-term effect of tax amnesty policy, many governments still consider it as an efficient revenue raiser, at the same time, effective enforcement cost reducer, and in some cases serves as a political instrument that helps transition to stricter tax regime fairer (Leonard & Zeckhauser, 1987).

From taxpayer's perspective, tax amnesty is a limited-time chance to pay unpaid taxes prior to the program without being subject to penalties, audit, investigation, or prosecution for any tax evasion crime (Beck II, 1991). Hence, for taxpayers, amnesty provides financial and legal forgiveness. Using Franzoni's language taken from his paper titled *Punishment and Grace: on the Economics of Permanent Amnesties*, tax amnesty induces taxpayers with high willingness to pay to self-select themselves as a

program participant and to escape from tax agency's standard enforcement or prosecution procedure (Franzoni, 1996).

In short run, one can subsequently conclude that the direct observable impact of tax amnesty policy includes increasing *gross* tax revenue and reducing the cost of administration—especially the enforcement cost. While the short-term and medium-term *net* revenue gains that are derived from tax amnesty policies vary across countries, many studies suggest that successful tax amnesty is rare. The most successful tax amnesties have relied on institutional factor such as improvement of tax agency's enforcement capacity (Le Borgne & Baer, 2008).

Empirical evidence to clarify that argument is broadly available. In 2008, the International Monetary Fund (IMF) conducted a cross-country study on tax amnesties and found that tax amnesty programs have produced mixed results regarding *gross* tax revenue collection. Countries that have become subject of the analysis include the United States, Argentina, Ireland, Italy, India, Turkey, and the Philippines.

In the U.S., from 1980 to 2004, seventy-eight tax amnesties were offered and mainly designed for collecting "extra" revenue in the middle of fiscal distress. Although considered as successful programs in short-run (1 fiscal year) under *gross* revenue measure, it turns out that 92% of these successes contains revenues collected from *account receivable*.[1] Hence, by excluding account receivable in the calculation, yet taking into account administrative costs (e.g., overtime pay for tax agency employees,

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[1] Account receivable from tax administration's point of view refers to tax liabilities associated with tax evaders or delinquent taxpayers that have already been detected and billed by tax agency but have not been successfully collected, yet.

advertising and public relation costs, and other costs related to the additional workflows, not forget to mention the indirect cost of resource reallocation from routine enforcement and services to amnesty management), one can easily find that *net* revenue gained from tax amnesties is likely insignificant.

Tax amnesties in Argentina (1995), India (1997), and Ireland (1999) can be considered successful in terms of *gross* revenue collection. From 1950 to 2004, Argentina had offered around 20 tax amnesties and collected $3.9 billion of *gross* revenue in the 1995's general tax amnesty program. India succeeded in collecting *gross* revenue of around $2.5 billion in 1997 and gathered $9.8 billion taxpayers' asset declaration in 2016 (Mundy, 2016). Another successful tax amnesty program was Ireland's third amnesty in 1999, collected more than $1 billion *gross* revenue only after the government gained *leverage* from the willingness of banking institutions to cooperate with tax agency to exchange taxpayer-related information.

Other developing countries like Turkey and the Philippines frequently applied tax amnesties for 29 times from 1923 to 2016 and 18 times between 1972 and 1987, respectively. Both countries' stand-alone tax amnesties were not successful in increasing tax revenue-to-GDP ratio during the period of amnesties and post the programs.[2] Evidence from Turkey, the Philippines, and Argentina support Stella's conclusion that frequently repeated amnesty programs in a situation where rooms for enforcement capacity improvement are too narrow (if not unavailable) tend to reduce

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[2] Stand-alone tax amnesty practices refer to tax amnesty programs that serve merely as a temporary solution of fiscal distress, without followed by fundamental change in tax system legal framework, tax policy, or tax administration's enforcement capacity improvement.

government revenue performance thus the tax-to-GDP ratio overtime, taxpayer compliance, and tax agency credibility (Stella, 1991).

The *Scudo Fiscale*, Italy tax amnesty program introduced in 2009—is different from those whose objective is merely collecting extra tax revenue. It has different rationale compared to other countries' tax amnesty practices. The policy aims to boost economic growth by spurring domestic investment through asset repatriation. By doing so, it is expected that broader tax base can yield higher tax revenue-to-GDP ratio. Although failed in generating significant short-run *gross* revenue for its treasury—only $7.2 billion collected (Dade, 2009), the Italian *Scudo Fiscale* was very successful in repatriating large scale of off-shore capital ($136.8 billion) into the domestic economy (Cohen & Clark, 2009). Same story, South Africa in 2003 and Chile in 2015 both succeed in repatriating approximately $8.5 billion and $19.5 billion of off-shore asset, respectively, while collecting extra tax revenue of around $170 million and $1.5 billion, respectively (Ariyanti, 2016).

2.2. Indonesia Tax Amnesty: Macroeconomic and Institutional Objectives

Indonesia tax amnesty policy in 2016 is a special case in terms of its objectives and the magnitude of its outcome (not its impact). The policy objectives go beyond *gross* revenue collection and taxpayer compliance. It aimed mainly at macroeconomic objectives and regime change. Among three objectives mentioned in *Law No.11 of 2016 on Tax Amnesty*, boosting economic growth and economic restructuring through asset repatriation is on the top of the list (Republic of Indonesia, 2016). Four proxies to

evaluate the impact of tax amnesty outcome are mentioned specifically in the Law. They are domestic liquidity, exchange rate, interest rate, and (domestic) investments.[3]

The second objective according to the Law is institutional change (to more stringent tax regime). The inclusion of this objective in the Law supports Alm *et al*'s proposition that tax amnesties can also be used for signaling tax regime transition to a tougher regime (Alm, McKee, & Beck, 1990). Per *Law No.11/2016,* the institutional change is signaled by two measures: firstly, tax reform or legal framework improvement that promote more equitable tax system; and secondly, database advancement. The third (last) objective of Indonesia tax amnesty is similar to that of tax amnesty program in general, that is to increase tax revenue.

Two key aspects of Indonesia's tax amnesty can be extracted from those three objectives. These are macroeconomic aspect and the notion regarding more equitable tax system. It is important to bear in mind that the way lawmakers sort these aspects into first and second order reflects their priority scale. One question, hence, should be asked; that is to what extent Indonesia's tax amnesty program promote (1) economic growth with minimum distortion (i.e., efficiency) for the economy, and (2) equitable income distribution and poverty incidence reduction. Previous studies have overlooked this pivotal question in their analysis.

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[3] The Law requires the repatriated assets to be invested domestically at least 3 (three) years in government securities, state owned enterprises' bond, government bond, financial investments in commercial banks, corporate bonds, infrastructure investments, real sector investments that are prioritized by government, and/or other legitimate investments under the law. It also restricts transfer of the declared assets to foreign countries within three years period.

Another issue failed to be addressed by previously published studies on the impacts of tax amnesty on economic well-being is the transmission mechanism of shocks generated by the policy outcomes, i.e. repatriated asset and the extra tax revenue collected by tax agency. Thus far, most of the discussions in the literature on tax amnesty only focused on the legal aspect, behavioral aspect (using Prospect Theory), and on some technical details of the program's administration. Therefore, economy-wide impact analysis is needed to shed light on the macroeconomic and distributional effects of tax amnesty policy that are often ignored by many analysts.

2.3. Economy-wide Models

The superiority of economy-wide model over econometric or other models lies in its ability in capturing the interdependence and interconnectedness between micro and macroeconomic variables in the economy, comprehensively (Min, 2014). The mechanism on how macro aggregates influence—and be influenced by—the economic agents' behavior, hence, can be explicitly explained by this model. Among many scholars who firstly used the economy-wide approach for the case of Indonesia were Thorbecke (1991), Lewis (1991), and Azis (1995).

Thorbecke used Computable General Equilibrium (CGE) model to assess the impact of voluntary Stabilization and Structural Adjustment (SSA) policy implemented by Indonesian government during the 1980s oil glut (1982-1988) on economic growth and income distribution. He found that although the economic growth was slowing down, the structural reform succeeded in improving income distribution (Thorbecke, 1991). Lewis documented CGE model for Indonesian Ministry of Finance in 1991 using

aggregate Social Accounting Matrix (SAM) of 1985. Lewis' model was specially designed to analyze the impact of taxation and trade policy changes on Indonesia's fiscal performance and economic structure (Lewis, 1991).

Compared to Lewis' model, Thorbecke's CGE model, however, had more detailed (disaggregated) SAM for its input. Moreover, Thorbecke's disaggregated social accounting matrix can be categorized as more advanced SAM for it takes into account Indonesia's flow of funds data. In his paper in 1991, Thorbecke called the combination of real sector SAM and flow of funds table as financial SAM (FSAM).

Azis, in 1995, developed a CGE model for developing country applied to Indonesia with more disaggregated labor factor and households in his 1985's Indonesian SAM (i.e., six categories of labor and households lived in rural area and two categories for those who live in urban area). He then used both static and dynamic CGE model simulations to analyze the impact of Indonesia's post-economic reform progress on macroeconomic variables and emphasized more on income distribution between rural and urban households. Indonesia's economic reform constitutes three shocks, among which are 1980s oil glut, devaluation in 1986, and tax reforms in 1985. Azis' static simulation found that government investment in the agricultural sector was pivotal for the improvement of income distribution between rural and urban households. Through dynamic simulation, he found that although Indonesia's gross domestic products (GDP) was constantly growing, the progress of economic reform worsened the income inequality between income groups in urban and rural area (Azis, 1997).

Two years later, in 1999, Bautista, Robinson, and El-Said echoed Azis' findings. Using 1995's Indonesian SAM for their economy-wide analysis (i.e., SAM multiplier analysis and CGE simulations), they found that significant GDP increase and income inequality reduction in Indonesia can be associated with agricultural demand-led (ADL) industrialization. On the other hand, spurring manufacturing sector yields in worsening income inequality and insignificant increase in GDP. They put some details in equity issue through which they recommend the country to increase its farm products export to maintain agricultural sector's terms of trade (Bautista, Robinson, & El-Said, 1999).

The application of economy-wide models, especially price-endogenous models such as CGE is not limited only to policy change or external shock's impact analysis. The model also applied for assessing the impact of regional integration scenarios on single country or even a group of countries. Lewis and Robinson (1996) use multi-country CGE model to assess the effect of ASEAN (Association of Southeast Asian Nations) and APEC (Asia-Pacific Economic Cooperation) free trade area creation on Indonesia economy. One of their simulation results suggests that the creation of FTA (free trade area) for ASEAN gives little benefit to Indonesia. In contrast, APEC FTA creation gives its members, especially Indonesia, significant benefits (Lewis & Robinson, 1996).

Post-1997 Asian Financial Crisis (AFC), the application of economy-wide model became even more relevant. The model helped those who were severely affected by the crisis like Thailand, Malaysia, Indonesia, Philippines, and South Korea to map out the crisis mechanism which eventually affected socio-economic indicators like poverty and

income inequality. Robilliard and Robinson (2005) updated the 1995 Indonesia social accounting matrix with data from the fiscal year 2002 (i.e., value added, export-import, and other macro data) to capture structural changes after the crisis. CGE simulation was utilized to assess the social impact of liberalization scenarios on poverty reduction and income inequality. Among those scenarios are Doha Development Agenda (DDA) and full liberalization with increased Value Added Tax (VAT) rate to cover government revenue loss from the import duty cut. Both scenarios yielded very insignificant income inequality reduction at the national level—i.e., 0.0 and -0.1 percentage change of Gini index, respectively—even though headcount ratio (HCR) decreased slightly significant by 0.1 and 2.3 percentage point, respectively. Interestingly, in both scenario, rural areas were more benefited than urban areas (Robilliard & Robinson, 2005). Of course, agricultural sector played a significant role in this situation.

Four years earlier, a study by Robilliard, Bourguignon, and Robinson (2001) on the 1997 Asian Financial Crisis and income distribution in Indonesia using CGE model and microsimulation has succeeded in quantifying and disentangling the effect of the crisis and the global weather phenomenon (El Niño) on income inequality and poverty. In addition, the models also simulate the impact of introducing sets of counterfactual scenarios (policy packages) to alleviate the increasing poverty and income inequality post-crisis. The simulations' results showed that El Niño contributed to the half increase of poverty indicator (i.e., HCR), while domestic credit crunch was responsible to the other half. The simulations also showed that social policy that focused on household transfer rather than food subsidy and public work program is way more efficient to reduce headcount poverty ratio (Robilliard, Bourguignon, & Robinson, 2001). Increase

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in income inequality, if the findings were accurate, were mainly contributed by natural disaster (El Niño drought) instead of domestic or foreign credit crunch and devaluation.

However, an important aspect of the 1997 Asian Financial Crisis has not been addressed by the abovementioned models. This unaddressed aspect was becoming even more and more crucial as eleven years later in 2008 another major event hit our economy again, a financial crisis we called the Great Recession. The aspect we are discussing is the role of financial sector and its behavior in the economy. Azis' model (2000) recognized the need of incorporating this aspect a year earlier than Robilliard, Bourguignon, and Robinson's model.

Using the balance sheets of six institutions in Indonesia, Azis specified their behavior in the economy. These institutions are government sector, households, production sector, the central bank, commercial banks, and foreign sector. This specification is crucial to explain the mechanism and the episode of the financial crisis in Indonesia that transformed into social conflict and unrest during 1997, especially in the hardest hit area, i.e. urban area (Azis, 2000*b*, 2000*a*).

One out of many desirable features of economy-wide models, especially CGE, is its ability to take into account price as an endogenous variable. In many developing countries, especially those that have undertaken economic reforms, prices are no longer constant but are dynamically dependent on market forces. CGE model—unlike any other economy-wide models such as SAM or structural path analysis (SPA)—is more realistic in the sense that substitutions and price changes are allowed to happen and therefore captured by the model's equations. Consequently, negative multipliers are

allowed in the CGE's Jacobian matrix, which is impossible in SAM and SPA. These features make CGE preferable to be used as a laboratory to simulate economy-wide impacts of policy changes and/or external shocks in developing countries. Another desirable feature of CGE is that it can capture not only the impacts of policy change or external shocks on macroeconomic variables but also on micro variables and intersectoral linkages (Azis, 1998).

The tendency to move from partial equilibrium to general equilibrium model is based on the idea that economy is a vast system through which all markets or sectors in the economy are interlocked (Dinwiddy & Teal, 1988). A change in one part of the economy, hence, will generate repercussion in some parts if not the whole part of the economy. This idea has been in the literature for decades, first introduced in 1874 by Leon Walras (1834-1910) through his work *Éléments d'Économie Politique Pure*. Walras explained his concept using sets of simultaneous equations that reflect how dynamic system solve the demand, supply, and equilibrium relations in the markets (Arrow & Debreu, 1954; Arrow & Hahn, 1971).

The evolution of computable general equilibrium model started with standard neo-classical Walrasian general equilibrium that can be found in the linear model of Johansen (1960) whose concern was Norway's welfare issue. A standard neo-classical CGE model assumed that economic agents behave rationally in maximizing profit and utility, the most efficient resource distribution is through market, market clearing always happens, and savings determine investments (opposed to Keynesian view). Typically, the neo-classical model does not require investment function to be specified.

Nevertheless, in developing countries, many neo-classical assumptions often do not apply. Efforts to develop more realistic CGE models for developing countries has been progressing since the 1970s. The model development took place both in its functions specification and in its datasets (SAM). For CGE model, social accounting matrix (SAM) serves as the backbone. SAM was originally built in 1962 by the 1984's Nobel Prize winner in Economics, Sir John Richard Nicholas Stone.

Further development of SAM for developing countries was made by Pyatt and Thorbecke (1976) for the International Labour Office's (ILO) World Employment Programme. This further developed SAM provides clear depictions of new realities on the income distribution mechanism and pattern among households in the economy. Unlike Input-Output table which can only depict the distribution of income between capital owner and labor, SAM offers detailed factor and non-factor income distribution in the households' level.

Notwithstanding, since post-liberalization and globalization era in the 1990s, developing countries have been facing new realities. The world is no longer a neo-classical world. The growing role of the financial sector in the economy and the changing institution's behavior are too obvious to be neglected in our analysis. These days, institutions have more freedom to choose financial instruments to invest their net savings. Therefore, investments definition is no longer limited to only physical investments in the real sector such as land, building, and/or equipment. Our economy-wide models must be able to capture these phenomena. The inclusion of financial accounts derived from the flow of funds (FOF) enables SAM as CGE's dataset to

capture those phenomena. CGE model that has both financial SAM (FSAM) as dataset and specification of financial institution's behavior is hereafter designated a Financial Computable General Equilibrium (FCGE) model.

Unlike CGE model, FCGE can capture the linkage between financial sector and real sector in the economy as well as within each sector. As mentioned before, Thorbecke (1991) started developing such model using Tobin's (1969) portfolio theory to assess SSA scenarios' impact in Indonesia.[4] Azis' study (2000a, 2000b) and Azis, Azis, and Thorbecke's study (2001) also utilized such model to assess the effects, mechanism, and episodes of financial crisis that turned into social crisis during 1997-1999 in Indonesia.[5]

Shahrier (2012) extended FCGE model of Thailand with poverty and income distribution block using Azis' (2002), Manopiniwes' (2005), and Puttanapong's (2008) FCGE model as references. She used the model for investigating the effects of expansionary fiscal policy and monetary policy (interest rate and reserve requirement) on the income distribution and poverty. She found that fiscal expansion has more positive effects on socioeconomic indicators than expansionary monetary policy. Her simulation also suggested that targeted monetary policy (for the poor) cannot be

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[4] James Tobin received Nobel Prize in Economics in 1981 "for his analysis of financial markets and their relations to expenditure decisions, employment, production, and prices."

[5] Iwan Azis, Erina Azis, and Erik Thorbecke concluded that the depreciating exchange rate during the crisis negatively affects poverty rate through price channel, while increasing interest rate worsens the income inequality index. Meanwhile, worsening exchange rate that was propagated with political unrest and pessimism has driven the economic agents to shift their portfolio away to foreign countries. These mechanisms along with IMF policy (increasing interest rate) deteriorated the domestic investment. Put together, domestic investment stagnation, higher price, drought caused by El-Nino, and more expensive intermediate input brought down the aggregate demand and supply.

standalone policy to alleviate poverty and inequality in Thailand. She pointed out that such policy should be accompanied by institutional change and human capital investments (Shahrier, 2012).

Waluyo (2017) developed a static financial interregional computable general equilibrium (FIRCGE) model for Indonesia using Indonesian financial interregional social accounting matrix (FIRSAM) of 2005 to evaluate the impacts of world crude oil price decline during 2015-2016 on the regional macro variables and income distribution. He also aimed to assess various policy scenarios to address the repercussions of that external shock. His simulations showed that Sumatra was among the most affected region. It happened as this region has the largest share of oil and gas productions in Indonesia.

Regarding policy choices, his simulations suggested that iso-loss curve of targeted policy is more efficient in addressing the economic and social impact of the shock compared to non-targeted policy. This iso-loss curve represents sets of joint strategy choices for Indonesian central bank (monetary authority) and the government (fiscal authority) with interest rate reduction and government expenditure as proxies. Waluyo emphasizes that targeting the hardest hit will help government allocate its resource (budget) more efficiently so that budgetary pressure can be reduced. However, it depends on how central bank and government coordinate to choose which sets of interest rate and fiscal stimulus in the iso-loss curve to be exercised (Waluyo, 2017).

CHAPTER 3

DATA AND METHODOLOGY

Quantifying the immediate outcome of tax amnesty policy in the short-run is quite straightforward. On the contrary, estimating the impact of the outcome on the whole economy is more complicated, let alone its distributional effects. It definitely requires extra efforts and more reliable tools. For more comprehensive policy evaluations, these tools or models should be able to provide not only partial equilibrium analysis but also general equilibrium for the interaction between production sectors, factor markets, institutions, and capital or financial markets within the economy, as well as with the rest of the world. Moreover, the models should be also able to simulate counterfactuals. A "before-after" approach, therefore, is not preferable due to its limited capability in isolating the impact of tax amnesty policy from other shocks/events that happen simultaneously with that policy.

Of three factors contributing to the delay in the evaluation of Indonesia's tax amnesty policy implementation, two will be addressed by this study. The first factor is fiscal agency inability (if not reluctance) to perform economy-wide impacts analysis on tax amnesty. This reluctance leads to a mismatch between evaluations as expected by *Law No.26/2016* and as provided by the government. Tax agency only measures the size of asset repatriation and extra *gross* tax revenue collected from the amnesty.

The second factor is the unavailability of structural analysis on income tax and redistribution system in the economy. This analysis helps us to understand who pays

tax, who gets what, and how tax amnesty should be designed. The third factor that is the measurement of tax agency performance and capacity will not be the subject of this thesis due to lack of access to sensitive information on tax law enforcement.

Law No.11 of 2016 on Tax Amnesty specifically emphasizes two key aspects:

No.	Key aspects	Specific objectives	Proxies
1.	Macroeconomic	Boosting *economic growth* and restructuring the economy through asset repatriation	a. Domestic liquidity b. Exchange rate c. Interest rate d. Domestic investments
2.	Equity	More equitable tax system	*(not specifically mentioned)*

Table 1 - *Two Key Aspects of Indonesian Tax Amnesty per Law No.11/2016*

This study utilizes and closely follows the Financial Computable General Equilibrium (FCGE) model developed by Azis (2002) to evaluate the abovementioned key aspects of the Law. Firstly, the study aims to assess the medium-run impacts of Indonesia's third tax amnesty policy outcomes on proxies mentioned in the Law, on other macroeconomic variables, and on socioeconomic indicators (income distribution and unemployment). Secondly, simulations of six counterfactual scenarios in this study aim to assess the impact on the economy and social indicators of sets of tax amnesty policies targeting at specific institutions in the economy.

3.1. Data

Generally, Financial Social Accounting Matrix (FSAM) can serve either as a model or as a dataset for another model (e.g. SPA or FCGE). As a model, FSAM generates sets of accounting multipliers that quantify the direct and indirect impacts of

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a shock or policy change in the economy. It answers the "what" question, unfortunately without providing answers for the "how" question, i.e. the mechanism on how the shock works. In other words, as a model, FSAM provides a "black box" for its users.

To open this "black box," a more advanced economy-wide model such as FCGE is required. Therefore, in this thesis, FSAM will function as the latter, i.e. serving as a dataset for FCGE model instead of as a standalone model. The latest Indonesian FSAM of 2005 is publicly available on the Indonesian central bank official website.[6]

SAM contains information derived from Leontief's Input-Output table (IO) and socio-economic survey data. FSAM combined SAM with flow-of-funds (FOF) data. Therefore, FSAM can capture the interrelation between (and within) real sector, social sector, and financial sector in the economy.
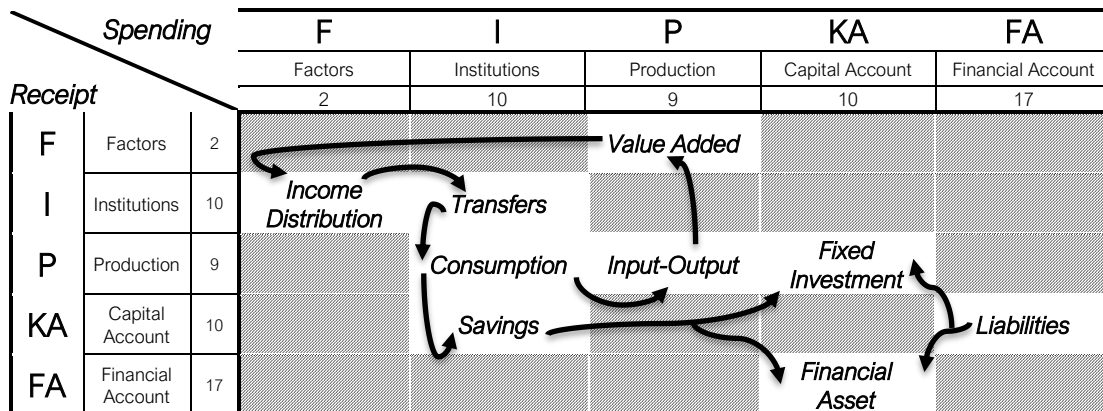
Figure 3 - *The Structure of FSAM*

Figure 3 shows the circular flow of economy, starts from production activities (P-P) that need intermediate inputs and primary inputs (capital and labor) to create value

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[6] Indonesian FSAM of 2005 was built by Bank Indonesia, Statistics Indonesia, and Ministry of Finance with Iwan J. Azis acted as one of the advisors. It was published in May 2008 (for the Bahasa version) and in July 2009 (for the English version). For further details on the content of 2005 FSAM, check: https://www.bi.go.id/en/publikasi/lain/lainnya/Pages/FSAM.aspx

added (P-F) toward distribution of factor incomes in return of capital and labor services provision by institutions (F-I) then continue to institutional transfer such as households' or enterprises' tax payments to government (I-I) so that eventually they can use their disposable income to consume commodities (I-P) produced by industries (P-P). Figure 3 also shows that institutions' capital account (KA) in the FSAM matrix consists of savings (I-KA) and investments (KA-P) of which each is disaggregated into two categories. On the one hand, savings that are sourced from real sector ("savings", I-KA) and/or from financial sector ("liabilities", FA-KA), on the other hand, investments that are allocated to the real sectors ("fixed investment", KA-P) and/or to financial sector ("financial asset", KA-FA).

Therefore, total investments by institutions (households, enterprise, government, the central bank, and the rest of the world) in the FSAM matrix are composed of investments in physical forms (fixed asset) in real sector and in the form of financial instruments in the loanable funds market. All institutions report their investments on the left-hand side of their balance sheet. Whereas, their total savings that consist of two components (i.e., savings and wealth) are reported on the right-hand side of the balance sheet. The format of the latest Indonesian FSAM is summarized in Figure 4.

Area 1 as shown in Figure 4 depicts the real economies as described by SAM (excluding savings and fixed investments). Area 2 indicates the contribution of the central bank, households, corporations (i.e., non-financial, banks, and non-bank entities), and government to the fixed gross capital formation or investments in the real sector. Area 3 shows the flow of financial instruments in the loanable funds market.

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EXPENDITURES

INCOMES

		PRODUCTION FACTORS	INSTITUTIONAL SECTORS			INDUSTRIAL SECTORS		TRADE MARGIN AND TRANS-PORT COST	COMMODITIES		CAPITAL (BY INSTITU-TIONS)	TAXES AND SUBSIDIES		FINANCIAL INSTRUMENTS	REST OF THE WORLD (ROW)
			HOUSE-HOLDS	CORP.	GOV.	FORMAL	IN-FORMAL		DOMES-TIC	IMPORT		INDIRECT TAXES	SUB-SIDIES		
		1	2			3		4	5		6	7		8	9
PRODUCTION FACTORS	1				FACTOR INCOME										INCOME INFLOW
INSTITUTIONAL SECTORS — HOUSE-HOLDS / CORP. / GOV.	2	INCOME DISTRIBUTION	INTRA INSTITUTION TRANSFER									INDIRECT TAXES			INFLOW TRANSFER
INDUSTRIAL SECTORS — FORMAL / INFORMAL	3				AREA 1			TOTAL INPUT				SUBSIDIES		
TRADE MARGIN AND TRANSPORT COST	4							TTM COMMODITIES						
COMMODITIES — DOMESTIC / IMPORT	5	FINAL DEMAND	FINAL DEMAND		INPUT OUTPUT STRUCTURE	TTM			INVESTMENT			IMPORT SUBSIDIES		EXPORT
CAPITAL (BY INSTITUTIONS)	6	SAVING			AREA 2									FINANCIAL LIABILITIES
TAXES AND SUBSIDIES — INDIRECT TAXES / SUBSIDIES	7		TOTAL SUBSIDIES			INDIRECT TAXES								
FINANCIAL INSTRUMENTS	8								FINANCIAL ASSETS	AREA 3				ROW - FINANCIAL LIABILITIES
REST OF THE WORLD (ROW)	9	INCOME OUTFLOW	OUTFLOW TRANSFER						IMPORT					ROW - FINANCIAL ASSETS

Source: Statistics Indonesia and Bank Indonesia (2009)

***Figure 4** - The Format of Indonesian FSAM (2005)*

The Indonesian FSAM published by Statistics Indonesia and Bank Indonesia is originally a 79 x 79 matrix. For simplicity, the commodities produced by informal and formal sectors in the economy are aggregated. Hence, FSAM for FCGE model's dataset in this study is a 70 x 70 matrix that captures the linkages between and within 2 production factors (F), 9 institutions (I), 9 production activities including 9 domestic commodities and 9 foreign commodities (P), 9 institutions' capital accounts (KA), 17 financial instruments that are available in Indonesia's financial markets (FA), trade margins and transport costs, and indirect taxes and subsidies.

The abovementioned data system will also be used to delineate the structure of tax and redistribution system in Indonesia in 2005 (the baseline). The delineation helps us to understand the allocation of tax burden in the economy, particularly income taxes, to nine institutions mentioned in the FSAM matrix. The latest Indonesian SAM of 2008 will also be used to check whether any major change in the structure has occurred.

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Figure 5 below shows the share of taxes paid by institutions in 2005 and 2008. Whereas Figure 6 shows the opposite, that is the allocation of tax revenue collected by the government to eight institutions in the economy.

Other data namely the rupiah value of asset repatriation and *gross* tax revenue collected from the third Indonesian tax amnesty are also required. These data help us to determine the magnitude of the shocks that will be imposed to the model. The data is publicly available on to the official website of Directorate General of Tax (DGT) as illustrated in Figure 7 below.[7]
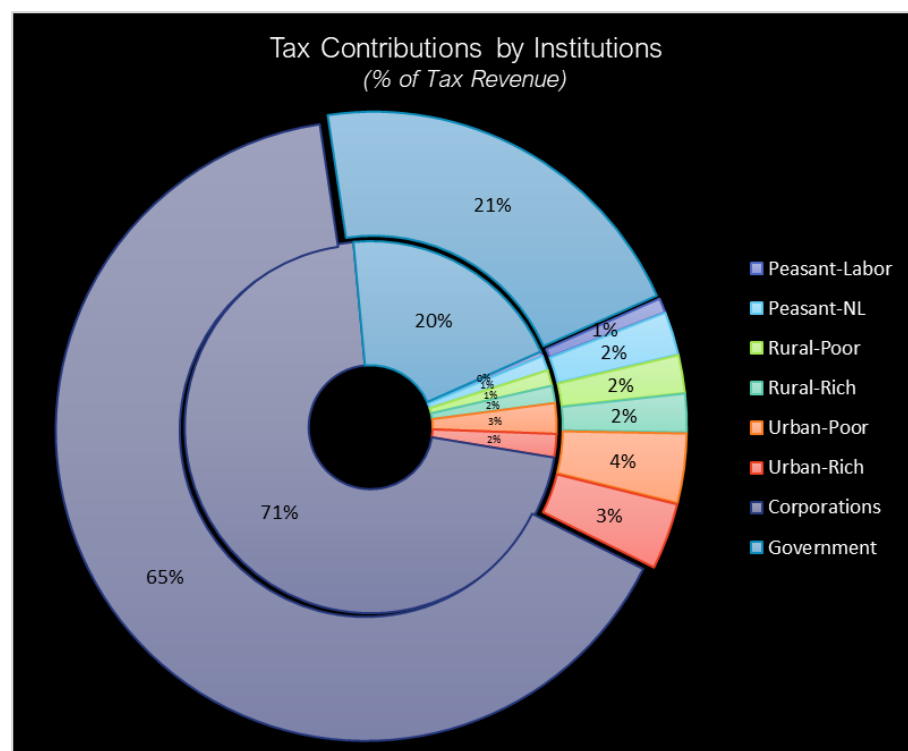
Source: Indonesian SAM 2005 and SAM 2008

Figure 5 - Tax Contributions 2005 (outer) and 2008 (inner) by Institutions

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[7] All information on the procedures of the third Indonesia's tax amnesty, including the statistics of foreign asset repatriation, domestic and foreign asset declaration, and gross revenue collection are available on http://www.pajak.go.id/content/amnesti-pajak

Tax Revenue Allocations by Institutions
(% of Tax Revenue)

35%

38%

16%

19%

9%

12%

11%

2%

1%

9%

1%

12%

8%

2%

12%

13%

- Peasant-Labor
- Peasant-NL
- Rural-Poor
- Rural-Rich
- Urban-Poor
- Urban-Rich
- Corporations
- Government

Figure 6 - Tax Revenue Allocation 2005 (outer) and 2008 (inner) by Institutions
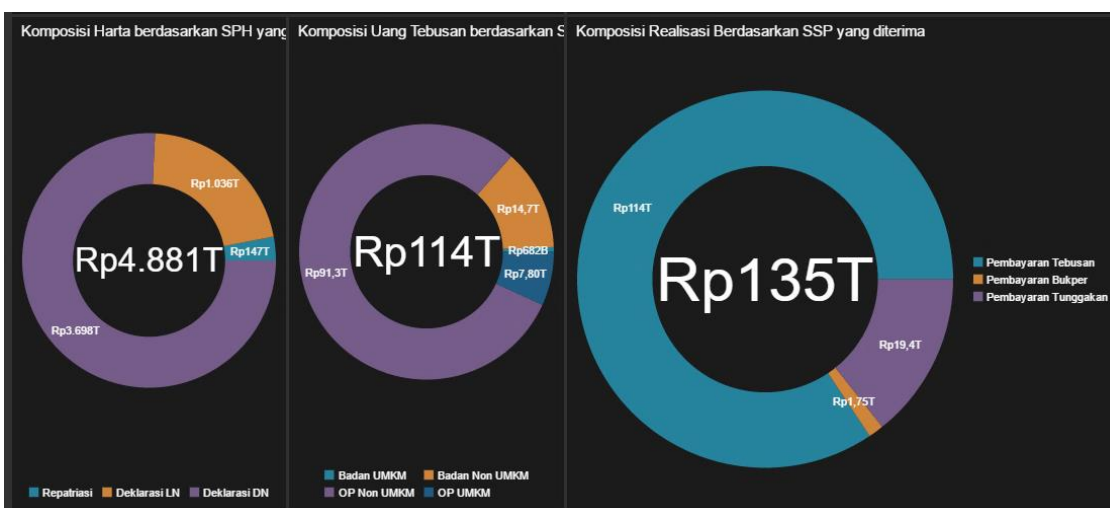
Figure 7 - Asset Repatriation and Gross Tax Revenue Collected from Indonesian Tax Amnesty 2016-2017

3.2. Methodology

3.2.1. The Financial Computable General Equilibrium Model

Under the unrealistic assumption of *ceteris paribus*, "before-after" approach for policy evaluation or impact analysis often ignores other events that simultaneously occur with the observed shocks. The inability to precisely isolate and disentangle the observed shock from many other causes, thus, become a major drawback for this approach. This drawback hinders analyst to provide robust explanation on what and how things are affecting the economy and the society. Consequently, reliable sets of policy solutions are rarely obtained from this method.

In contrast, Financial Computable General Equilibrium is capable of doing counterfactual analysis, in other words, examining changes in a country's economy and socio-economy "with and without" a particular shock. The FCGE model goes beyond the "before-after" approach. It provides a multiplier analysis that can describe the transaction channels and transmission mechanism on how external shocks and/or policy changes affect the whole economy and economic agents' behavior.

As mentioned earlier, this thesis' model closely follows the FCGE model developed by Azis (2002) for the Indonesian economy. Some equations are slightly modified[8] to introduce asset repatriations placement into four specific financial instruments and to incorporate *gross* tax amnesty penalties collection.[9] The model

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[8] Three modifications of equations in income block as well as in the financial module (including the GAMS codes) are listed in Appendix 1.

[9] The four financial instruments are (1) working capital credit, (2) investment credit, (3) consumer credit, and (4) government bond.

consists of two modules namely core CGE module and financial module. Put together, these modules consist of 10 blocks of 88 sets of equations as listed in <u>Table 2</u> below. The detailed equations and variables for each block are listed in <u>Appendix 1</u>.

			Core Modules (CGE)					Financial Modules	
Production Block	Price Block	Income block	Expenditure Block	Market Clearing Block	GDP Block	Distortion Block	Transfer Block	Financial Block	C & D Block
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
OUTPUT(i)	PMDEF(i)	YFEQ(f)	YCONEQ(h)	EQUIL(i)	GDPY	DTTMEQ(i)	ITRANEQ(in,in2)	AssetSQ(as,in)	RNA1EQ(in)
INTEQ(i)	PEDEF(i)	DINCOME(ngi)	HEXPEQ(h)	FMKTEQ(f)	GDPR	FTTMEQ(i)	GTRANEQ(gin,in2)	LiabSQ(in,as)	RNA2EQ(in)
VADEF(i)	ABSORPTION(i)	GINCOME(gin)	GEXPEQ(gin)	FLABEQ		ITAXEQ(i)	RTRANEQ(in,in2)	FixASQ(in)	RNA3EQ(in)
FACTDEQ(i,f)	SALES(i)	FINCOME(fr)	OEXPEQ(nno)			TRIFEQ(i)	RNShrEQ(in)	WealthQ(in)	RNA4EQ(in)
WAGEEQ(i)	ACTP(i)	DTAXEQ(gin,din)	REXPEQ(fr)			IMPERQ(i)		FixAQ(in)	RNA5EQ(in)
WFLABOR	PINTDEF(i)		SAVEQ(din)			SUBEQ(i)		WEALFQ(in)	FINA1EQ(asfxr)
INTERM(i)	PDINTDEF(i)		SAVFQ(fr)			SUBMQ(i)		AsInBAL(in)	MONEYD(in)
INTERM2(i)	PFINTDEF(i)		SAVINGEQ						RNV1EQ(in)
INTEREQ(i)	PKDEF(i)		ROWSAV						MDEQ(asmd,in)
ARMINGTON(i)	PINDEXDEF		CDEQ(i)						MSSHR(in,asmd)
ARMINGTON2(i)	WTQEQ(i)		DKEQ(i)						AST1AQ(ast1,in)
COSTMIN(i)			IDEQ(i)						AST1SH(in,ast1)
CET(i)			INVESTEQ						AST2AQ(in,ast2)
CET2(i)			DOMINVEQ(i,fin)						AST2SH(ast2,in)
MAXREV(i)			AVGREQ						ASTEEQ(aste)
INTQEQ(i)									ASTQEQ(astq)
TTMEQ(i)									
TTMXEQ(i)									
18	11	5	15	3	2	7	4	7	16

Table 2 *- Blocks of Equations in FCGE Model*

The core module is composed of 8 blocks of sets of equations. These are production block (18 equations), price block (11 equations), income block (5 equations), expenditure block (15 equations), market clearing block (3 equations), gross domestic products (2 equations), distortion block (7 equations), and transfer block (4 equations). Financial module, on the other hand, incorporates financial block (7 equations) and currency/demand deposit block (16 equations). All these 10 blocks are interlocked. The interconnection is graphically illustrated in <u>Appendix 2</u>.

It is important to bear in mind that unlike any other CGE models that often assume perfect competition and constant return to scale (CRS), FCGE model in this paper has already taken into account imperfect competition which is obvious in many developing

countries (see $IMPERQ_i$ equation in the distortion block[10]). In addition, the model has also considered non-constant return to scales in the production block.

3.2.1.1. Production Block

This block resembles the supply side of the Indonesian economy's real sector in the process of producing outputs. Two stages of production process are structured as sets of nested constants elasticity of substitution (CES) functions, as shown in <u>Figure 8</u>. Firstly, the industrial demand for primary inputs (i.e., labor and capital) will determine the value-added (VA) of industry i. Secondly, total domestic outputs will be determined by the combination between VA_i and the composite of intermediate inputs derived from the Armington's (1969) CES function of domestically produced and imported inputs.
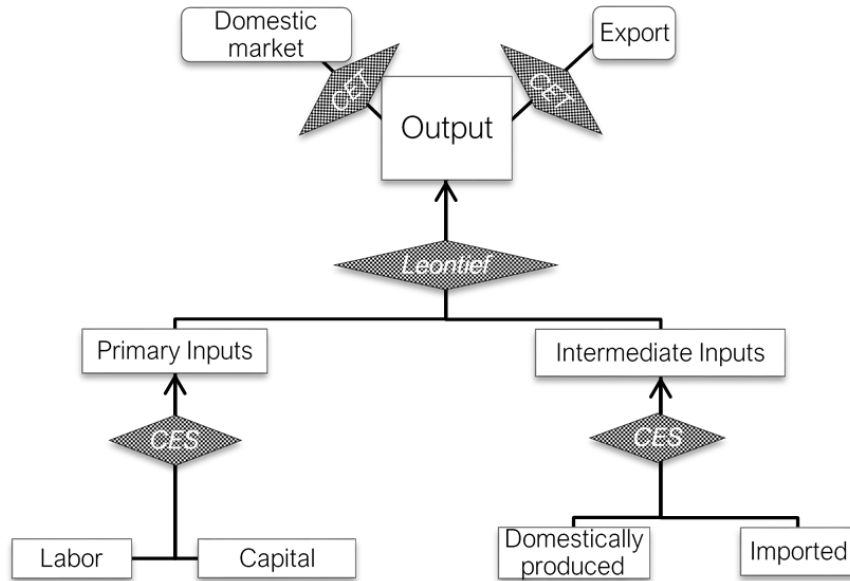
Figure 8 *- Production Structure*

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[10] Equation for Imperfect Competition ($IMPERQ_i$) is defined as $Imperfect_i = impf_i \, PD_i \, D_i$, where *impf* is imperfect distortion parameter, *PD* is price for domestic consumption, and *D* is the quantity of domestic consumption.

The price of capital and labor (wage rates or WF_f) influence the optimization of sectoral demand for primary inputs in the factor demand equation (*factdeq*) at the stage where VA_i is to be determined (left hand side of Figure 8). Firms minimize their capital and labor related costs to get their desired optimum composite of value added (VA_i) given the price of value added (PV_i). Equation (1) below shows the abovementioned factor demand equation:

Equation (1) - Factor demand function

$$factd_{i,f} = VA_i \left(\frac{PV_i \, bv_{i,f}}{WF_f \, wfdist_{i,f} \, (avx_i \, av_i)^{\rho v_i}} \right)^{\frac{1}{(1+\rho v_i)}}$$

where parameter ρv_i captures the production elasticity of value added for sector i and parameter $wfdist_{i,f}$ captures the reality in which wage rates varies across sectors. The avx_i, av_i and $bv_{i,f}$ are value added parameter, its distortion, and intersectoral mobility of factor, respectively.

At the second stage of the production nest, VA_i and intermediate inputs' demand ($INTM_i$) are derived to get the sectoral domestic output (X_i) as the following:

Equation (2) - Value added definition

$$VA_i = avx_i \, av_i \left(\sum_f bv_{i,f} \, factd_{i,f}^{-\rho v_i} \right)^{\frac{-1}{\rho v_i}}$$

Equation (3) - Intermediate goods (VA equation)

$$INTM_i = VA_i \left(\frac{PV_i \, (1 - bi_i)}{PINTM_i \, bi_i} \right)^{\frac{1}{(1+\rho i_i)}}$$

<div align="center">***Equation (4)*** *- Sectoral output function*</div>

$$X_i = ai_i\left(bi_i\, VA_i^{-\rho i_i} + (1 - bi_i)\, INTM_i^{-\rho i_i}\right)^{\frac{-1}{\rho i_i}}$$

where PV_i, $PINTM_i$, bi_i, and ρi_i represent price of value added, price of intermediate inputs, distributional parameter, and sectoral elasticity of substitution for intermediate inputs, respectively.

The gross sectoral domestic outputs then transform into commodities for domestic consumption (D_i) and/or export (E_i) with price PD_i and PE_i, respectively. The transformation process is no other than firms allocate their domestic outputs to domestic and international market constant elasticity of transformation (CET) function as shown in the equation (5) below:

<div align="center">***Equation (5)*** *- CET function*</div>

$$X_i = ax_i\left(bx_i\, D_i^{-\rho x_i} + (1 - bx_i)\, E_i^{\rho x_i}\right)^{\frac{1}{\rho x_i}}$$

where ax_i, bx_i and ρx_i are shift, distributive, and elasticity of substitution parameters, respectively. Total supply of goods is composed of domestically produced goods (D_i) and imported goods (M_i). CES function for the relation between D_i and M_i applies similarly like the CET function, as shown in the equation (6) below:

<div align="center">***Equation (6)*** *- Armington function*</div>

$$Q_i = aq_i\left(bq_i\, D_i^{-\rho q_i} + (1 - bq_i)\, M_i^{-\rho q_i}\right)^{\frac{-1}{\rho q_i}}$$

More detailed sets of equations for the implication of CET and CES function and firms' revenue maximization are listed in Appendix 1.

3.2.1.2. Price Block

The price block specifies the domestic price of exported (PE_i) and imported commodities (PM_i) as functions of the world price of export (PWE_i) and import (PWM_i), export tax/subsidy $(te_i$ or $psube_i)$, import tax/subsidy $(tm_i$ or $psubm_i)$, trade and transport margin of import (ttf_i), and exchange rate (EXR). Equation (7) and (8) below shows PE_i and PM_i, respectively:

Equation (7) - Domestic price of exported commodities

$$PE_i = PWE_i \, \frac{EXR}{(1 + te_i - psube_i)}$$

Equation (8) - Domestic price of imported commodities

$$PM_i = PWM_i \, EXR \, (1 + tm_i - psubm_i + ttf_i)$$

As the goods available for sale are composed of domestically produced goods (D_i) and imported goods (M_i), the value can be specified with the following equation:

Equation (9) - Absorption (the value of Armington Composite Goods)

$$Q_i \, PQ_i = D_i \, PD_i + M_i \, PM_i$$

Equation (10) - The value of domestic output

$$X_i \, PX_i = D_i \, PD_i (1 - tdom_i - ttd_i - impf_i) + E_i \, PE_i + SUB_i$$

Equation (10) specifies the value of domestically produced goods that are available for domestic consumption and export as a function of the quantity (D_i) and the price (PD_i) of sectoral outputs for domestic consumption and for export $(E_i$ and $PE_i)$, indirect domestic tax $(tdom_i)$, domestic trade and transport margins (ttd_i), imperfect distortions $(impf_i)$, and sectoral subsidies (SUB_i).

Prices of value added, capital goods, and intermediate inputs mentioned earlier in the production block are defined in here. Equation (11) - (14) show the definition of capital goods price (PK_i), the price of value added (PV_i), the domestically produced and imported intermediate inputs price ($PDINTM_i$ and $PFINTM_i$), respectively.

Equation (11) - The price of sectoral capital goods

$$PK_i = \sum_j PQ_j \left[cap_{j,i} \right]$$

The price of capital goods for sector i is capital good from sector j to sector i in the capital matrix (cap) as a share of the price of Armington Composite Goods.

Equation (12) - The price of value added

$$PV_i = \frac{(X_i\, PX_i - PINTM_i\, INTM_i)}{VA_i}$$

The sectoral price of value added is the difference between the value of domestic outputs and the value of both domestically produced and imported intermediate goods with respect to its value added.

Equation (13) - The price of domestically produced intermediate inputs

$$PDINTM_i = \sum_j aad_{j,i}\, PQ_j$$

Equation (14) - The price of imported intermediate inputs

$$PFINTM_i = \sum_j aaf_{j,i}\, PQ_j$$

Whereas the intermediate input of sector i is the Input-Output coefficient of intermediate good demand from sector j to i multiplied by the price of Armington Composite Goods. Finally, the price index ($PINDEX$) is defined as the ratio of GDP to real GDP.

3.2.1.3. Income Block

This block defines the incomes acquired by households, government (gin), non-government domestic institution (ngi), and foreign institution (fr). Since income is taxable, the direct tax function will also be specified in this block. Equation (15) – (19) show the specification of factor income (YF_f), government income ($Gincome_{gin}$), non-government domestic income ($Dincome_{ngi}$), foreign income ($Fincome_{fr}$), and direct taxes collected by government from domestic institutions ($Dirtax_{gin,din}$), respectively.

Equation (15) - Factor income

$$YF_f = \sum_i \left(WF_f \; wfdist_{i,f} \; factd_{i,f} \right) + \sum_{fr} YFROW_{f,fr}$$

Income from labor service and/or capital utilization f is defined as the sectoral sum product of average factor price and factor demand across sectors in addition to the summation of factor income earned from the rest of the world.

Equation (16) - Government income

$$Gincome_{gin} = \sum_f \left(factoin_{gin,f} \; YF_f \right) + \sum_{in2} ITRAN_{gin,in2}$$

$$+ \left(gishr_{gin} \sum_i (Indtax_i + Tariff_i) \right)$$

Government income consists of factor income, transfer from institutions in the form of direct taxes or other non-direct tax transfers, and government agency share of the indirect taxes and tariffs collection.

Equation (17) - Non-government domestic income

$$Dincome_{ngi} = \sum_f \left(factoin_{ngi,f}\ YF_f\right) + \sum_{in2} ITRAN_{ngi,in2}$$

Non-government (households and private enterprises) income is composed of factor income and inter-institutional transfers including (but not limited to) cash/in-kind transfers from government, inter-household transfer, philanthropy, return on financial assets, remittance, etc.

Equation (18) - Foreign income

$$Fincome_{fr} = \sum_f \left(factoin_{fr,f}\ YF_f\right) + \sum_{in2} ITRAN_{fr,in2}$$
$$+ \left(mishr_{fr} \sum_i (PWM_i\ EXR\ M_i) \right)$$

Foreign income includes factor income transferred to foreign institutions, institutional transfers, and foreign institutions share of income from imports in domestic currency.

Equation (19) - Direct taxes*

$$Dirtax_{gin,din} = dtax_{gin,din}\ INC_{din}\ \boldsymbol{taxfact_{gin,din}}$$

The above direct tax equation defines tax collection through which specific direct tax rates ($dtax_{gin,din}$) applies to all domestic households and corporates income (INC_{din}). This equation is marked with asterisk (*) to show that a modification from its

original form has been conducted in this thesis to introduce the shock of extra tax revenue collection from tax amnesty. A new parameter ($taxfact_{gin,din}$), hence, is introduced to modify the original direct tax equation. *Taxfact* or tax factor parameter acts as a modifier for direct tax collection in case of a change in tax policy has occurred (e.g. Indonesian tax amnesty that yields a 15% increase in tax revenue). Put simply, the new parameter ($taxfact$) allows modelers to modify the size of transfers originated from domestic institutions (din) to government (gin) in the form of direct tax. This is a major distinction and a departure from the original non-tax amnesty FCGE model.

Later on, the depiction on how extra tax revenues collected from the Indonesian tax amnesty affects selected economic and social indicators will be discussed in Subchapter 4.2. The detailed explanation for the equation modification including the GAMS code is discussed in Appendix 1.

3.2.1.4. Expenditure Block

The expenditure block explains the behavior of economic agents in consuming commodities or services and in investing their net-worth. Four expenditures by institutions are specified in this block. These are household, government, non-government, and foreign expenditures.

Households expenditure includes spending for consumption, direct tax, and transfers to other domestic or foreign institutions. Their consumption behavior can be specified as a function of household's disposable income and marginal propensity to consume (1 - marginal propensity to save). Equation (20) and (21) below shows those specifications:

Equation (20) - Household expenditure

$$EXP_h = YCons_h + \sum\nolimits_{gin} Dirtax_{gin,h} + \sum\nolimits_{ngi} ITRAN_{ngi,h} + \sum\nolimits_{fr} ITRAN_{fr,h}$$

Equation (21) - Household consumption behavior

$$YCons_h = \left(INC_h - \sum\nolimits_{gin} Dirtax_{gin,h} \right)(1 - mps_h)$$

$$- \left(\sum\nolimits_{ngi} ITRAN_{ngi,h} + \sum\nolimits_{fr} ITRAN_{fr,h} \right)$$

Government expenditure is a function of government agency share of expenditure ($ggshr$) in consuming goods/services from sector i or allocating subsidy to sector i, and government transfer to institutions. This function is shown in Equation (22) below.

Equation (22) - Government expenditure

$$EXP_{gin} = ggshr_{gin} \left(\sum\nolimits_i (GD_i PQ_i) + \sum\nolimits_i (SUB_i + SUBE_i + SUBM_i) \right)$$

$$+ \sum\nolimits_{in} ITRAN_{in,gin}$$

Non-government expenditure consists of any spending of enterprises to other institutions in the economy as specified in the following equation:

Equation (23) - Non-government expenditure

$$EXP_{nno} = \sum\nolimits_{in} ITRAN_{in,nno}$$

Foreign expenditure is defined as the spending by foreign institutions for exporting goods/services from domestic sector i, for paying the costs of factors, and for inter-institutional transfers. The equation of foreign expenditure is the following:

Equation (24) - Foreign expenditure

$$EXP_{fr} = ershr_{fr} \sum_{i}(PWE_i \, EXR \, E_i) + \sum_{f} YFROW_{f,fr} + \sum_{in} ITRAN_{in,fr}$$

The investment behavior of economic agents is specified in equation (25) – (27):

Equation (25) - Private domestic investment

$$INV_{i,fin} = VA_i^{\lambda 1_i} \lambda 0_{i,fin}(1 + avgRN)^{\lambda 2_i}$$

$$avgRN = \frac{\sum_{as} \sum_{in} RN_{as} AssetSLag_{as,in}}{\sum_{as} \sum_{in} AssetSLag_{as,in}}$$

where $avgRN$ is average real interest rate, λs are constants, RN_{as} is financial asset's rate of return, and $AssetSLag$ is the initial value of asset stock.

Equation (26) - Investment by origin

$$ID_i = \sum_{j} DK_j[cap_{i,j}]$$

Equation (26) suggests that the utilization of capital for investment is determined by the coefficient in the capital matrix in the FSAM dataset and the initial quantity of capital.

Equation (27) - Investment by destination

$$DK_i PK_i = kshr_i(INVEST)$$

$$INVEST = \sum_{i} \sum_{in} INV_{i,in}$$

Finally, equation (27) shows that the value of investment in the destination sector—where DK_i and PK_i are the quantity and the price of capital by sector of destination, respectively—is proportional ($kshr$) with fixed investment.

3.2.1.5. Market Clearing Block

The market clearing block serves as a follow-up after the behavior of the economic agents has been specified in the previous blocks. It contains three equations that equilibrate the demand side and the supply side of goods market, labor market, and capital market. The following equations define those equilibria:

Equation (28) - Equilibrium in goods market

$$Q_i = INTQ_i + CD_i + GD_i + ID_i + \frac{ttmX_i}{PQ_i}$$

where $INTQ_i$, Cd_i, Gd_i, and Id_i are sectoral intermediate inputs demand, private consumption, government consumption, and investment demand, respectively. While $ttmX_i$ and PQ_i are the received trade/transport margins and the price of Armington composite goods.

Equation (29) - Equilibrium in capital market

$$FS_f = \sum_i factd_{i,f}$$

Equation (30) - Equilibrium in labor market

$$LS = (1 + UEMPR) \sum_{fl} FS_{fl}$$

where FS_f, $factd_{i,f}$, $UEMPR$, LS, and FS_{fl} are capital supply, factor demand, unemployment rate, labor supply, and factor supply of labor, respectively.

3.2.1.6. GDP Block

The gross domestic products block consists of two GDP functions specification. These are total gross domestic products based on value-added including tax (GDP) and

real gross domestic products ($RGDP$). Equation (31) and (32) below show the detailed specification of those functions.

Equation (31) - GDP based on VA

$$GDP = \sum_i (VA_i PV_i + Indtax_i + Tariff_i - SUB_i - SUBM_i)$$

where $SUBM_i$ is subsidies for import.

Equation (32) - Real GDP

$$RGDP = \sum_i \left(Cd_i + Gd_i + Id_i + \sum_i E_i - \sum_i M_i(1 - Tmreal0_i) \right)$$

where $Tmreal0_i$ is tariffs and trade and transport margins (*ttm*) in real value.

3.2.1.7. Distortion Block

The distortion block contains any interference to perfect competition in the market. These interferences include indirect tax ($Indtax_i$), import tariff, export subsidy ($SUBE_i$), import subsidy ($SUBM_i$), trade and transport margins on domestic ($DTTM_i$) or imported commodities ($FTTM_i$), and imperfect market distortions ($impf_i$). The detailed equations are listed in Appendix 1.

3.2.1.8. Transfer Block

This block describes total inter-institutional transfers ($ITRAN$) from various sources. These include transfer from institutions to government ($GTRAN$) in the form of direct tax, financial returns transfer to institutions ($RTRAN$), and other transfer ($OTRAN$). The following equations specify all those kinds of inter institutional transfers:

Equation (33) - Total institutional transfers

$$ITRAN_{in,in2} = GTRAN_{in,in2} + RTRAN_{in,in2} + OTRAN_{in,in2}$$

$$GTRAN_{gin,din} = Dirtax_{gin,din}$$

$$RTRAN_{h,in2} = RNshare_h \sum_{asrn} \left(RN_{asrn} \ LiabSLag_{in2,asrn} \right)$$

where RN_{asrn} is rate of return on earning asset (i.e. 12 financial instruments mentioned in Indonesian FSAM matrix). $LiabSLag$ and $RNshare$ are the value of liability stocks and the share of institutional financial asset, respectively. The following equation specifies the institutional $RNshare$:

$$RNshare_{in} = \frac{\sum_{asrn} \left(RN_{asrn} \ AssetSLag_{asrn,in} \right)}{\sum_{asrn} \sum_{in2} \left(RN_{asrn} \ AssetSLag_{asrn,in2} \right)}$$

3.2.1.9. Financial Module

One important aspect of financial module that distinguishes FCGE from CGE is the definition of total investment and total saving. In FCGE model, $TSAVING$ is acquired not only by *saving* from the real sector but also by *financial liability* owed from the financial sector. On the other hand, $TINVEST$ is composed of not solely *fixed asset* investment in the real sector, but also of *financial asset* investment in the financial sector. These distinctions are clearly specified with the following equations:

Equation (34) - Total savings and investments

$$TSAVING = wealth_{in} + \sum_{as} LiabS_{in,as}$$

$$TINVEST = fixAs_{in} + \sum_{as} AssetS_{as,in}$$

Either in CGE or FCGE, both accounts are required to be in equilibrium:

Equation (35) - Institution's asset balance

$$TSAVING = TINVEST$$

Put simply, FCGE is CGE plus (financial) asset and liabilities. Hence, additional equations specification to capture the economic agents' behavior in allocating their funds to financial asset and liabilities is needed. The specification is derived, especially, from the Flow-of-Funds (FOF) dataset which provides information on the asset and liabilities of economic agents. The behavioral equation is no other than linkages between assets, liabilities, and the rate of return (interest rate)—whether as flow ($Asset$ / $Liab$) or as current/past stock ($AssetS$ / $LiabS$ / $AssetSLag$ / $LiabSLag$).

Equation (36) - Asset & liability at the end of period (current balance)

$$AssetS_{as,in} = AssetSLag_{as,in} + Asset_{as,in}$$

$$LiabS_{in,as} = LiabSLag_{in,as} + Liab_{in,as}$$

Equation (37) - Allocation behavior

$$AssetS_{ast1,in} = \theta1_{ast1,in} \left(\frac{rn_{ast1}}{rn0_{ast1}}\right)^{\sigma1_{ast1,in}}$$

$$LiabS_{in,ast1} = \theta2_{in,ast1} \left(\frac{rn_{ast1}}{rn0_{ast1}}\right)^{\sigma2_{ast1,in}}$$

Equation (37) shows that the decision making of economic agents in how they allocate their fund to asset or liability is determined by interest rate (rn), elasticity (θ), and (σ).

Since our simulations include allocating the repatriated asset from tax amnesty to four financial instruments in the form of loan[11] and government bond ($FINA$ 7), two equations are modified from the original non-tax amnesty FCGE model as the following:

$$LiabS_{in,ast1}\textbf{credfact}_{in,ast1} = ast1shr_{in,ast1}\left(\sum_{in2} AssetS_{ast1,in2}\right)$$

$$LiabS_{GOV1,aste}\textbf{gbondfact}_{GOV1,aste} = \theta2_{GOV1,aste}\left(\frac{rn_{aste}}{rn0_{aste}}\right)^{\sigma2_{GOV1,aste}}$$

Parameter $credfact_{in,ast1}$ in the equation above allows us to modify the size of financial liabilities stocks of institutions (in) in the form of loan ($ast1$).[12] Whereas, parameter $gbondfact_{gin,aste}$ modifies the size of financial liabilities stocks of government (gin) in the form of government bond ($aste$). On how the allocation of the repatriated asset affects economic and social indicators will be discussed in Subchapter 4.2. The GAMS code for the equations modification are listed in Appendix 1.

Financial instruments sold by the financial sector are new sources of income for economic agents through which return on assets is then transferred.[13] The size of this income is determined by both assets and liabilities stock as well as the current interest rate and elasticity. In the FCGE model simulation, data on the past stock of asset and liability ($AssetSLag$ and $LiabSLag$) stands as separate datasets from FSAM.

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[11] Working capital ($FINA$ 10), investment credit ($FINA$ 11), and consumer credit ($FINA$ 12).

[12] $ast1shr_{in,ast1}$ in the equation is an asset-share parameter which is defined as $LiabS0_{in,ast1}/\sum_{in2} AssetS0_{ast1,in2}$

[13] See equation (17) in the income block

3.2.1.10. Model Closures

The following variables are set to be exogenous:

1. Government expenditures and transfers

2. Investment (INV)

3. Income from abroad ($yfrow$) and subsidy (sub)

4. World price of export/import (pwm/pwe)

5. Domestic transport and trade margins (ttd)

6. Marginal propensity to save (mps)

7. Current account balance ($FSAV$)

8. Labor and non-labor factor supply (LS and FS)

9. Lag of stocks in the CGE ($fixASLag, wealtLag$) and in the financial module ($AssetSLag, LiabSLag$).

CHAPTER 4

SIMULATION AND ANALYSIS

Having discussed the construction of FCGE model for tax amnesty, this chapter covers policy experiments with FCGE model simulations. The experiments are conducted to achieve three objectives. The first objective is to measure the impact on macroeconomic variables and income distribution of having tax amnesty and of not having tax amnesty policy. As mentioned earlier in the previous chapter in Table 1, two key aspects of *Law No.11/2016 on Tax Amnesty* are macroeconomic measure and equity measure. These measures become central issues to be evaluated.

The second objective of the experiments is to explain how and why tax amnesty affects the macroeconomic and socioeconomic condition in Indonesia by using FCGE framework. The last objective of the experiment is to compare the simulation results of seven policy scenarios using two criteria, i.e. macroeconomic indicators and equity measures. For macroeconomic criteria, the Law specifically mentioned 4 (four) proxies to be used as parameters to measure the effects of two quantifiable direct consequences of Indonesia's third tax amnesty policy, i.e. asset repatriation and extra *gross* tax revenue. These macroeconomic proxies are domestic liquidity, exchange rate, interest rate, and domestic investment. In addition, our model also provides some alternative proxies such as real GDP ($RGDP$), consumption (CD), Export (E), import (M), price index ($Pindex$), government income ($Gincome$), and income tax revenue ($Dirtax$).

For equity criteria, the Law did not specifically mention any proxy. However, the model provides two good proxies that can be used to measure equitable income distribution and another socioeconomic indicator such as unemployment ($Uemprate$). On equity, the proxies are income distribution between residents who live in rural area and in urban area ($YdistRU$) as well as income distribution between the rich households and the poor households ($YdistLH$).

4.1. On the Magnitude of the Tax Amnesty's Outcome

This subsection attempts to compare the magnitude of two direct outcomes of tax amnesty policy across time within Indonesia and cross-countries. The most observable direct outcome is *gross* tax revenue collection. However, since the policy objective of the third Indonesian Tax Amnesty is not merely tax revenue collection but also macroeconomic objective, consequently, new outcome emerges. This new outcome is asset repatriation through which Indonesian citizens' liquid assets in foreign country are transferred back to Indonesia. The government requires these repatriated assets to be invested legally in financial instruments that are available in the country. As mentioned earlier in subchapter 3.2, this thesis assigns four financial instruments to be points of destination for the allocation of that repatriated assets. These are working capital credit ($FINA$ 10), investment credit ($FINA$ 11), consumer credit ($FINA$ 12), and government bond ($FINA$ 7). The reason why those four instruments are selected is because they affect real sector differently and have different level of risks.

Compared to the first (1965) and the second (1984) tax amnesty, Indonesian third tax amnesty (2016) is a success story in terms of *gross* tax revenue collection. Tax

amnesty in 2016 collected 10 times larger *gross* tax revenue than the first tax amnesty in 1965. Figure 9 below shows the comparison of revenue collection within the country across time:

Indonesia: Tax Amnesty's Gross Tax Revenue Collection
(% of GDP)
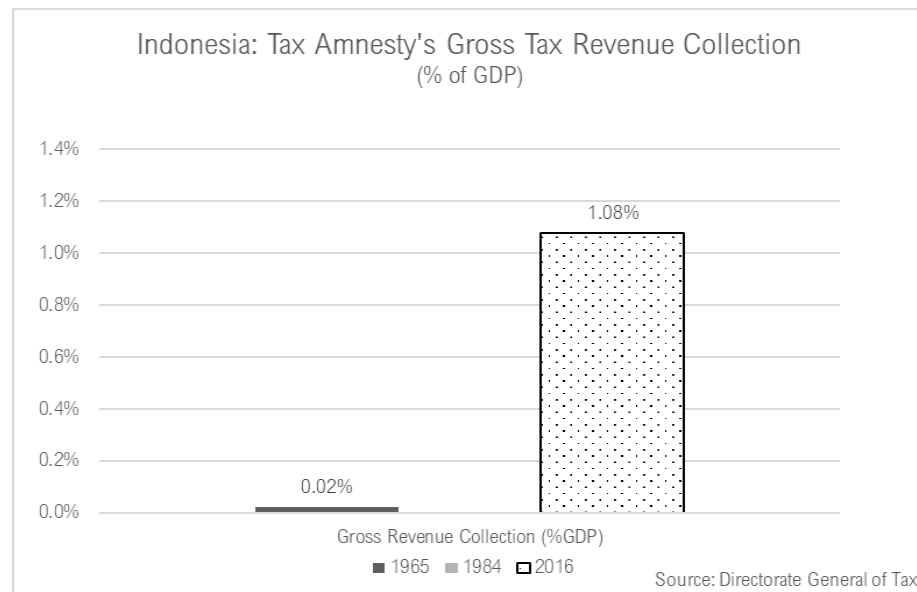
Note: no data on 1984's tax amnesty is available.

Figure 9 - Indonesia's Gross Revenue Collection (1965-2016)

Official reports published by Directorate General of Tax (DGT) shows that in only 8 months tax amnesty program in 2016 succeeded in collecting about 135 billion IDR. In contrast, the tax amnesty in 1965 can be considered unsuccessful. Kompas Daily, in 1965, captured this first tax amnesty policy failure by citing Hussein Kartasasmita's statement (the head of Jakarta Financial Inspection at that time) that until July 24, 1965, tax revenue collection was only 12 billion IDR, less than half of its target.[14]

The second tax amnesty policy in 1984 in the era of President Soeharto regime had the same story with the 1965's tax amnesty. Indonesia was facing budget pressure

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[14] Kompas, "*Hari Terachir Pengampunan Padjak 17 Agustus 1965*," Kompas, Jakarta, August 5, 1965.

as its oil export-driven economic performance declined and shocked by the world recession and oil price crisis. With almost 70% of the government revenue were sourced from oil export sector, the Indonesian economy was very vulnerable to external shocks. The worldwide economic recession of 1982-1983 and the declining world's oil prices in 1983-1986 pushed President Soeharto to adjust the national budget deficit by introducing packages of tax reforms to mobilize non-oil/gas-based revenues.[15]

Five laws were enacted during 1983-1985 to follow up the tax reforms plan, including income tax code, VAT code, property tax code, stamp duty code, and the fundamental law of taxation, i.e. *the General Provisions and Taxation Procedures Law*. Tax administration system radically shifts from *official* to *self-assessment* to minimize the cost of enforcement and to maximize tax revenue collection. Tax amnesty, in this context, attempted to boost short-term tax revenues and long-term tax compliance by targeting underground economy before tax regime change.

By contrast, tax amnesty Law in 2016 is a completely different story. It regards tax revenue collection goal as the last priority. Instead, macroeconomic and equity goals are on the top priority list. Asset declaration and asset repatriation, therefore, emerge as new potential shocks for our model. Still, among those two new consequences, asset repatriation is the only one that has concrete and tangible feature to be introduced as a shock for the economy.

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[15] Cited from Iwan Azis in the Chapter 4 of *The Economies of Asia, 1950-1998: Critical Perspectives on The World Economy*, a journal published in 2000, edited by Ash and Booth.

To give a clearer illustration on the magnitude of tax amnesty success in terms of asset repatriation, the absolute dollar value in Figure 1 Chapter 1 should be transformed into percentage of GDP measure. Based on dollar value, until 2017, Indonesia's tax amnesty was, of course, the most successful in terms of tax revenue collection and asset repatriation/declaration. However, based on percentage GDP, Argentina's tax amnesty (2016) seems to be the most successful in terms of revenue collection (1.77% of GDP). Whereas, in terms of asset repatriation, Indonesia is the most successful (38.79% of GDP). Figure 10 below depicts the cross-country tax amnesty outcome in percentage of GDP:
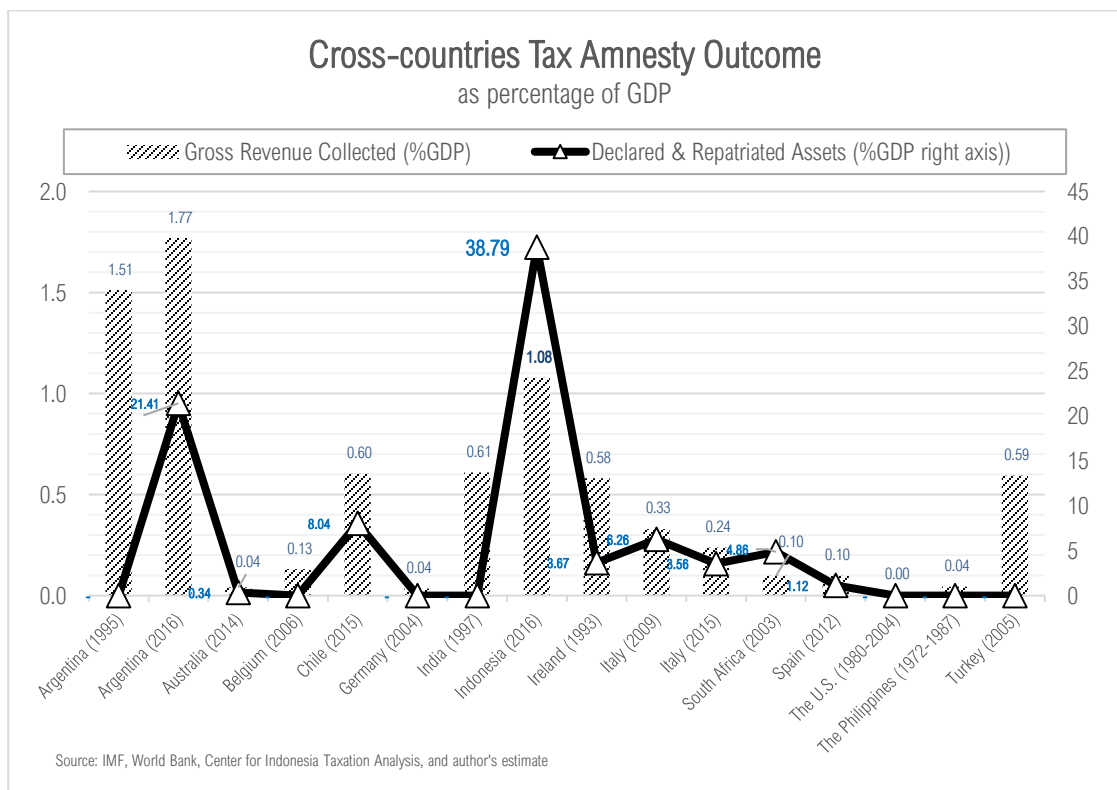
Figure 10 - Cross-country Tax Amnesty Outcome (%GDP)

The graphical information above is presented in this section to help to estimate the magnitude of the shock (caused by asset repatriation) to be imposed into the model.

4.2. The Shocks and the Scenarios

Figure 1 and Figure 10 only show the magnitude of extra tax revenue collection and asset repatriation from tax amnesty program. The impacts on the Indonesian economy and socioeconomic condition of those extra tax revenue and repatriated assets, however, cannot be evaluated only by looking at their magnitude. The impacts can be (only) measured and assessed comprehensively if those two amnesty outcomes are being treated as exogenous in our model. Nevertheless, the graphical illustration in both figures remains useful for determining the size of shocks that affect the economy.

Two shocks as shown in <u>Table 3</u> below will be imposed on the FCGE model. These shocks are the following:

	Shock #1	Shock #2
Description of the shock	Tax revenue increase by 15%	**A**: Current account balance -38.79%
		B: Working capital credit increased by 40%
		C: Investment credit increased by 20%
		D: Consumer credit increased by 30%
		E: Government bond increased by 10%
Equation/variables	$(DIRTAX)$	$(FSAV)$ and $(FINA\ 10, 11, 12, 7)$

Table 3 - The Model's Shocks

The first shock is tax revenue increase caused by both normal operations and special event namely tax amnesty policy. This shock represents policy change through which new tax law (Law No.11/2016 on Tax Amnesty) yields a significant 15% increase in income tax revenue.[16] In the FCGE model, especially in the income block, this 15%

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[16] The institutional share of the 15% tax revenue increase is assumed to be correspond with <u>Figure 5</u> in sub chapter 3.1. Whereas for the counterfactual experiment, the institutional share of that increase will be

tax revenue increase will modify the size of the institutional transfer ($ITRAN_{g,in}$) to government, or to be specific the direct tax equation ($DIRTAX$). As mentioned earlier in Subchapter 3.2.1.3, the detailed explanation and GAMS code for the direct tax equation are listed in Appendix 1.

The second shock is asset repatriation. As a result of this shock, current account balance ($FSAV$) changes by -38.79% as shown in Figure 10. This shock is then followed by the allocation of the repatriated asset into four financial instruments i.e. wor,king capital credit ($FINA$ 10 increased by 40%), investment credit ($FINA$ 11 increased by 20%), consumer credit ($FINA$ 12 increased by 30%), and government bond ($FINA$ 7 increased by 10%). Hypothetically, tax amnesty policy incentivizes Indonesian citizens whose assets are in foreign countries (or tax havens) to put their off-shore liquid assets back to Indonesia's real sector or financial sector. Consequently, economy and equity tend to be affected by this repatriation.

Experiments with FCGE simulation will be conducted to test the effects of both shocks—i.e., tax revenue increase and asset repatriation including its allocation to four financial instruments—on selected macroeconomic and socioeconomic indicators.[17]

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modified to compare the impact of different policies (targeted *vis-à-vis* non-targeted) on the selected macroeconomic and socioeconomic variables. The pattern of the government expenditure, however, is assumed unchanged.

[17] The following 9 macroeconomic indicators will be used in the simulations: 1. RGDP, 2. Consumption (*CD*), 3. Export (*E*), 4. Import (*M*), 5. Price Index (*Pindex*), 6. Exchange Rate (*EXR*), 7. Avg. Interest Rate (*avgrn*), 8. Government income (*Gincome*), and 9. Income tax revenue (*DIRTAX*). In addition, three socioeconomic indicators will also be used. These include (1) Income distribution between rural and urban dwellers (*YdistRU*), (2) Income distribution between the poor and the rich (*YdistLH*), and (3) Unemployment rate (*UNEMP*).

The transmission channel through which the abovementioned shocks affect twelve selected economic and social indicators is illustrated in Figure 11 below:

Figure 11 - Transmission Channel by Tax Revenue Increase and Allocation of Repatriated Asset
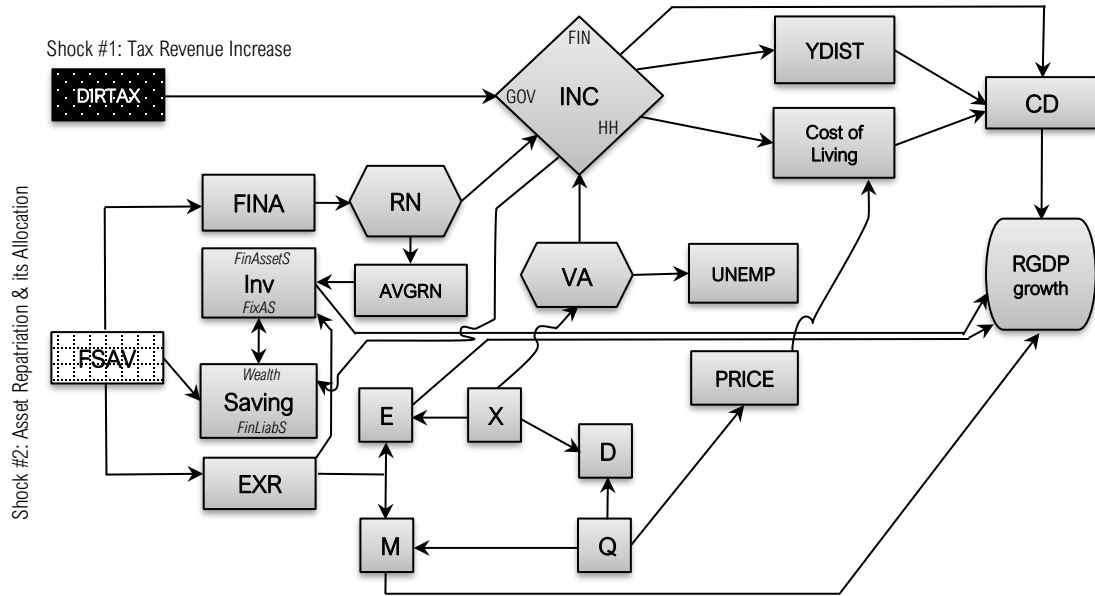
1. Asset repatriation by the rich enhances domestic liquidity through capital inflows which in turn is captured by commercial banks in their balance sheet. This situation enables banks to give more loans to real sectors in the form of working capital credit, investment credits, and consumer credits to expand consumption and production which eventually might adjust the GDP, the price, and households' income.

2. In return for that liquidity, banks must provide return on asset (financial income) for the financial assets holders, namely the rich. If an increase in the rich's financial income is accompanied by inflationary pressure, the rich might be hit by the pressure but their regular consumption could still be sustained. Whereas the poor will be the hardest hit since most of their incomes are spent for basic consumption.

An increase in direct tax as a result of tax amnesty policy whose participants are mostly the rich, middle class, and corporation—immediately raises government income level which in turn influence consumption level and saving. It also tends to improve income distribution between the rich and the poor as the policy has a negative effect on the income of the policy participants. Moreover, since the policy does not specifically target a source of income to be taxed, in other words only collects penalties from taxpayers' unreported income or asset, taxpayers' return on assets (financial income) might remain untouched and therefore tend to offset the improvement of households'

income distribution. Overall, shock from *Dirtax* tends to generate a negative effect on the income level of participants although for delinquent taxpayers *the forgiveness effect* of tax amnesty helps them to lessen the amount of tax to be paid.

By contrast, the second shock has more complex transmission channel. The inflows of liquid assets from abroad to Indonesia as result of asset repatriation are mostly captured by financial institutions, especially commercial banks. Consequently, the repatriation increases the liability side of the commercial bank's balance sheet. In turn, they allocate that fresh funds from repatriation to financial instruments by giving loans to consumers in the forms of working capital loans, investment credits, and/or consumer credits to make profits. However, as a return for that funds, depends on the interest rates, they must transfer return on asset or financial income to the asset holders who are mostly the rich. This *financial income effect* gives tax amnesty participants not only forgiveness from being subjected to tax audit or investigation that might cost them large amount of money and time, but also additional income from their ownership of those three financial instruments including government bonds. Hence, taken together, *the forgiveness effects* combined with *the financial effects* tend to increase the income of economic agents, especially the rich. Consumption levels and investment also tend to rise, which in turn creates an expansionary effect to the economy. Exchange rate also tends to increase as a result of capital inflows from asset repatriation. This increase will influence export and import, which in turn influence the total output of production and composite good, followed by adjustment in price index in the economy. This price effect will eventually influence households' cost of living and might worsen the income inequality between the rich and the poor or between rural and urban dwellers.

Seven scenarios composed of factual and counterfactuals will be simulated to assess the impacts of the shocks. These scenarios are shown in Table 4 below:

Policy scenarios	Experiment number	Shock #1	Shock #2
Without tax amnesty (TA)	*1*	4% tax revenue increase	-
TA: non-targeted	*2.1**	15% tax revenue increase	A
	2.2*	15% tax revenue increase	B, C, D, E
TA: targeted to corporations	*3.1*	4% tax revenue increase for: • all households ($HH1 - 4$), • government agencies (GOV), and • the central bank ($FIN1$) 20% tax revenue increase for: • financial sector ($FIN2$ and $FIN3$), and • real sector ($FIN4$)	A
	3.2	Same as above	B, C, D, E
TA: targeted to the rich and corporations	*4.1*	4% tax revenue increase for: • rural and urban poor ($HH1$ and $HH3$), • government agencies (GOV), and • the central bank ($FIN1$) 17% tax revenue increase for: • rural and urban rich ($HH2$ and $HH4$), • financial sector ($FIN2$ and $FIN3$), • real sector ($FIN4$)	A
	4.2	Same as above	B, C, D, E

Note: Experiments without asterisk are counterfactual policy scenarios on selected economic and social indicators.

Table 4 - Seven Scenarios Covered by the Simulations

4.3. The Simulation Results and Analysis

The simulation results for each shock and experiment in Table 5 and Table 6 below are presented relative to the base run results. As illustrated earlier in Figure 11, understanding the transmission mechanism or on how and why the shocks affect economic and social indicators is essential. In the following section, we will discuss the impact of each shock and experiment using Figure 11's framework.

Table 5 - *Non-simultaneous Simulation Results for Each Shock*

Selected Indicators	Base run	Shock #1 Extra Tax Revenue	Shock #2: Asset Repatriation				
			FSAV - 38.79%	Working Capital Credit increase by 40%	Investment Credit increase by 20%	Consumer Credit increase by 30%	Government Bond increase by 10%
		15% tax revenue increase	A	B	C	D	E
Social:							
Income Distribution (rural-urban)	1	0.9996	0.9986	1.0112	1.0000	1.0000	1.0032
Income Distribution (poor-rich)	1	1.0008	1.0019	0.9758	1.0000	1.0000	0.9929
Unemployment Rate	1	1.0041	0.9673	0.8691	0.9999	0.9999	0.9514
Macroeconomic:							
RGDP	1	0.9998	1.0017	1.0063	1.0000	1.0000	1.0024
Consumption	1	0.9966	1.0039	1.1355	1.0001	1.0001	1.0462
Export	1	1.0000	0.9861	1.0269	1.0000	1.0000	1.0093
Import	1	0.9997	1.0169	0.9848	1.0000	1.0000	0.9952
Price Index	1	0.9948	0.9798	1.1942	1.0001	1.0001	1.0484
Exchange Rate	1	0.9948	0.9718	1.2098	1.0001	1.0001	1.0531
Interest Rate	1	1.0005	0.9999	1.0869	1.0000	1.0000	1.0237
Income Tax Revenue	1	1.1700	0.9827	1.1703	1.0001	1.0001	1.0426
Total Government Income	1	1.1231	0.9841	1.1723	1.0001	1.0001	1.0430

Table 6 - Simulation Results for Each Experiment

Selected Indicators	Base run	No Tax Amnesty	Non-targeted Tax Amnesty		Targeted Tax Amnesty			
		Experiment 1	Experiment 2.1	Experiment 2.2	Experiment 3.1	Experiment 3.2	Experiment 4.1	Experiment 4.2
		4% tax revenue growth	15% tax revenue increase + capital inflows (FSAV)	15% tax revenue increase + increased credits and government bond	Targeting corporations + capital inflows (FSAV)	Targeting corporations + increased credits and government bond	Targeting the rich and corporations + capital inflows (FSAV)	Targeting the rich and corporations + increased credits and government bond
Social:								
Income Distribution (rural-urban)	1	0.9999	0.9983	1.0157	0.9958	1.0131	0.9949	1.0121
Income Distribution (poor-rich)	1	1.0002	1.0027	0.9667	1.0080	0.9719	1.0102	0.9740
Unemployment Rate	1	1.0010	0.9715	0.8412	1.0018	0.8569	1.0148	0.8637
Macroeconomic:								
RGDP	1	1.0000	1.0015	1.0075	1.0001	1.0068	0.9995	1.0065
Consumption	1	0.9992	1.0005	1.1733	0.9756	1.1586	0.9651	1.1524
Export	1	1.0000	0.9861	1.0349	0.9862	1.0370	0.9861	1.0378
Import	1	0.9999	1.0167	0.9791	1.0149	0.9770	1.0141	0.9762
Price Index	1	0.9987	0.9748	1.2913	0.9413	1.2341	0.9282	1.2117
Exchange Rate	1	0.9987	0.9669	1.3133	0.9337	1.2561	0.9207	1.2337
Interest Rate	1	1.0001	1.0004	1.1303	1.0032	1.1348	1.0042	1.1364
Income Tax Revenue	1	1.0415	1.1500	1.4753	2.5720	3.2663	3.3457	4.2313
Total Government Income	1	1.0300	1.1052	1.4194	2.1369	2.7152	2.6997	3.4156

Before proceeding to assess the simulation results for each experiment as shown in Table 6, it is necessary to check the effect of each shock listed in Table 5. Each shock has different effects on the selected economic and social indicators in our model. The following figure shows the non-simultaneous simulation result of Shock #1 (tax revenue increase) and Shock #2 (asset repatriation) A, B, C, D, and E on 12 indicators:

The Effects of Each Shock on the Selected Economic & Social Indicators
(% of change)

■ Shock #1   ■ Shock #2A   ■ Shock #2B   ■ Shock #2E
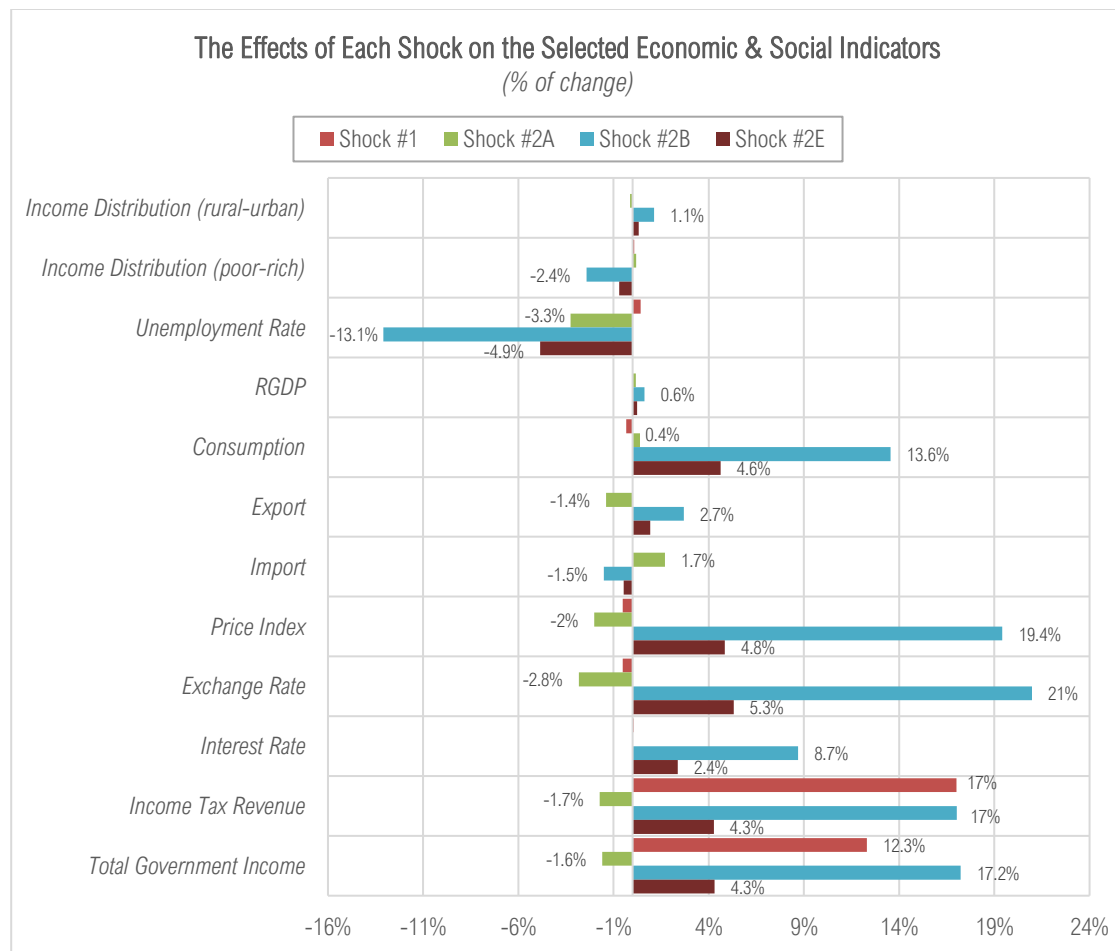
Figure 12 - The Effect of Each Shock on the Selected Indicators

As shown above, extra tax revenue collected from tax amnesty (*Shock* #1) has no significant effects on all indicators except income tax revenue (17%) and total government income (12.31%). Instead, this shock decreases GDP by 0.54% as

consumption declined. The distributional effect is also insignificant as in the simulations; government expenditure pattern and tax structure are assumed unchanged.

Capital inflows through FSAV ($Shock\ \#2A$) slightly affect most of the macroeconomic indicators by decreasing exchange rate, export, price index, unemployment rate, and government income, as well as increasing import, consumption, and RGDP. It occurs as the inflows put pressure on the exchange rate and make it to appreciate by 2.8%. As a result, trade account balance ($E - M$) declines due to increased imports (1.7%) and falling exports (1.4%). The decline of unemployment rate might indicate that labor market has benefited from increased consumption (0.4%), import (1.7%), and RGDP (0.2%). Put together, increased activity in the economy as indicated by raising supply and demand causes the price index to adjust. The decline in income tax revenue ($DIRTAX$) or government income might suggest that tax base i.e. institutions,' income has declined as well. The income decline is indicated by the price index fall (2.2%) which might suggest that consumers are lack of purchasing power to buy imported or domestically produced commodities.

The third shock ($Shock\ \#2B$) of 40% increase in working capital credit has the largest effects on most of macroeconomic and social indicators. Working capital loan improves firm's liquidity in financing routine business operations such as paying wages, account payable, and other short-term operational expenses. As the liquidity of both firms and wage earners (households) increase, the level of economic activity also increases as indicated by raising consumption (13.6%), GDP (0.6%), and price index (19.4%), as well as falling unemployment rate (13.1%). As a result, income tax revenue ($DIRTAX$) and government income rise by 17%.

However, the increased demand for working capital loan by firms needs to be backed up by sufficient supply of funds either domestically or from foreign countries. An 8.7% increase in interest rate reflects the demand and supply of such funds in the domestic financial market. An increase in interest rate might incentivize institutions to invest their funds in financial sector rather than real sector. Households who allocate their funds to the domestic financial market receive financial return in addition to their factor income. This phenomenon explains why the income distribution between rich and poor worsens by 2.4%, it is particularly because asset holders who earn that financial return are mostly rich households. By contrast, the improvement of income distribution between rural and urban dwellers (1.1%) indicates that the increased economic activity caused by increased firms' and households' liquidities makes rural dwellers better-off.

Some of the assets or funds that are needed to make the working capital loan available in the domestic financial market can come from foreign countries. When it happens, foreign institutions' savings (SAV_{fr}) will increase. The model simulation suggests that SAV_{fr} is increased by 21% from 71,942 to 87,032.4 billion IDR. This explain why exchange rate is depreciated by 21%, which in turn also increase export by 2.7% and decrease import by 1.5%.

The simulation results for $Shock\ \#2C$ and $Shock\ \#2D$ yield insignificant impacts on selected economic and social indicators.[18] Whereas shock from the 10% increase in government bond ($Shock\ \#2E$) affects the selected indicators through similar transmission mechanism with the shock from working capital credit ($Shock\ \#2B$) but

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[18] It explains why the simulation results are not presented in Figure 12.

with lower magnitudes. In summary, the simulations have shown that both *Shock #2B* and *Shock #2E* have expansionary effects on the economy.

Experiment 1 (No Tax Amnesty)

Turning now to the analysis of simulation results for each experiment shown in Table 6. Experiment 1 simulate the effects on the economic and social indicators of having no tax amnesty policy in Indonesia in 2016-2017. The only shock imposed in this experiment is 4% tax revenue growth. Figure 13 below shows the impact of the experiment on 12 indicators:
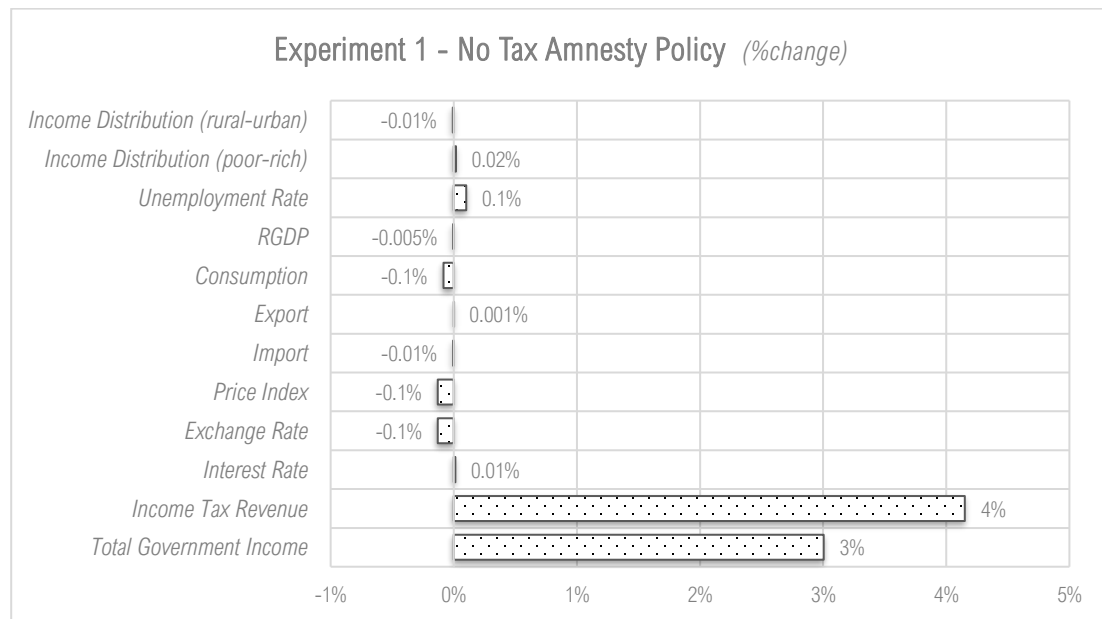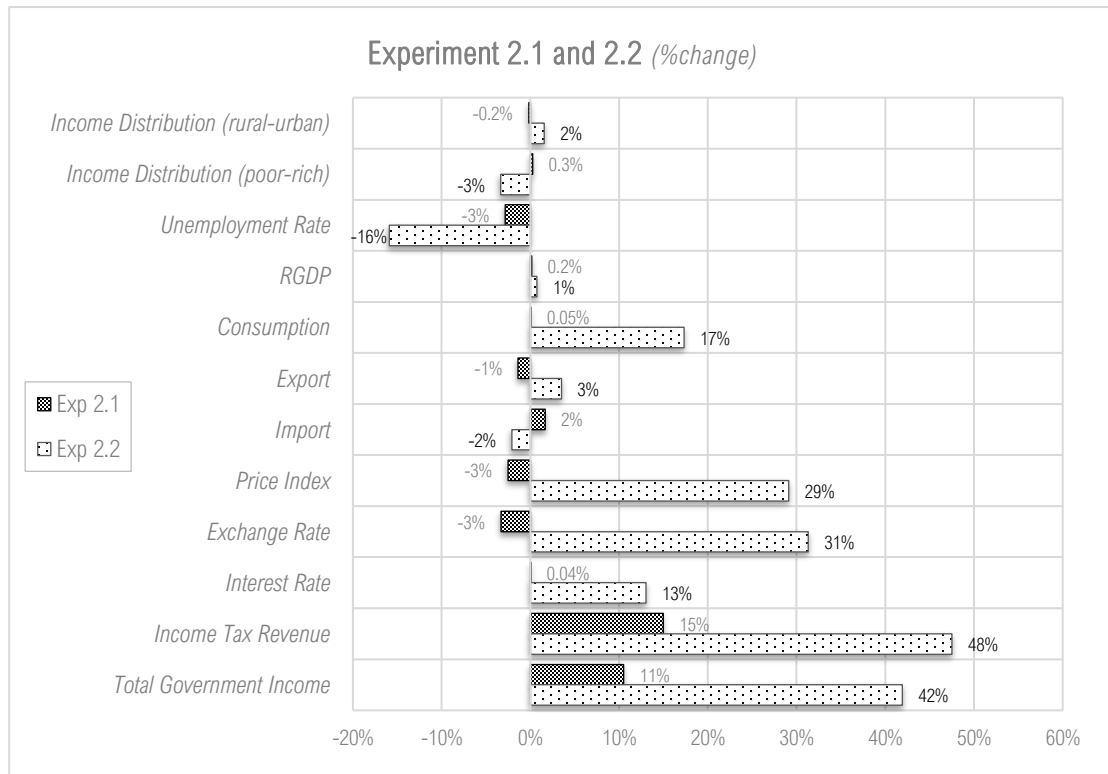

Figure 13 - The Simulation Result of Experiment 1

The result suggests that Experiment 1 has a slight contractionary effect on the economy as indicated by 0.1% decrease in GDP, consumption, and price index, as well as 0.1% increase in unemployment rate. Although income distribution between the poor and the rich improves, and the rural-urban income distribution worsens, overall, the distributional effects are insignificant.

Experiment 2 (Non-Targeted Tax Amnesty Policy)

Both Experiment 2.1 and 2.2 assess the effects of non-targeted tax amnesty policy on selected economic and social indicators. In terms of asset repatriation, Experiment 2.1 assumes the shock as capital inflow ($FSAV$ -38.79%), while Experiment 2.2 assumes that working capital loan ($FINA$ 10), investment credit ($FINA$ 11), consumer credit ($FINA$ 12), and government bond ($FINA$ 7) are increased by 40%, 20%, 30%, and 10%, respectively. Regarding tax revenue collection from tax amnesty program, both experiments assume 15% increase, regardless the distribution.

Figure 14 - The Simulation Result of Experiment 2.1 and 2.2

Figure 14 shows that tax amnesty followed up with increased demand in four financial instruments (Experiment 2.2) has a larger magnitude of impacts than tax amnesty with no specific allocation of repatriated assets (Experiment 2.1). Nevertheless,

both experiments suggest that non-targeted tax amnesty policy tend to have expansionary effects on the Indonesian economy as indicated by an increase in RGDP and consumption, as well as decreased unemployment rate, regardless of the magnitudes. On why the impact of the experiments have different magnitudes can be traced back to the non-simultaneous-simulation result for each shock as discussed earlier in the previous subsection (Figure 12 and its explanations).

For instance, regarding export and import, Experiment 2.1 contains *Shock #2A* that tend to decrease export (1%) and increase import (2%) as the capital inflows (through FSAV) have pushed the exchange rate to appreciate (3%). The experiment suggests that, in general, the level of economic activity in real sector has altered as indicated by falling unemployment rate and increased consumption, import, and RGDP. The altered level of economic activity, especially imports, that are mostly handled in urban area by urban poor, might explain the fall in income distribution between rural and urban dwellers (0.2%) and the improved equity level between the poor and the rich (0.3%). The decline in price index, however, has suggested that an increase in the supply of imported commodities is not accompanied by consumers' willingness or ability to absorb commodities available in the market.

In contrast, Experiment 2.2 shows the opposite direction of export, import, and income distribution. Export is increased by 3% whereas import is fallen by 2% as a result of Rupiah depreciation. Income distribution between the poor and the rich worsens (-3%) while the equity between rural and urban dwellers improves (2%). These trajectories are typical of *Shock #2B* and *Shock #2E* in which financial market plays

its role in increasing the income of the rich, which in turn aggravate income inequality between high-income and low-income earners.

It is important to bear in mind that the increase in the working capital loan, investment credit, consumer credit, and government bond are in fact sourced from asset repatriation which is nothing but assets originated from abroad whose holders are mostly rich economic agents. In return of their participation in repatriating their foreign assets during tax amnesty period in 2016-2017, the rich were not only free from tax audit, investigation, and penalties which made them paying more taxes; instead they are also receiving financial income from their financial assets ownerships. *Law No.11/2016 on Tax Amnesty* deliberately expects this to happen, perhaps under consideration that capital inflows from asset repatriation would have been helping the economy to grow. However, our simulation shows that the cost of that expectation is nothing but worsened income inequality between the poor and the rich. This situation is typical of economic development policy in Indonesia in which income inequality is considered as a residual.

Regarding economic indicators, the growing economy as simulated in Experiment 2.2 has pushed the price index to increase. However, this inflationary pressure is modestly offset by interest rate increase. Hence, along with 17% increase in consumption, 3% increase in export, and 2% decrease in import, overall, the economy is slightly expanding as indicated by 1% increase in RGDP. Labor market also benefited from this expansionary effect as the unemployment rate declined by 16%. Put together, by macroeconomic measures, non-targeted tax amnesty as simulated in these experiments is beneficial to the economy. One fundamental question to ask regarding social indicator, however, is whether inequality matters or not in policymaking.

Experiment 3 and 4 (Targeted Tax Amnesty Policy)

In this section, we discuss the impacts of tax amnesty policy that is specifically designed to target corporations (Experiment 3), as well as the rich and corporations (Experiment 4). Experiment 3.1 assumed that extra tax revenue from tax amnesty is shared proportionally to corporations ($FIN2, FIN3,$ and $FIN4$), whereas shock from asset repatriation is assumed come from capital inflow ($FSAV$). Experiment 4.1 shared the extra tax revenue to corporations and the rich ($HH2$ and $HH4$) while assuming the same shock as Experiment 3.1 in terms of asset repatriation. Figure 15 below compares the simulation results of Experiment 3.1 and 4.1:
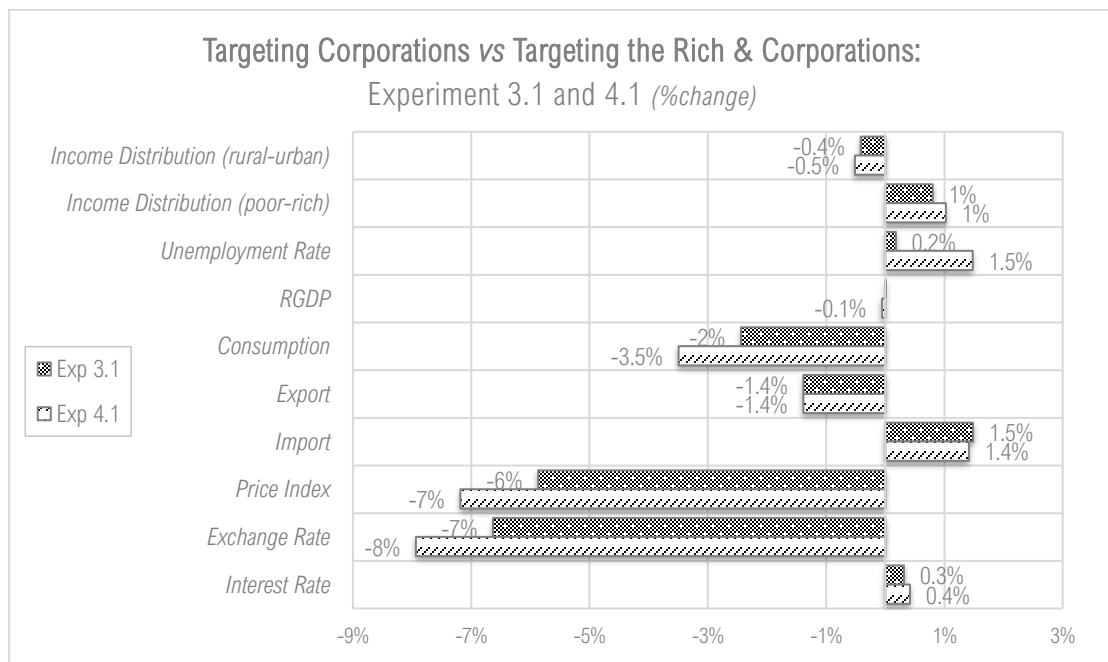
Figure 15 - The Simulation Result of Experiment 3.1 Compared to 4.1

As shown above, both experiments generate similar effects on all economic indicators and social indicators. Either targeting corporations (Exp 3.1) or targeting both the rich and corporations (Exp 4.1), tax amnesty generates contractionary effects on the economy. Capital inflows from asset repatriation have caused the Rupiah to appreciate

by 7% and 8% in Experiment 3.1 and 4.1, respectively. Consequently, import is increased, and export is declined by about 1.4%. The economy then faces deflationary pressure as the domestic consumption in both experiments shrinks by 2% and 3.5%, respectively. This pressure can be indicated by a modest decline in price index which is slightly offset by an increase in interest rate. Along with rising unemployment, overall, the economy has contracted.

The effect of targeting the rich and/or corporations on income inequality is obvious. In both experiments, taxing the rich improves the income distribution between high and low-income earners by about 1%. On the other hand, worsening rural-urban equity might suggest that rural dweller whose factor income is earned from their interaction with the rich and/or corporations—have lost parts of their income as the rich and corporations faced liquidity problem after paying large amount of taxes.

One interesting question that needs to be asked, however, is that of why targeting the rich and/or corporations have led the economy to shrink. The answer, perhaps, can be found in Akerlof and Shiller's notion on *animal spirits*. The notion suggests that the causes of an up and down in the economy are largely beyond numbers, that is, mental in nature (Akerlof & Shiller, 2009). Targeting tax amnesty to those who play a big role and have a big share in the economy, namely the rich and the corporations, can dampen their sense of confidence and good faith that drive the economy. Being a target can also hurt their sense of fairness as if they were judged as tax evaders who seek forgiveness. This notion holds, especially when the information on who complies and who evades the tax law is, in fact, asymmetric. These mental state, in turn, repress their willingness to consume or invest which eventually leads the economy to shrink.

Experiment 3.2 and 4.2 are a completely different story. These experiments suggest that those who participate in tax amnesty by repatriating their liquid foreign asset to be invested in four selected financial instruments—are given two incentives. First, they will be free from tax audit, penalties, and prosecution. Second, they will receive return on assets, in return for their investment in those four financial assets.
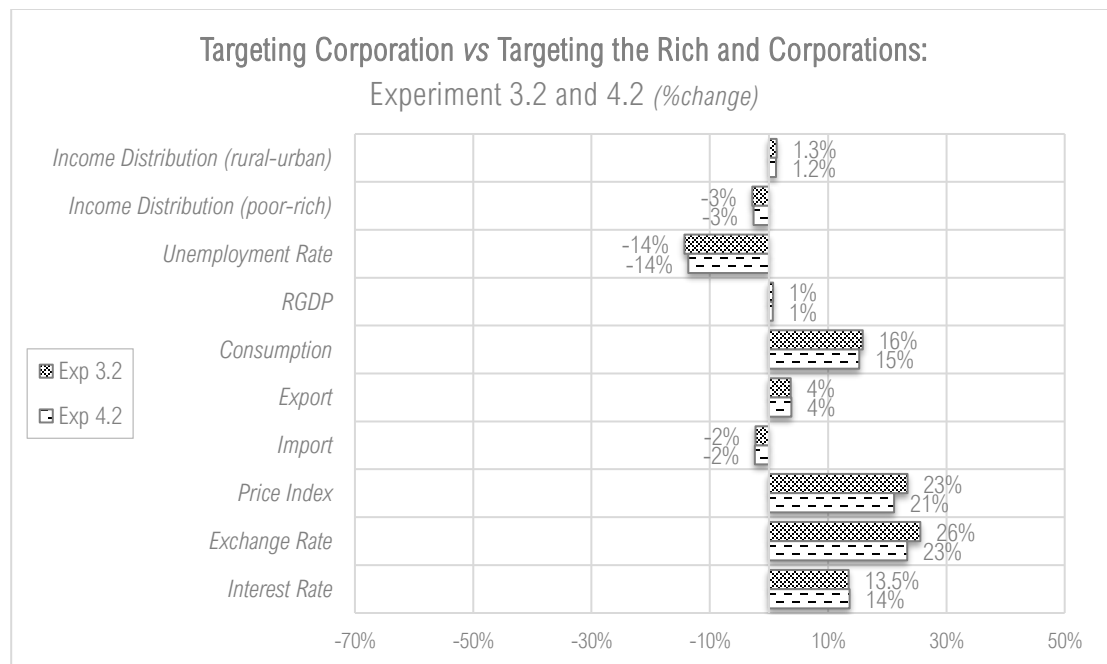
Figure 16 - *The Simulation Result of Experiment 3.2 Compared to 4.2*

Figure 16 shows that giving the abovementioned incentives to those who invested their repatriated assets in four financial instruments, namely *FINA 7, FINA 10, FINA 11,* and *FINA 12,* has generated an expansionary effect on the economy. This effect can be indicated by positive percentage changes of RGDP (1%), consumption (15-16%), and net export (2%), along with falling unemployment rate (14%). Although the economy faces inflationary pressure, the increase in interest rate has served as a countermeasure for that pressure, therefore, altogether, the economy expands under those two scenarios.

Considering income inequality indicator will lead to a different story. The expansion of the economy has led the rural-urban income distribution to improve by 1.2-1.3%, which might suggest that both rural and urban dwellers are better-off with the expansionary effect on the economy. However, the expansion has been accompanied by worsening income distribution between high and low-income earners (-3%). This result suggests that two main features of Indonesia's tax amnesty have played their role. These are incentives in the form of forgiveness from tax audit or prosecution which can cost the rich large amounts of tax payable, and most importantly, incentives in the form of financial income for the rich as a return for their willingness to invest their repatriated assets in four selected financial instruments. Put simply, *financial income effects* (along with *tax forgiveness effect*) are responsible for the worsening income inequality between the poor and the rich.

In summary, both targeted and non-targeted tax amnesty policy, especially those that are designed to incentivize the participants with financial income for their repatriated assets—has generated expansionary effects on the economy with the cost of worsening income inequality between the poor and the rich. Among those two scenarios, the non-targeted policy is more superior in terms of job creation, and of consumption and export spurring, as well as of rural-urban income distribution improvement. By contrast, the rich/corporation-targeting policy that has no salient information on where the repatriated assets are allocated in the financial market has led the economy to shrink.

CHAPTER 5

CONCLUDING REMARKS

Seven scenarios are simulated with FCGE model to assess the effects of having tax amnesties that are designed to target the rich and/or the corporations (namely 'targeted tax amnesty') as well as tax amnesties that are inclusive to any participants ('non-targeted tax amnesty'). Another important feature of the scenarios is the type of shocks with regard to assets repatriation. These are capital inflows (through $FSAV$) with (1) no specific and salient asset allocation to financial instruments available in the financial market, and with (2) specific allocation of repatriated assets owned by the rich into four selected financial instruments.

The simulations have revealed that Indonesia's third tax amnesty has generated a slight expansionary effect on the economy at the cost of worsening income inequality. As measured with nine economic and three social indicators, the simulation results show that although 'targeted' and 'non-targeted' tax amnesty generally lead the economy to grow, income inequality between the poor and the rich is widened. The *financial income effects* along with *tax forgiveness effect* are responsible for the worsening income inequality between the poor and the rich.

Financial institutions, especially commercial banks mostly capture an increase in domestic liquidity caused by capital inflows from asset repatriation whose holders are mostly the rich. As a result, the liability side of banks' balance sheets increases so that banks have more financial resources to be allocated to the economic agents. For the

profit-maximizing purpose, banks allocate that resources to four financial instruments in the form of loans and government bonds. In return, they must transfer financial income to the asset holders (i.e. the rich). Beside receiving additional income from their ownership of financial instrument in banks, the rich are legally forgiven from being subjected to tax audit or investigation which may cause them to pay large amounts of taxes. Although an increase in tax revenue collection has a negative effect on the income of the rich, those *financial income effect* combined with *forgiveness effect* largely offset that negative effect of tax revenue collection. If an increase in the rich's financial income is accompanied with inflationary pressure, the rich might be hit by the pressure but their regular consumption could still be sustained, whereas the poor will be the hardest hit since most of their incomes are spent for basic consumption. Hence, *price effect* can amplify the worsened income inequality between the poor and the rich in the Indonesia.

Other obvious findings emerged from this experimental study is that the saliency in the allocation of the repatriated asset to financial instruments matters. Out of seven simulations, one shows that tax amnesty that is designed to target the rich and the corporations specifically but with no salient information on where the repatriated assets have been invested in the financial market—tend to have contractionary effects on the economy. Moreover, the scenario will also worsen the income distribution between rural and urban area. Compared to other scenarios, 'non-targeted policy' is more superior in terms of job creation, consumption boosting and export spurring, and of rural-urban income distribution improvement.

While comprehensively covering the wide impacts of tax amnesty on the economic and social indicators, this study was limited by the absence of FSAM dataset that can capture economic development post-tax reform in 2009 and post-transfer of property tax management from central government to local government in 2014. Another limitation is the absence of dynamic model that can be used for long-run assessment for the repatriated assets. In addition, the model assumed that institutional problem in Indonesia is at its minimum level. No specific *BOCR* (Benefit, Opportunity, Cost, and Risk) calculations have been made to provide judgements on the best counterfactual scenarios that work for Indonesia.

It is noteworthy also to consider the political cost of introducing tax amnesty, including the future cost of having law-abiding taxpayers (voters) that feel disappointed for being treated unfairly as policymakers offer generosity and forgiveness to tax evaders and delinquent taxpayers. In the future, this unrest can possibly lead to a new pattern and larger magnitudes of non-compliance. This political cost is often overlooked by policy actors because of its latency and intangibility. The other reason is that either politician whose time horizon is too narrow (i.e., next election) and civil servants whose time horizon is way longer than politicians (i.e., pension) put too high discount factor to future tax revenue collection and tax compliance.

At the same time, the tendency of incrementalism among government agencies has been giving little if not zero incentive to civil servants to develop a technique that can comprehensively assess the latency of that political costs of tax amnesties. The intangibility of that costs, perhaps, also hinders policy actors from conducting

assessment. Therefore, a methodology that can tackle that latency and intangibility issue needs to be promoted (e.g., Analytic Hierarchy Process or Analytic Network Process). The functionality of this methodology can help Indonesia to depart from old political economy that tends to neglect the behavioral effect of other players in the society. The arrival to new political economy, according to de Janvry *et.al*, only possible if there are rooms available for both government's technocratic advice and external players' intervention in the policy-making process. When that room is available, the abovementioned methodology will properly function in giving new information about the expected outcome of the policy game (de Janvry, Sadoulet, & Thorbecke, 1995).

Finally, there are certainly limitations that are unknown or unimaginable. However, I do believe that the experiments conducted in this thesis are a valuable contribution to the previous literature on the impacts of tax amnesty. In conclusion, tax amnesty might cause the economy to expand or to contract, depends on how it is designed. However, no matter the economic effects of tax amnesty, social indicators such as income inequality should not be treated as a residual.

This study closely follows the Financial Computable General Equilibrium (FCGE) model developed by Azis (2002). Most of the equations, variables, and notations listed below are, therefore, similar to the original model, except for equations that reflect extra income taxes collection[19] and allocation of assets repatriation[20] to four selected financial instruments. Equation with asterisk (*) shows the major distinction and a departure from the original non-tax amnesty FCGE model.

1. **BLOCKS OF EQUATIONS**

   1.1. Production Block (18 equations)

   Equation (1) - Factor demand function (FACTDEQ$_{i,f}$)

   $$factd_{i,f} = VA_i \left(\frac{PV_i \, bv_{i,f}}{WF_f \, wfdist_{i,f} \, (avx_i \, av_i)^{\rho v_i}} \right)^{\frac{1}{(1+\rho v_i)}}$$

   Equation (2) - Value added definition (VADEF$_i$)

   $$VA_i = avx_i \, av_i \left(\sum_f bv_{i,f} \, factd_{i,f}^{-\rho v_i} \right)^{\frac{-1}{\rho v_i}}$$

---

[19] In the income block, "Equation (19)" on Direct Taxes (DTAXEQ$_{gin,din}$) contains a tax factor parameter ($taxfact_{gin,din}$) that is intended to modify the original direct tax equation so that it enables the model to capture an increase in tax revenue collected from tax amnesty (*Shock* #1 as shown earlier in Table 4 - Subchapter 4.2) whether it is from 'non-targeted' tax amnesty scenario (15% increase), 'targeted' tax amnesty scenario (either 17% increase for corporations and rich households in rural and urban area or 20% increase for corporations), as well as from having no tax amnesty policy (4% growth of tax revenue collection). Put simply, the new parameter ($taxfact$) allows modeler to modify the size of transfers originated from domestic institutions (din) to government (gin) in the form of direct tax.

[20] Financial module (specifically the C & D block) is modified to introduce the allocation of repatriated assets from tax amnesty to four financial instruments, either in the form of loans, namely working capital loans ($FINA$ 10), investment credits ($FINA$ 11), consumer credits ($FINA$ 12), or in the form of securities i.e. government bond ($FINA$ 7). Parameter $credfact_{in,ast1}$ allows us to modify the size of financial liability stocks of institutions (in) in the form of credit ($ast1$). Whereas, parameter $gbondfact_{gin,aste}$ modifies the size of financial liability stocks in FSAM dataset of government (gin) in the form of government bonds ($aste$).

Equation (3) - *Intermediate goods (VA equation $INTEQ_i$)*

$$INTM_i = VA_i \left(\frac{PV_i\,(1 - bi_i)}{PINTM_i\, bi_i} \right)^{\frac{1}{(1+\rho i_i)}}$$

Equation (4) - *Sectoral output function ($OUTPUT_i$)*

$$X_i = ai_i \left(bi_i\, VA_i^{-\rho i_i} + (1 - bi_i)\, INTM_i^{-\rho i_i} \right)^{\frac{-1}{\rho i_i}}$$

Equation (5) - *CET function (CET_i)*

$$X_i = ax_i (bx_i\, D_i^{-\rho x_i} + (1 - bx_i)\, E_i^{\rho x_i})^{\frac{1}{\rho x_i}}$$

Equation (6) - *Armington function ($ARMINGTON_i$)*

$$Q_i = aq_i (bq_i\, D_i^{-\rho q_i} + (1 - bq_i)\, M_i^{-\rho q_i})^{\frac{-1}{\rho q_i}}$$

Wages equation ($WAGEEQ_i$)

$$Wages_i = Pindex^{vp_i} \left(\frac{PV_i}{PV0_i} \right)^{1-vp_i} \left(\frac{\left(\dfrac{X_i}{\sum_{fl} factd_{i,fl}} \right)}{PDL0_i} \right)^{\pi_i}$$

($WFLABOR_{fi}$)

$$WF_{fl} = WF0_{fl} \sum_i Wages_i.\,wlshare_{i,fl}$$

Intermediate composite equation ($INTERM_i$)

$$INTM_i = at_i \left(bt_i DINTM_i^{-\rho t_i} + (1 - bt_i)\, FINTM_i^{-\rho t_i} \right)^{\frac{-1}{\rho t_i}}$$

Intermediate composite equation 2 ($INTERM2_i$)

$$INTM_i = DINTM_i$$

Intermediate composite optimality ($INTEREQ_i$)

$$FINTM_i = DINTM_i \left(\left(\frac{PDINTM_i}{PFINTM_i} \right) \left(\frac{1 - bt_i}{bt_i} \right) \right)^{\frac{1}{(1+\rho t_i)}}$$

Armington for non-import ($ARMINGTON2_i$)

$$Q_i = D_i$$

Cost minimization ($COSTMIN_i$)

$$M_i = D_i \left(\left(\frac{PD_i}{PM_i} \right) \left(\frac{1 - bq_i}{bq_i} \right) \right)^{\frac{1}{(1+\rho q_i)}}$$

CET for non-export equation ($CET2_i$)

$$X_i = D_i$$

Revenue maximization (MAXREV$_i$)

$$E_i = D_i \left(\left(\frac{PE_i}{PD_i(1 - tdom_i - TTD_i - impf_i)} \right) \left(\frac{bx_i}{1 - bx_i} \right) \right)^{\frac{1}{(1 - \rho x_i)}}$$

Supply of intermediate inputs equation (INTQEQ$_i$)

$$INTQ_i = \sum_j \left(aad_{i,j} DINTM_i + aad_{i,j} FINTM_i \right)$$

Total TTM equation (TTMEQ$_i$)

$$TTM_i = DTTM_i + FTTM_i$$

Total TTMX equation (TTMXEQ$_i$)

$$TTMX_i = ttx_i \sum_j TTM_j$$

1.2. Price Block (11 equations)

Equation (7) *- Domestic price of exported commodities (PEDEF$_i$)*

$$PE_i = PWE_i \frac{EXR}{(1 + te_i - psube_i)}$$

Equation (8) *- Domestic price of imported commodities (PMDEF$_i$)*

$$PM_i = PWM_i\, EXR\, (1 + tm_i - psubm_i + ttf_i)$$

Equation (9) *- Absorption (the value of Armington Composite Goods)*

$$Q_i\, PQ_i = D_i\, PD_i + M_i\, PM_i$$

Equation (10) *- The value of domestic output (SALES$_i$)*

$$X_i\, PX_i = D_i\, PD_i(1 - tdom_i - ttd_i - impf_i) + E_i\, PE_i + SUB_i$$

Equation (11) *- The price of sectoral capital goods (PKDEF$_i$)*

$$PK_i = \sum_j PQ_j \left[cap_{j,i} \right]$$

Equation (12) *- The price of value added (ACTP$_i$)*

$$PV_i = \frac{(X_i\, PX_i - PINTM_i\, INTM_i)}{VA_i}$$

Equation (13) *- The price of domestically produced intermediate inputs (PDINTDEF$_i$)*

$$PDINTM_i = \sum_j aad_{j,i}\, PQ_j$$

Equation (14) *- The price of imported intermediate inputs (PFINTDEF$_i$)*

$$PFINTM_i = \sum_j aaf_{j,i}\, PQ_j$$

Price of Intermediate Composite (PINTDEF$_i$)

$$PINTM_i = \frac{\big((PDINTM_i\ DINTM_i) + (PFINTM_i\ FINTM_i)\big)}{INTM_i}$$

Weight on prices equation (WTQEQ$_i$)

$$wtq_i = \frac{Q_i}{\sum_j Q_j}$$

Price Index (PINDEXDEF)

$$Pindex = \frac{GDP}{RGDP}$$

1.3. Income Block (5 equations)

Equation (15) - *Factor income (YFEQ$_f$)*

$$YF_f = \sum_i \big(WF_f\ wfdist_{i,f}\ factd_{i,f}\big) + \sum_{fr} YFROW_{f,fr}$$

Equation (16) - *Government income (GINCOME$_{gin}$)*

$$Gincome_{gin} = \sum_f \big(factoin_{gin,f}\ YF_f\big) + \sum_{in2} ITRAN_{gin,in2}$$
$$+ \Big(gishr_{gin} \sum_i (Indtax_i + Tariff_i)\Big)$$

Equation (17) - *Non-government domestic income (DINCOME$_{ngi}$)*

$$Dincome_{ngi} = \sum_f \big(factoin_{ngi,f}\ YF_f\big) + \sum_{in2} ITRAN_{ngi,in2}$$

Equation (18) - *Foreign income (FINCOME$_{fr}$)*

$$Fincome_{fr} = \sum_f \big(factoin_{fr,f}\ YF_f\big) + \sum_{in2} ITRAN_{fr,in2}$$
$$+ \Big(mishr_{fr} \sum_i (PWM_i\ EXR\ M_i)\Big)$$

*Equation (19) - *Direct taxes (DTAXEQ$_{gin,din}$)*

$$Dirtax_{gin,din} = dtax_{gin,din}\ INC_{din}\ \boldsymbol{taxfact_{gin,din}}$$

A new parameter for extra tax revenue collection from tax amnesty are introduced in the GAMS IDE codes:

```
*## Tax Amnesty's Extra Tax Revenue Parameters
taxfact(gin,din)  TAX FACTOR
```

The following figures show the GAMS codes for the shocks that come from the collection of extra tax revenues from tax amnesty program:

```
*## SCENARIO 1:NO TAX AMNESTY POLICY
taxfact(gin,din)=taxfact(gin,din)*1.036;
```

```
*## SCENARIO 2: TAX AMNESTY / NON-TARGETED ##
taxfact(gin,din)=taxfact(gin,din)*1.145;
```

```
*## SCENARIO 3: TAX AMNESTY / TARGETED / CORPORATIONS ##
*$ontext
taxfact(gin,din)=taxfact(gin,"HHH1")*1.036;
taxfact(gin,din)=taxfact(gin,"HHH2")*1.036;
taxfact(gin,din)=taxfact(gin,"HHH3")*1.036;
taxfact(gin,din)=taxfact(gin,"HHH4")*1.036;
taxfact(gin,din)=taxfact(gin,"GOV1")*1.036;
taxfact(gin,din)=taxfact(gin,"FIN1")*1.036;
taxfact(gin,din)=taxfact(gin,"FIN2")*1.203;
taxfact(gin,din)=taxfact(gin,"FIN3")*1.203;
taxfact(gin,din)=taxfact(gin,"FIN4")*1.203;
*$offtext
```

```
*## SCENARIO 4: TAX AMNESTY / TARGETED / RICH AND CORPORATIONS ##
*$ontext
taxfact(gin,din)=taxfact(gin,"HHH1")*1.036;
taxfact(gin,din)=taxfact(gin,"HHH2")*1.174;
taxfact(gin,din)=taxfact(gin,"HHH3")*1.036;
taxfact(gin,din)=taxfact(gin,"HHH4")*1.174;
taxfact(gin,din)=taxfact(gin,"GOV1")*1.036;
taxfact(gin,din)=taxfact(gin,"FIN1")*1.036;
taxfact(gin,din)=taxfact(gin,"FIN2")*1.174;
taxfact(gin,din)=taxfact(gin,"FIN3")*1.174;
taxfact(gin,din)=taxfact(gin,"FIN4")*1.174;
*$offtext
```

1.4. Expenditure Block (15 equations)

Equation (20) - Household expenditure (HEXPEQ$_h$)

$$EXP_h = YCons_h + \sum_{gin} Dirtax_{gin,h} + \sum_{ngi} ITRAN_{ngi,h} + \sum_{fr} ITRAN_{fr,h}$$

Equation (21) - Household consumption behavior (YCONEQ$_h$)

$$YCons_h = \left(INC_h - \sum_{gin} Dirtax_{gin,h} \right)(1 - mps_h)$$
$$- \left(\sum_{ngi} ITRAN_{ngi,h} + \sum_{fr} ITRAN_{fr,h} \right)$$

Equation (22) - Government expenditure (GEXPEQ$_{gin}$)

$$EXP_{gin} = ggshr_{gin}\left(\sum_i (GD_i PQ_i) + \sum_i (SUB_i + SUBE_i + SUBM_i)\right) + \sum_{in} ITRAN_{in,gin}$$

Equation (23) - Non-government expenditure (OEXPEQ$_{nno}$)

$$EXP_{nno} = \sum_{in} ITRAN_{in,nno}$$

Equation (24) - Foreign expenditure (REXPEQ$_{fr}$)

$$EXP_{fr} = ershr_{fr}\sum_i (PWE_i\, EXR\, E_i) + \sum_f YFROW_{f,fr} + \sum_{in} ITRAN_{in,fr}$$

Equation (25) - Private domestic investment (DOMINVEQ$_{i,fin}$)

$$INV_{i,fin} = VA_i^{\lambda1_i}\lambda0_{i,fin}(1 + avgRN)^{\lambda2_i}$$

Average Interest Rate (AVGREQ)

$$avgRN = \frac{\sum_{as}\sum_{in} RN_{as} AssetSLag_{as,in}}{\sum_{as}\sum_{in} AssetSLag_{as,in}}$$

Equation (26) - Investment by origin (IDEQ$_i$)

$$ID_i = \sum_j DK_j[cap_{i,j}]$$

Equation (27) - Investment by destination (DKEQ$_i$)

$$DK_i PK_i = kshr_i(INVEST)$$

Investment Equation (INVESTEQ)

$$INVEST = \sum_i \sum_{in} INV_{i,in}$$

Domestic savings (SAVEQ$_{din}$)

$$SAV_{din} = INC_{din} - EXP_{din}$$

Foreign savings (SAVFQ$_{fr}$)

$$SAV_{fr} = INC_{fr} - EXP_{fr}$$

Savings equation (SAVINGEQ)

$$Saving = \sum_{in} SAV_{in}$$

ROW saving equation (ROWSAV)

$$FSAV.EXR = \sum_{fr} SAV_{fr}$$

Consumption demand (CDEQ$_i$)

$$CD_i = \frac{\sum_h \alpha q_{i,h} \, YCONS_h}{PQ_i}$$

1.5. Market Clearing Block (3 equations)

Equation (28) - Equilibrium in goods market (EQUIL$_i$)

$$Q_i = INTQ_i + CD_i + GD_i + ID_i + \frac{ttmX_i}{PQ_i}$$

Equation (29) - Equilibrium in capital market (FMKTEQ$_f$)

$$FS_f = \sum_i factd_{i,f}$$

Equation (30) - Equilibrium in labor market (FLABEQ)

$$LS = (1 + UEMPR) \sum_{fl} FS_{fl}$$

1.6. GDP Block (2 equations)

Equation (31) - GDP based on VA (GDPY)

$$GDP = \sum_i (VA_i PV_i + Indtax_i + Tariff_i - SUB_i - SUBM_i)$$

Equation (32) - Real GDP (GDPR)

$$RGDP = \sum_i \left(Cd_i + Gd_i + Id_i + \sum_i E_i - \sum_i M_i(1 - Tmreal0_i) \right)$$

1.7. Distortion Block (7 equations)

TTM domestic (DTTMEQ$_i$)

$$DTTM_i = TTD_i \, PD_i \, D_i$$

TTM import (FTTMEQ$_i$)

$$DTTM_i = ttf_i \, PWM_i \, EXR. M_i$$

Indirect tax (ITAXEQ$_i$)

$$Indtax_i = tdom_i \, PD_i \, D_i$$

Tariffs (TRIFEQ$_i$)

$$Tariff_i = tm_i \, PWM_i \, EXR. M_i$$

Imperfect substitution (IMPERQ$_i$)

$$Imperfect_i = impf_i \, PD_i \, D_i$$

Export subsidy (SUBEQ$_i$)

$$SUBE_i = psube_i \, PE_i \, E_i$$

Import subsidy (SUBMQ$_i$)

$$SUBM_i = psubm_i \, PWM_i \, EXR.M_i$$

1.8. Transfer Block (4 equations)

Equation (33) - Total institutional transfers (ITRANEQ$_{in,in2}$)

$$ITRAN_{in,in2} = GTRAN_{in,in2} + RTRAN_{in,in2} + OTRAN_{in,in2}$$

Domestic institutions' transfer to government (GTRANEQ$_{gin,din}$)

$$GTRAN_{gin,din} = Dirtax_{gin,din}$$

Return of financial assets transferred to household (RTRANEQ$_{h,in2}$)

$$RTRAN_{h,in2} = RNshare_h \sum_{asrn} \left(RN_{asrn} \, LiabSLag_{in2,asrn}\right)$$

Share for financial returns transfer (RNShrEQ$_{in}$)

$$RNshare_{in} = \frac{\sum_{asrn}\left(RN_{asrn} \, AssetSLag_{asrn,in}\right)}{\sum_{asrn}\sum_{in2}\left(RN_{asrn} \, AssetSLag_{asrn,in2}\right)}$$

1.9. Financial Block (7 equations)

Equation (34) - Total savings and investments

$$TSAVING = wealth_{in} + \sum_{as} LiabS_{in,as}$$

$$TINVEST = fixAs_{in} + \sum_{as} AssetS_{as,in}$$

Equation (35) - Institution's asset balance (AsINBAL$_{in}$)

$$TSAVING = TINVEST$$

Equation (36) - Asset at the end of period (current balance) (AssetSQ$_{as,in}$)

$$AssetS_{as,in} = AssetSLag_{as,in} + Asset_{as,in}$$

liability at the end of period (LiabSQ$_{in,as}$)

$$LiabS_{in,as} = LiabSLag_{in,as} + Liab_{in,as}$$

Fixed investment flow (FixAQ$_{in}$)

$$fixA_{in} = \sum_{i} INVES_{i,in}$$

Fixed investment stock-flow (FixASQ$_{in}$)

$$fixAS_{in} = fixA_{in} + fixASLag_{in}$$

Wealth flow (WEALFQ$_{in}$)

$$WEALF_{in} = SAV_{in}$$

Wealth stock-flow (WealthQ$_{in}$)

$$Wealth_{in} = WEALF_{in} + WealthLag_{in}$$

1.10. C & D Block (16 equations)

Equation (37) - Allocation behavior (AST1AQ$_{ast1,in}$)

$$AssetS_{ast1,in} = \theta 1_{ast1,in} \left(\frac{rn_{ast1}}{rn0_{ast1}} \right)^{\sigma 1_{ast,in}}$$

*Allocation behavior (AST1SH$_{in,ast1}$)

$$LiabS_{in,ast1} credfact_{in,ast1} = ast1shr_{in,ast1} \left(\sum_{in2} AssetS_{ast1,in2} \right)$$

Two new parameters for asset repatriation are introduced in the GAMS IDE codes:

```
*## Allocation of Repatriated Asset Parameter
credfact(in,ast1)
gbondfact(gin,aste)
```

The following figure shows the GAMS codes for the shock that come from the allocation of repatriated asset to financial instruments in the form of loans:

```
*#####Allocation of Repatriated Asset Shock#######

*Working Capital Loans
credfact(din,"FINA10")=credfact(din,"FINA10")*1.4;
*Investment Credits
credfact(din,"FINA11")=credfact(din,"FINA11")*1.2;
*Consumption Credits
credfact(din,"FINA12")=credfact(din,"FINA12")*1.3;
```

Allocation behavior (AST2AQ$_{in,ast2}$)

$$LiabS_{in,ast2} = \theta 2_{in,ast2} \left(\frac{rn_{ast2}}{rn0_{ast2}} \right)^{\sigma 2_{ast2,in}}$$

Allocation behavior (AST2SH$_{ast2,in}$)

$$AssetS_{ast2,in} = ast2shr_{ast2,in} \left(\sum_{in2} LiabS_{in2,ast2} \right)$$

*Allocation behavior (ASTEEQ$_{aste}$)

$$LiabS_{GOV1,aste} gbondfact_{GOV1,aste} = \theta 2_{GOV1,aste} \left(\frac{rn_{aste}}{rn0_{aste}} \right)^{\sigma 2_{GOV1,aste}}$$

The following figure shows the GAMS codes for the shock that come from the allocation of repatriated asset to financial instruments in the form of loans and government bond:

```
*#####Allocation of Repatriated Asset Shock#######

*Working Capital Loans
credfact(din,"FINA10")=credfact(din,"FINA10")*1.4;
*Investment Credits
credfact(din,"FINA11")=credfact(din,"FINA11")*1.2;
*Consumption Credits
credfact(din,"FINA12")=credfact(din,"FINA12")*1.3;

*Government Bonds
gbondfact(gin,"FINA7")=gbondfact(gin,"FINA7")*1.1;
```

Allocation behavior (ASTQEQ$_{astq}$)

$$\sum_{in} LiabS_{in,astq} = \sum_{in} AssetS_{astq,in}$$

Composite interest rate (RNAEQ$_{in}$)

$$RNA1_{in} = \frac{\left(\sum_{asdp} rn_{asdp} AssetSLag_{asdp,in}\right)}{\left(\sum_{asdp} AssetSLag_{asdp,in}\right)}$$

$$RNA2_{in} = \frac{\left(\sum_{asgb} rn_{asgb} AssetSLag_{asgb,in}\right)}{\left(\sum_{asgb} AssetSLag_{asgb,in}\right)}$$

$$RNA3_{in} = \frac{\left(\sum_{assec} rn_{assec} AssetSLag_{assec,in}\right)}{\left(\sum_{assec} AssetSLag_{assec,in}\right)}$$

$$RNA4_{in} = \frac{\left(\sum_{ascr} rn_{ascr} AssetSLag_{ascr,in}\right)}{\left(\sum_{ascr} AssetSLag_{ascr,in}\right)}$$

$$RNA5_{in} = \frac{\left(\sum_{aseq} rn_{aseq} AssetSLag_{aseq,in}\right)}{\left(\sum_{aseq} AssetSLag_{aseq,in}\right)}$$

FOREX reserves (FINA1EQ$_{asfxr}$)

$$AssetS_{asfxr,FIN1} = LiabS_{ROW1,Asfxr}$$

Money demand (MONEYD$_{in}$)

$$MD_{in} = \alpha1_{in} \left(INC_{in}{}^{\alpha2_{in}}\right)\left(rnv1_{in}{}^{-\alpha3_{in}}\right)$$

Composite interest rate except money (RNV1EQ$_{in}$)

$$rnv1_{in} = \frac{\left(\sum_{nasmd} rn_{nasmd} AssetSLag_{nasmd,in}\right)}{\left(\sum_{nasmd} AssetSLag_{nasmd,in}\right)}$$

Money demand portfolio (MDEQ$_{asmd,in}$)

$$AssetS_{asmd,in} = mdshare_{asmd,in} MD_{in}$$

Money demand portfolio (MSSHR$_{in,asmd}$)

$$LiabS_{in,asmd} = mdshr_{in,asmd} \left(\sum_{in2} AssetS_{asmd,in2}\right)$$

2. LIST OF VARIABLES

2.1. Core Computable General Equilibrium Variables

X_i	Initial Domestic Output
VA_i	Initial Value-Added
$INTM_i$	Initial Intermediate Composite
$DINTM_i$	Initial Domestic Intermediate Input
$FINTM_i$	Initial Imported Intermediate Input
Q_i	Initial Composite Good Quantity
D_i	Initial Domestic Good Sold Domestically
M_i	Initial Import Quantity
E_i	Initial Export Quantity
PX_i	Initial Price of X
PV_i	Initial Price of Value-Added
$PINTM_i$	Initial Price of Intermediate Composite
$PDINTM_i$	Initial Price of Domestic Intermediate Input
$PFINTM_i$	Initial Price of Foreign Intermediate Input
PQ_i	Initial Price of Composite Goods Q
PD_i	Initial Price of Domestic Good Sold Domestically
PM_i	Initial Price of Import Quantity
PE_i	Initial Price of Export Quantity
PWM_i	Initial World Price of Imports
PWE_i	Initial World Price of Exports
$Pindex$	Initial Price Index
EXR	Initial Exchange Rate
TTM_i	Initial Trade & Transport Margin (Paid)
$DTTM_i$	Initial Trade & Transport Margin on Domestic (Paid)
$FTTM_i$	Initial Trade & Transport Margin on Import (Paid)
$TtmX_i$	Initial Trade & Transport Margin (Received)
TTD_i	Domestic Trade and Transport Margins
$INTQ_i$	Initial Supply of Intermediate Goods or Services
CD_i	Initial Private Consumption Demand
GD_i	Initial Govt Consumption Demand
ID_i	Initial Investment Demand
GDP	Initial GDP
$RGDP$	Initial Real GDP
wtq_i	Weight for Consumer Price Index
$TMREALV_i$	Transport & Trade Margin Real Terms Initial Value
YF_f	Initial Factor Income
$Factd_{i,f}$	Initial Factor Demand

WF_f	Initial Factor Price
$Wfdist_{i,f}$	Initial Factor Price Sectoral Proportion Ratios
$Wages_i$	Initial Sectoral Wage
PDL_i	Initial Sectoral Average Productivity
FS_f	Initial Factor Supply
$LSUP$	Labor Supply (Total)
$UEMP$	Unemployment (Total)
$UEMPR$	Unemployment Rate
$YFROW_{f,fr}$	Domestic's Earning Abroad (ROW-to-Factors) in Foreign Currency
$ITRAN_{in,in2}$	Initial Institutional Transfers (Total)
$GTRAN_{in,in2}$	Initial Institutional Transfers (to Government or Direct Tax)
$RTRAN_{in,in2}$	Initial Institutional Transfers (Financial Returns)
$OTRAN_{in,in2}$	Initial Institutional Transfers (Others)
INC_{in}	Institution's Revenue
EXP_{in}	Institution's Expenditure
SAV_{in}	Institution's Saving
$FSAV$	Initial ROW Saving in Foreign Currency
$YCons_h$	Initial Consumption by Households
MPS_h	Initial Households' Marginal Propensity to Save
$Indtax_i$	Initial Total Indirect Tax
$Tariff_i$	Initial Tariff
$Imperfect_i$	Initial Imperfect Competition Distortion
SUB_i	Initial Sectoral Subsidy
$SUBE_i$	Export Subsidy
$SUBM_i$	Import Subsidy
$DIRTAX_{gin,din}$	Initial Direct-Income Tax
$SAVING$	Initial Total Saving
$INVEST$	Initial Total Investment
PK_i	Initial Price of Capital by Sector of Destination
DK_i	Initial Quantity of Capital by Sector of Destination
$INV_{i,in}$	Private Domestic Investment
$TOTEXQ$	Total Export Quantity
$TOTIMQ$	Total Import Quantity
$TRADEBAL$	Total Trade Balance ($TOTEXQ - TOTIMQ$)
$TRADEBALS_i$	Trade Balance ($E_i - M_i$)
$YDistRU$	Income Distribution between Rural and Urban Dwellers
$YDistLH$	Income Distribution between the Poor and the Rich

2.2. Financial Module's Variables

$TAssetS_{in}$	Total Asset Stock Value
$AssetS_{as,in}$	Asset Stock Value (end-of-period)
$Ashare_{as,in}$	Share of Asset Stock Value
$FixAS_{in}$	Fixed Asset Stock Value (end-of-period)

$TLiabS_{in}$	Total Liability Stock Value
$LiabS_{in,as}$	Liability Stock Value (end-of-period)
$Lshare_{in,as}$	Share of Liability Stock Value
$AssetSLag_{as,in}$	Asset Stock Value (beginning-of-period)
$FixASLag_{in}$	Fixed Asset Stock Value (beginning-of-period)
$LiabSLag_{in,as}$	Liability Stock Value (beginning-of-period)
$Wealth_{in}$	Wealth Stock Value (end-of-period)
$WealthLag_{in}$	Lag of Wealth Stock Value
$Asset_{as,in}$	Asset (Flow) Value
$FixA_{in}$	Fixed Asset (Fixed Investment)
$Liab_{in,as}$	Liability (Flow) value
$WEALF_{in}$	Flow of Wealth
PS_{as}	Price of Asset
$PSLag$	Price of Asset in the Last Period
RN	Asset's Rate of Return
$RNLag$	Lag of Asset's Rate of Return
$RNshare_{in}$	Share of Assets in Institution
$avgRN$	Average Interest Rate
MD_{in}	Money Demand
$rnv1_{in}$	Average Interest Rate #1 (Non-Money)
$mult$	Total Money Demand
rm	Total Asset and Liability
$m2s$	Money Supply
$TTLiabS_{as}$	Total Liability Stock
$TTAssetS_{as}$	Total Asset Stock
$RNA1_{in}$	Composite Interest Rate 1
$RNA2_{in}$	Composite Interest Rate 2
$RNA3_{in}$	Composite Interest Rate 3
$RNA4_{in}$	Composite Interest Rate 4
$RNA5_{in}$	Composite Interest Rate 5
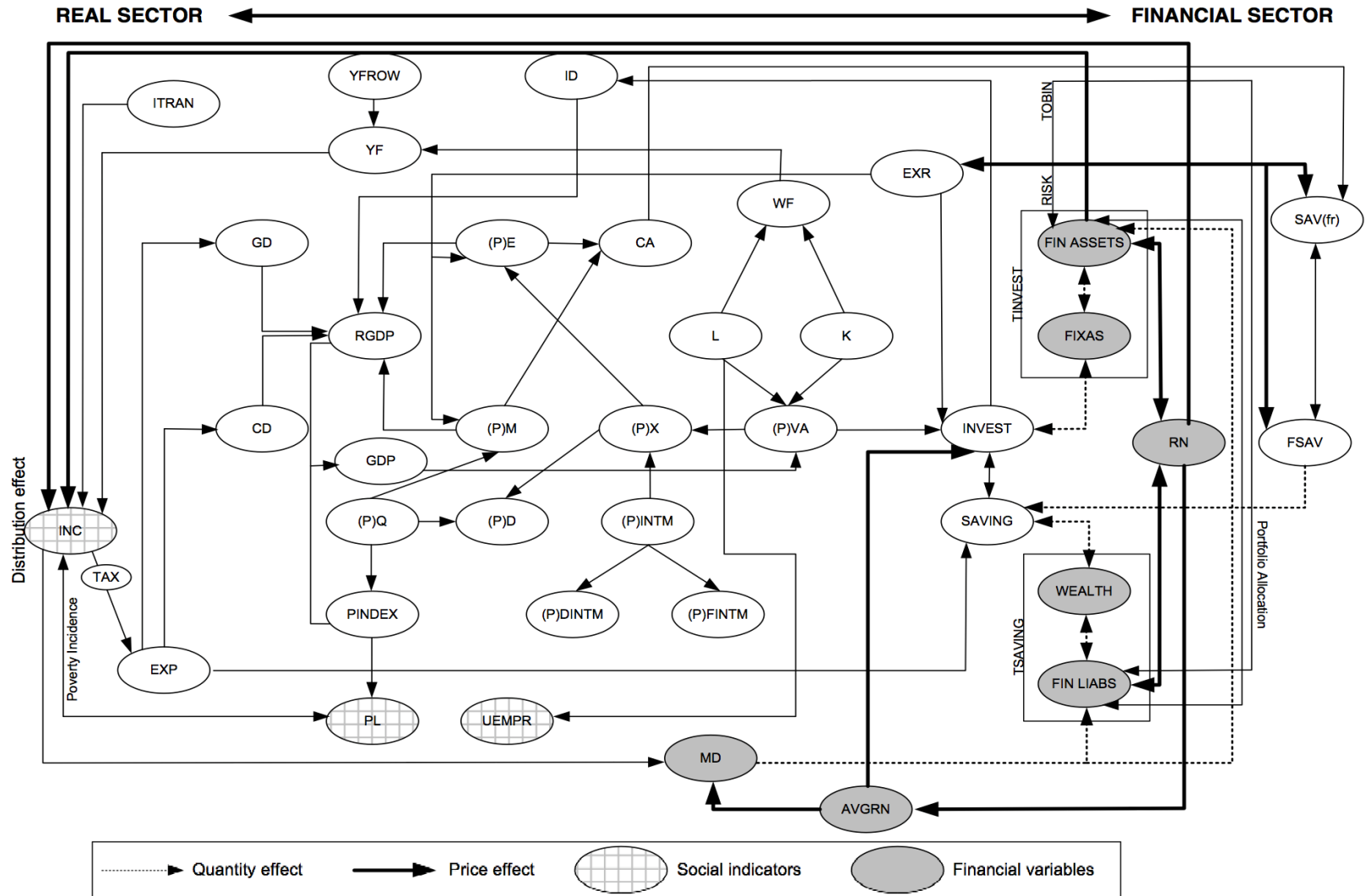
Figure 17 - Interlocked System of FCGE Variables

Source: Azis (2014)

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