Global Trade Analysis Project
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This paper is from the
GTAP Annual Conference on Global Economic Analysis
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Modeling the importance of financial liberalization to Indonesia's economic growth

By Krisna Gupta

Indonesia has been struggling to return to its pre-Asian Financial Crisis growth level. The latest development roadmap, dubbed "Making Indonesia 4.0", aims to exploit high-tech manufacturing to pursue an export-oriented growth. The government, realizing the needs for external finance as well as technology, is trying to formulate more liberalized investment policies, both on the portfolio investment and direct investment, while also controling the risk premia that may be associated with financial liberalization. This paper examines the mechanisms afforded by the policies to, among other things, improve access to finance and encourage productivity growth through more effective matching of labor and capital, as well as attaining global best practices. Drawing on comparative information on the cost of capital in Indonesia, the result suggests effective reform could deliver substantial economic gains, raising living standards in Indonesia. The potential gains to the Indonesian economy are illustrated using a version of the GTAP model extended to model possible changes in the cost of capital in the standard version of the model. The results provide an indication of the substantial potential economic benefits that could accrue to the Indonesian economy through successful implementation of the roadmap.

Keywords: financial liberalization, cost of capital, risk premia.

1. Introduction

It is getting harder for Indonesia to reach the level of economic growth achieved prior to the 1997 Asian Financial Crisis (Resosudarmo and Abdurohman, 2018). Many development plans have been launched, with the latest being a new development plan called 'Making Indonesia 4.0'. This plan intends to exploit technology to boost Indonesia's manufacturing growth. It is also an export-led growth plan that seeks to generate an overall trade account surplus. With full implementation, GDP is projected to increase to reach 2% GDP growth higher than the baseline. The plan concentrates to develop 5 industry sectors, namely the food and beverage, textile and apparel, automotive, electronics, and chemical (Ministry of Industry, 2018).

Given its ambitious goals, the plan is optimistic. Indonesia is not at the frontier country when it comes to the take-up of new technology. In terms of readiness for the future of production, Indonesia is ranked by the World Economic Forum in the "nascent" position, which is the lowest of four categories (A. T. Kearney Incorporated, 2018). The score of Indonesia's readiness is behind that of its neighbors such as Malaysia and Thailand, while comparable to Vietnam's. For Indonesia to be successful in implementing new technology in its manufacturing sectors, effective national economic reform is needed.

One is financial market liberalization. Effective financial market liberalization could help to reduce the saving gap between actual and potential saving in Indonesia, provide the country with more abundant capital to enhance growth, and improve the matching of capital with labor (Gretton, 2016; McKibbin, 1999). The capital-to-sector matching will also be improved if impediments to efficient invest in different sectors are lowered and equal treatment is afforded across industries. More investment is associated with technological spillover and export upgrading (Harding and Javorcik, 2012). Empirical evidence also suggests that foreign ownership in Indonesian firms correlates with above-average productivity performance and are more resilient against financial crises (Goeltom, 1995; Poczter et al., 2014).

Indeed, the intention to invite foreign investment is stated in the Making Indonesia 4.0 plan. The government admits the need for more capital, which cannot be provided by Indonesia's current saving rate alone. The plan, however, lacks the means to do so, and does not provide a quantitative projection on how much foreign investment it needs to attract to reach its goal. This is what this study aims to supply.

This paper first explores the substantial literature on Indonesia's historical experience with financial market liberalization, especially during the banking deregulation in the 1980s. The room for a more liberalized regime of financial openness is then explored, and then applied to a Computable General Equilibrium (CGE) model to give projections of a range over which Indonesia's economy could fare with effective economic reform. Lastly, the modelling results are discussed to conclude what realistic outcomes could be expected from effective reform and some policy changes that could help Indonesia reach its productive potential.

2. Financial liberalization in Indonesia

The argument about financial liberalization goes back to Schumpeter (1934), who state the importance of the distribution of capital to economic development. Shaw (1973) and McKinnon (1973) further add to the debate suggesting then controlled financial markets leads to an excess demand for investment and inefficient allocation of credit. This insight was very influential for many

economic institutions at that time, most notably the IMF and World Bank (Goeltom 2008).

While the argument for financial liberalization has dominated for a long time, it gets challenged. Financial liberalization by itself seems to have very weak link with growth (Stiglitz 2000, Bumann et al. 2013). The evidence from Sub-Saharan African Countries even suggests that financial liberalization seems to lead to smaller growth, unless accompanied with strong institutions (Ahmed 2012). Moreover, Stiglitz (2000) shows that financial liberalization has a strong, negative relationship with stability. He argues that a free financial market by itself is a "pro-cyclical policy", where banks throw money when business is good, and hesitate to lend when the economic situation is dire. Stiglitz (2000) adds that it is hard to imagine entrepreneur invest in a long-term project from a short-term source of fund. This seems to be the case for at least Argentina, Mexico and Turkey, where in the exposure to financial liberalization, firms tend to favor portfolio investment over fixed investment (Demir 2009).

The financial market also suffers from an asymmetric information problem (Stiglitz 2000). Goeltom (2008) suggests that under perfect information, supply of funds is inelastic at the interest rate level, regardless of the demand for capital. However, under asymmetric information, lenders observe borrower internal funds as a proxy for how good the lender is. The higher the external funds requested relative to lender's internal funds, the higher premia the borrower face. This particularly problematic especially during crisis times, when typically, currency lost its value, hence reducing borrower net worth (Goeltom 2008). This is exactly the pro-cyclical argument provided by Stiglitz (2000).

Indonesia's economic history is highly influenced by commodity prices such as the oil boom in the 70s and the commodity boom during the mid-2000s (Hill, 2018; Shrestha and Coxhead, 2018). Moreover, the economic reform in Indonesia has in many occasions followed a pattern whereby economic restrictions were increased during boom times and loosened during the poor global condition (Patunru and Rahardja, 2015).

The story of Indonesia's financial liberalization is no exception. During the oil boom during the 70s, Indonesia's banking sector was characterized as similar to that of a "financially repressed system" (Goeltom, 1995). Things were starting to change in 1983, where the government embarked on a program of banking deregulation, with measures including the ability to set its own interest rate for state banks, credit ceiling eradication, and allowing for lower credit ceilings (Goeltom, 1995). The financial deregulation reform was advanced again in 1988 through early 90s, which had a much bigger impact than that in 1983 (Goeltom, 1995). These series, however, happened at the same time with a more intense cronyism economy, which later lead to the fall of Suharto, the 32 years ruling president, following the 1997 Asian Financial Crisis (Patunru and Rahardja,

2015). The complete policy timing and Indonesia's GDP relative to that of the U.S., taken from Patunru and Rahardja (2015), is shown in figure 1.
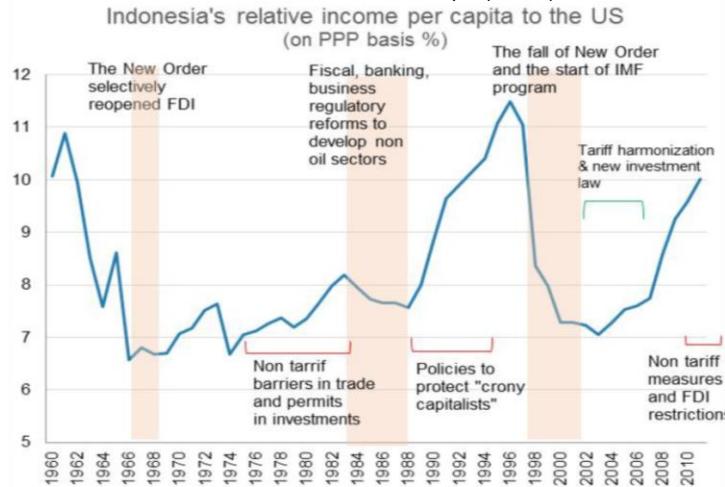

Figure 1. Indonesia's GDP with broad policy timing, 1960 - 2010

Source: Patunru and Rahardja, 2015

Figure 2 shows the movement of Indonesia's investment in its balance of payments. The Asian Financial Crisis (AFC) in 1998 drives Indonesia's financial account to the negative side. The fall of Soeharto and the IMF recovery program enabled Indonesia's financial account to be in somewhat a better shape, but it was not until the Great Financial Crisis (GFC) in 2008 when Indonesia saw a new level of capital account. The post GFC timeframe is also when Indonesia's capital account becomes much more volatile.
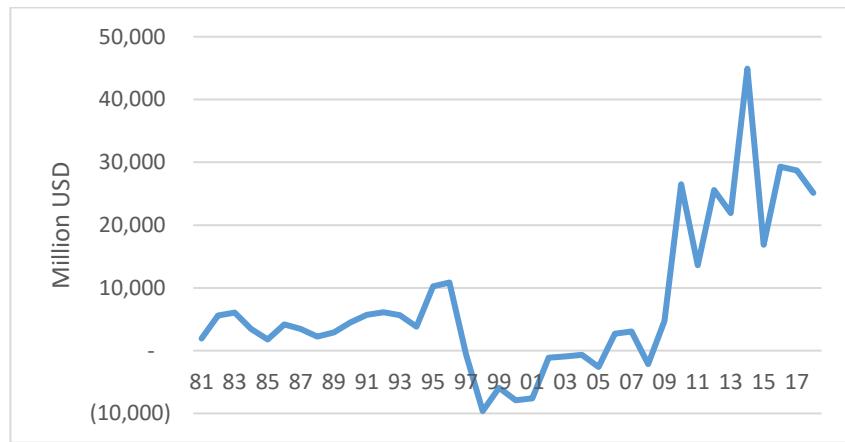

Figure 2. Financial Account, Balance of Payment of Indonesia, 1981 – 2018, current USD

Source: IMF and Bank Indonesia

Figure 3 displays a deeper detail on Indonesia's financial account, by breaking it down to three categories: foreign direct investment (FDI), portfolio investment, and other investment. It is interesting to see that Indonesia's financial account was dominated by other investment up until the early 1990s. Other investment, according to Bank Indonesia's metadata, is essentially private and public loans and other liabilities, including trade credit. Data do not allow for pre-1981 financial account visualization, but it seems as though the high "other investment" driven of positive financial account can possibly be attributed to the banking deregulation.
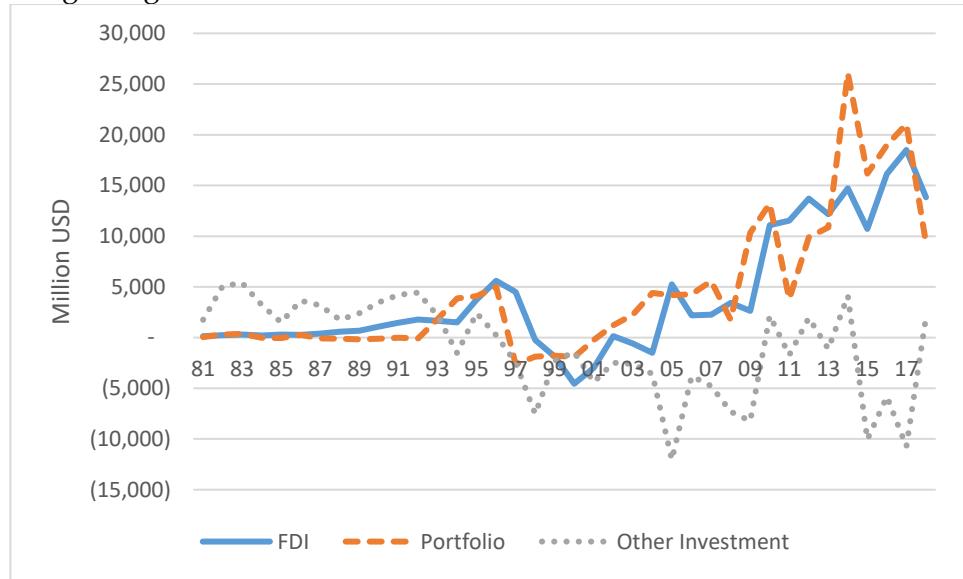

Figure 3. Indonesia's Financial Account Breakdown, 1981 – 2018, current USD

Source: IMF and Bank Indonesia

By 1993, the role of other investment was reversed, making FDI and portfolio investment more important contributor to financial account inflows. The increase of portfolio investment, though, was smaller than FDI in the early 1990s. Portfolio and other investment arguably have a higher post-GFC volatility on Indonesia's financial account than FDI.

Another story that is important with regard to capital account movement is Foreign Direct Investment (FDI). FDI is crucial to shrinking the domestic saving gap and even more important to encouraging technological transfer in manufacturing and other industries in Indonesia, and can be especially important to a country where bank loans remains the highest source of capital (Kohpaiboon, 2006; Lindblad, 2015). However, the story of Foreign Direct Investment (FDI) in Indonesia follows an even rougher pattern compared to the banking deregulation.

Lindblad (2015) divides Indonesia's FDI story into three different time-ranges. The first range is 1966 to 1982, which marks the first half of Soeharto's 32 years of leadership. Soeharto's leadership. Soeharto allows FDI to flow into Indonesia, albeit bottlenecked. During this first time-range, FDI went mostly to the mining industry and was dominated by U.S.' investment. Malari incident in 1976 reduced Indonesia's attractiveness to FDI.

The second time-range spans between 1983 up to three years after the Asian Financial Crisis (AFC). Following the end of the oil boom, Indonesia was forced to switch to export diversification. Manufacturing expanded rapidly, with FDI's domination switching from being U.S.-dominated to Asia-dominated, and in particular, Japan. The AFC only increased Indonesia's liberalization, marked by the government allowing was 99% of foreign ownership in banks (Lindblad, 2015).

The third time-range, according to Lindblad (2015), starts from 2001 to the current time, the democracy era. The risk of investing in Indonesia increased due to uncertainty in regulation and decentralization. Until recently, even though Indonesia's FDI has grown, it is still below the growth of its neighboring countries, particularly Vietnam and India (Resosudarmo and Abdurohman, 2018).

Figure 4 shows Indonesia's historical FDI inflow, which provides a somewhat different story. The level of FDI in Indonesia doesn't change much before 1990. There is a spike in 1975 that goes down directly in 1976, which could be a corroboration to the Malari incident, but the scale is miniscule compared to 1990 onwards. The pattern of Indonesia's FDI after 1990 changes drastically with a much bigger inflow of FDI, especially after the Global Financial Crisis (GFC) in 2008. Additionally, the FDI pattern during this time period follows the trend of Indonesia's income shown in figure 1 quite closely.
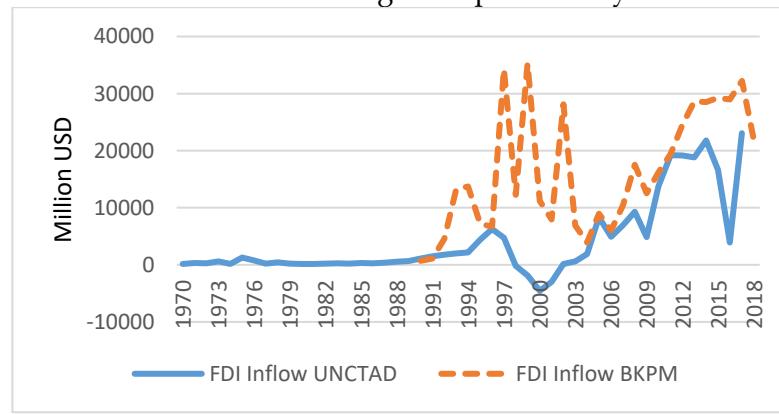

Figure 4. FDI Inflow in Indonesia, 1970 – 2018 in current USD

Source: UNCTAD, BKPM

6

Another interesting point from figure 4 is the discrepancy between UNCTAD data with the data compiled by Badan Kebijakan Penanaman Modal (BKPM), the body that regulates FDI in Indonesia. As we can see from the chart, there are very noticeable differences between the two FDI data series. UNCTAD data corroborates with Bank Indonesia's FDI data, which is taken from the balance of payments. The data coming from BKPM is, however, an approved list of the planned FDI. This means the discrepancy can potentially be the unrealized planned FDI, which can reflect Indonesia's uncertainty to the investor (Lindblad, 2015).

The more focused, extensive study of Indonesia's risk with FDI is the one conducted by Magiera (2011). With the new investment law introduced in 2007, Indonesian government tried to streamline its FDI policy under BKPM. The law allows for no limitation on FDI, except for sensitive industries under a negative investment list (DNI). This law however, quickly became uncoordinated as many regulatory interests related to different industries also brought in a law, that control FDI in their respective industries, particularly in logistics, education, health and telecommunications. (Magiera, 2011).
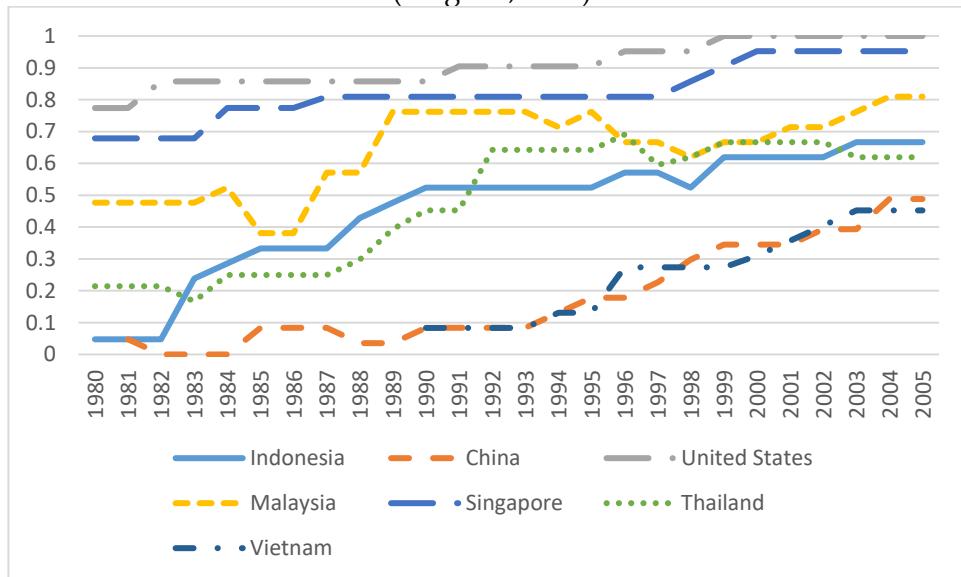
Figure 5. Financial Reform Index, 7 selected economies, 1980 - 2005

Source: Abiad et al., 2005

Overall, Indonesia has progressed quite significantly since the first banking deregulation. Figure 5 shows the index of financial reforms from 1980 to 2005 of 7 selected countries. As observed, the notable increase of the financial reform index of Indonesia happened in 1983 and 1988, corresponding to a period of banking deregulation. Prior to the end of 1980s, Indonesia did not get a big increase. The fastest increase in the liberalization in Indonesia is indeed coming

7

from the banking deregulation such as relaxation of the credit ceiling and interest rate controls. The slowest are privatization and international capital inflow. The data stops in 2005, which restrict us from seeing the picture painted by the FDI law in 2007.

According to this index, Indonesia's financial reform is comparable with Thailand and Malaysia, and freer than that of Vietnam and China. However, on domestic credit provision, Indonesia is falling behind. Figure 6 shows the share of domestic credit provided by financial institution of 7 selected economies as a percentage of the nation's GDP. Indonesia barely increases its credit provision since 1960. Vietnam even surpassed Indonesia's credit share in 2003, converging to other South East Asian economies.
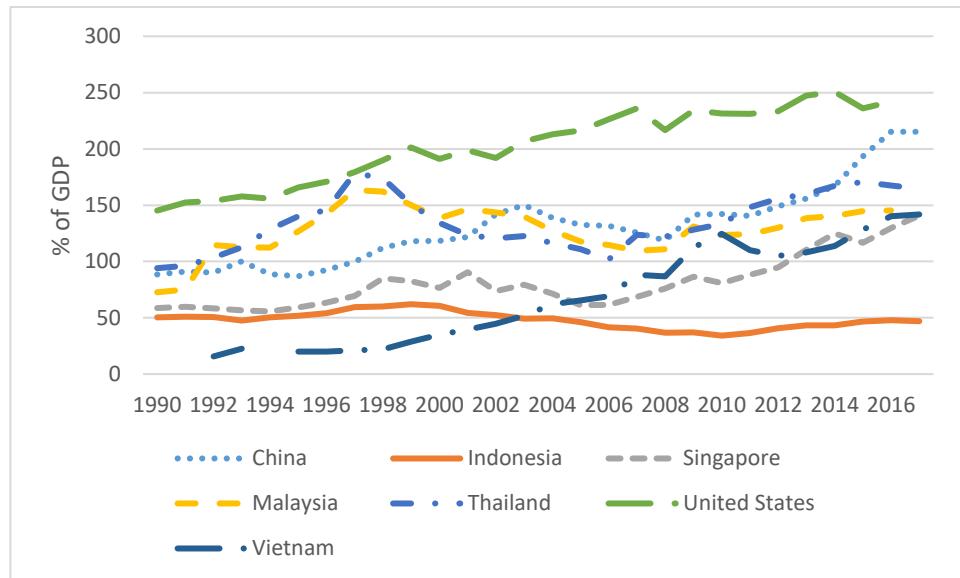
Figure 6. Domestic credit provided by financial institutions, % of GDP 1990 - 2017

Source: World Development Indicators, World Bank

While Indonesia experienced financial reforms in the past, it still has a room to grow. Indonesia's capital market requires more supply to grow faster than baseline and to lessen its dependencies on external shock. Next section provides the way to simulate what happens when the reform continues, and how this reform is needed to reduce impediments to new capital formation.

While Indonesia undertook some liberalization on their capital account in the 80s, it hasn't experienced any further financial liberalization in recent years. Jahan and Wang (2016) construct a number of capital account openness indices, which is featured in IMF's data mapper. The Wang-Jahan index is an aggregated index of *de jure* policies of capital account openness, disaggregated to different types of assets. While Indonesia's aggregate capital openness index is relatively

unchanged since 2000 to 2013 on 0.5 (from a 0-1 range), the difference in types of assets is quite interesting to look at. This is illustrated in figure 7.

Figure 7 presents 6 selected asset types. Indonesia's capital account openness index seems to change quite dramatically in 2009, after the GFC. Commercial credit and bond openness gained extra openness in that year, while equity fallen to zero from 0.25. Meanwhile, collective investment is arguably the most open type of investment in Indonesia, which has 0.75 score. Apart from what is presented in figure 6 are direct investment, which sits at 0.5 from 2000-2013, and real estate ownership and derivative that stays at 0. Interestingly, personal capital transaction gets to score at 1, or fully liberalized.
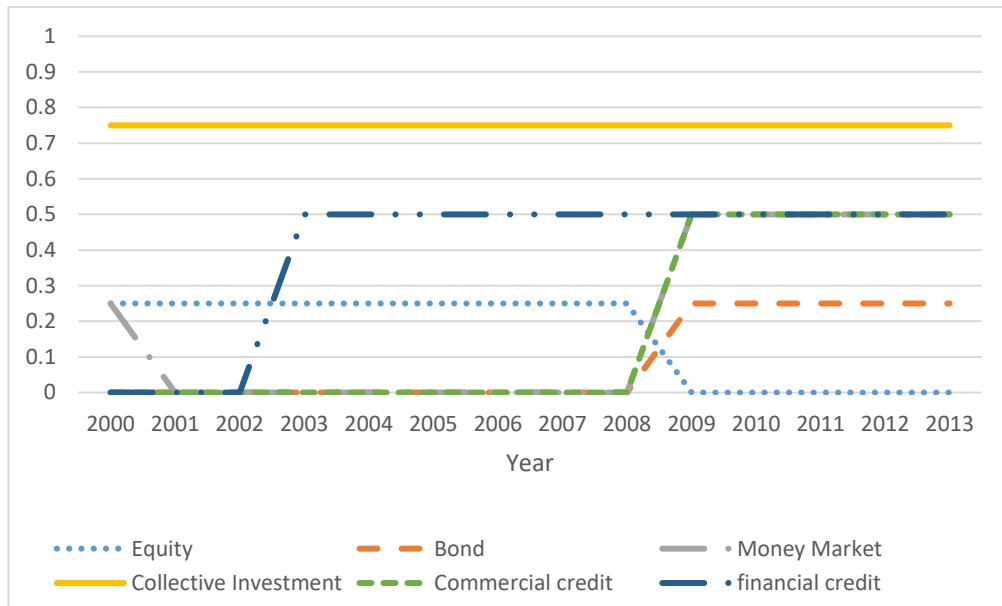
Figure 7. Indonesia's Capital Account Openness Index, selected asset types, 2000 - 2013

Source: IMF, 2018

The late 2000s is one of the most interesting points amid the GFC and the quantitative easing made by the U.S. and the EU. Indonesia seems to understand that in this situation, opening its capital account is the way to get the money coming to its own market. This is also the time where Indonesia's both portfolio and derivative and others side of the capital account got boosted, as presented by figure 3. While it doesn't seem like much has happened in 2010s, it is possible that Indonesia may be able to see similar jump in its financial account if further liberalization is to be done, assuming our entrepreneurs are still hungry of fresh money.

These indices suggest that Indonesia still have room to open its capital account movement further. However, after the AFC, the case for more liberal

approach to capital account needs to be dealt with care. It needs to be done in a way that it free enough to deepen Indonesia's financial market, but mitigates the risks associated with financial liberalization. Indonesia needs to identify its own risk, make a reform on its risk prevention, especially on short-term capital flight.

Indonesia's financial market is shallow and mainly dominated by banks (Goeltom 1995, Triggs et al 2019). This means, any reform happens to bank will greatly benefit Indonesia. One is the issuance of a National Strategy for Financial Inclusion in 2016, aiming to increase Indonesian's exposure to banking institution. Second, Bank Indonesia in 2017 reduced partial reserve requirement, benefiting small banks facing liquidity problem (International Monetary Fund 2018).

Developing non-bank capital market is probably even more crucial to deepen Indonesia's capital market. Goeltom (2008) argues that one way to deepen Indonesia's financial market is through the issuance of Bonds. While corporate bonds in Indonesia remains small, government bonds in Indonesia is becoming the alternative for deepening Indonesia's financial market. One possible way to further developing government bond market is to allow provincial governments to issue their own bonds.

However, there are risks associated with expanding the government bonds. Triggs et al (2019) assess Indonesia's most current risk and crisis prevention method. It seems that the main risk comes from a high foreign ownership of government bond, which expose Indonesia to a currency risk. The bond can reach a relatively high interest rate at 7.8 % in June 2018, which potentially crowds out private investment (Triggs et al 2019). In fact, since 2003, the government's budget needs to adjust to a fiscal rule, which limits Indonesia's budget deficit to 3% GDP (Blondal et al 2009). This limits the ability for the central government to issue more bonds. Additionally, Indonesia implemented a tobin tax in 2018 To further buff Indonesia from short term capital flight risk (Triggs et al 2019).

One other current development in capital risk mitigation in Indonesia is the new anti-crisis measure (Triggs et al 2019). This relates to the new Law 9/2016 on Financial System Crisis Prevention and Mitigation, or known locally as Pencegahan dan Penanganan Krisis Sistem Keuangan (PPKSK). This law creates a new ad-hoc body called KSSK, which role is to advise the President to declare a crisis, which then let relevant agencies to act accordingly. Triggs et al (2019), however, is rather pessimistic on the role of this Law. It lessens central bank's lender of the last resort power, increasing the length of the red tape, and slowing down technocratic institutions to act fast. Time is essential as a problematic bank can quickly lost its equity value on a crisis.

Perhaps the better way to avoid short-term capital flight risk is to have a better direct investment regime, as FDI is much less volatile compared to portfolio investment (Stiglitz 2000). Early 2018, BKPM simplified its investment

regulation by issuing BKPM Regulation 13 on Guidelines and Procedures for Investment Licensing and Facilities, effectively replacing 5 of its own previous regulations. The new regulation aims to make investment much easier, especially if it is invested in the special economic zones. Investor needs only to visit BKPM and the local government's office in a One Stop Service manner. It remains to be seen, however, how far this new regulation takes more control on Indonesia's direct investment from other ministries which is one of the problems mentioned by Magiera (2011). Additionally, this law does not change Negative Investment List. This means that the attractiveness of this new law may be limited only to current investors or new investors trying to enter to the already open industries.

The new Free Trade Agreement (FTA) signed by Indonesia might also help in this case. Indonesia just recently signed an FTA with Australia, dubbed Indonesia-Australia Comprehensive Economic Partnership Agreement (IACEPA). IACEPA is a comprehensive FTA, touching also the issue of direct investment, among others, the first for both countries. This means Australia can enter the Indonesian industry opened by the IACEPA, regardless of the Indonesia's unilateral Negative Investment List, at least on paper. Some Industries including logistics, mining, education and tourism, which allows for majority foreign ownership for Australia. While Indonesia-Australia's economic interdependence is relatively limited, but IACEPA is the first agreement to specifically regulates FDI for both economies. While the actual execution of the FDI chapter in the agreement needs to be further observed, this can be a good leap to a more open, unilateral direct investment policy for Indonesia.

More liberalization toward Indonesia's capital account can be proven to be hard, especially after the AFC. However, Indonesian institution is trying hard to implement a better way to open its capital account, while trying its best to mitigate the risk that is lurking. These new reforms, which are still ongoing, potentially can attract new flow of funds without having to hike interest rate.

3. Modeling Indonesian Investment

Under perfect market and fully liberalized financial regime, investment will go to the highest return countries, until eventually reaches equilibrium. Under a freer movement of capital account, the existing difference carries a great deal of information on the country's characteristics. It can be suggested that a country's financial reform success can be reflected by a smaller rate of return, even under the freer capital account regime.

Several papers use CGE to model economic reform and treat economic reform like trade in goods liberalization. McKibbin (1999) uses the difference of the cost of capital between countries with U.S. as a measure of the scope for financial market liberalization. It is argued that the less impediment to trade in investment, foreign capital will flow to the higher interest rate country, which

later reducing the price of capital due to increased overseas supply of capital (McKibbin 1999, Goeltom 2008). McKibbin (1999) uses G-cubed to run such simulation.

Productivity Commission (2009) uses a modified version of the Global Trade Analysis Project (GTAP) a computable general equilibrium model to simulate the increased cost of financial provision. During the GFC in 2008, many countries introduce measures to the banking industries to reduce risks, such as increasing bank reserve requirements. All the measures could potentially increase the cost of financial provision by these banks and other financial institutions. The Productivity Commission (2009) simulated how these measures can decrease the financial industry's efficiency, lead to lower output of the industry, and affects the overall economy, which relies on financial, services as intermediate input.

Other work which uses GTAP to model financial liberalization is the work of Gretton(2015). He uses the similar version of GTAP as Productivity Commission (2009) to model the potential impact of China's economic reform to Australia. He uses similar approach as McKibbin (1999), reducing 50% of China's wedge which equals to 10% of required rate of return, and apply it to the GTAP model. The result suggests an increased 5.7 percentage points increase in GDP from the base.

The basic approach to financial liberalization in these studies rest on a similar basic principle: more fluid movement of finance leads to the convergence of the cost of capital, which means the country with less fluid flow of capital will approach the level of those with a more liberal financial system. This approach is suitable to the study for Indonesia, where the interest rate remains high compared to the developed countries like the U.S. Additionally, Indonesia's rate difference with the U.S. seems to be important in modeling international capital flow (Lu 2018).

Capital accumulation in theory is usually shown by using aggregated (one sector) production function with an assumption with the saving rate (Francois et al., 1997). In the Solow-Swan model, where saving rate is exogenous and saving equals investment, capital accumulates through investment less depreciation. New investment only occurs based on how productive it is, and with decreasing marginal rate of productivity of capital, it will stop accumulating when investment equals depreciation. During capital accumulation period, output grows to a steady state level.

Consider a reform that allows capital (and other factor of productions) to move. Happened to such economy, capital will flow to sectors value capital the highest, enhancing economic efficiency, reflected in increased productivity to the sector (Francois et al., 1997). In turn, this will shift productivity up, hence more accumulation of capital, which in turn move the economy to the new steady state.

The Global Trade Analysis Project (GTAP) model is a CGE model developed by Purdue University made to quantitatively model the world trade (Hertel and

Tsigas 1996). It consists of many regions, many sectors which interacts in a general equilibrium framework. While the model was originally used to analyze trade in goods, many researchers modify GTAP model to fit other purposes as well. The one used in this paper is a modified version of GTAP.

In GTAP, each sector in each region has one representative producer, one representative consumer, and one government, each making decision in their own region. Saving and investment in this model are facilitated by a global bank instead of a regional bank. The global bank produces a composite investment good to be consumed by regional households.

As a comparative static model, the standard GTAP assumes short run closure for its investment problem. That is, it equalize the change in the end-of-period capital stock with the beginning-of-period capital stock less depreciation plus gross investment (Hertel and Tsigas, 1996). In this short-run closure, firms' decisions follow diminishing return on investment, where firms return on investment decreases as investment increases. Capital moves between sectors in a region so that it mimics the real-world data, stops at a certain level of rate of return of investment. In the standard model, capital can find a better return sector in the region, but not out of the region (i.e., no capital movement between countries).

The consequence of the standard GTAP model is as follows. Firstly, liberalization in investment will not increase the productive capacity of the economy through capital accumulation. This is amid the same amount of pre and post reform capital stock. The gain from any improvement in economic efficiency or technological improvement will only be reflected by a static income effect. Secondly, no movement of capital means liberalization won't affect international flow of capital. Capital can only be so productive as the regional rate of return amid its inability to find higher return sector abroad.

For this study, a modified GTAP version used by Productivity Commission (2009) and Gretton (2016). This version of GTAP allows for endogeneity of capital stock by swapping it with exogenous rate of return. Instead of letting GTAP calculate rate of return from a constant amount of capital, this version hold rate of return and let GTAP calculates the capital stock accumulation. In a sense, it can be said that this closure allows for a longer run scenario, and allows one to shock rate of return changes.

In GTAP, investment follows similar rule to the standard capital accumulation macroeconomic theory. It works such that:

$$ke(r) = INVKERATIO(r) * qcgds(r) \\ + [1 - INVKERATIO(r)] * kb(r) \qquad (1)$$

where ke(r) is the percentage change of the end-of-period capital stock in the r region. INVKERATIO(r) is the ratio of investment to the end-of-period capital stock, which makes 1-INVKERATIO(r) the existing capital stock. While it seems

like a long run closure, standard GTAP doesn't allow for capital adjustment in pre-reform and post-reform capital accumulation.

Required rate of return, or RORC in GTAP, is defined as the rate of rental price of capital over price of saving, less depreciation rate. In other word, this is the net return of capital, reflecting the difference between gross return and the cost. Defining GRNETRATIO as gross return over net return, the change of the required rate of return can be expressed as:

$$rorc(r) = GRNETRATIO(r) * [rental(r) - pcgds(r)] \qquad (2)$$

Investors are forward looking, in that they expect the future rate of return, or RORE, to be negative. The relationship between RORC, RORE and capital stock then:

$$RORE(r) = RORC(r) * [KE(r) - KB(r)]^{-RORFLEX} \qquad (3)$$

or in percentage change form:

$$rore(r) = rorc(r) - RORFLEX(r) * [ke(r) - kb(r)] \qquad (4)$$

where RORFLEX reflects the elasticity of required rate of return to the change of capital stock. This standard set-up with exogenous capital stock allows for calculation of different rate of return between regions. In other words, the capital stock dictates the rate of return of each countries.

The version of GTAP that I am using incorporates the movement of capital between countries. Productivity commission (2009) endogenize the capital stock in the country using two additional equations:

$$capital = sum\{r, reg, \frac{VKB(r)}{sum\{s, reg, VKB(s)\}} * qo("capital", r)\} \qquad (5)$$

$$rorc(r) = rorc\_r + f\_rorc(r) \qquad (6)$$

Equation (5) allows capital to be endogenized, while equation (6) let us exogenize the rorc(r) due to a fix rorc_r and the shift variable f_rorc(r). These two equations are added to the main model, while we swap them in the closure to allow for the exogeneity of rate of return and endogeneity of the capital stock. In the end, this setting let all rorc(r) adjust to the rore(r), where all country gets the same rore(r). In the terms of change, the equilibrium point happens when the change of rate of return in all countries converge to zero.

In the GTAP version that I use, the rorc is kept exogenous and a slack variable is added to enable the shock of rorc. A negative shock to the rorc(r), keeping GRNETRATIO constant, will force the changes in rental price less price of capital goods turns negative, driving up the demand of capital goods. The economy will supply the good through domestic saving and net borrowing from abroad. The model used is comparative static and therefore does not depict the process of

accumulation nor its financing. A dynamic model inclusive of international financial flows would be required to do this.

This setting is useful for simulating the potential effects of financial market liberalization. The role of financial liberalization should be to liquify financial flow. The flow of finance, in theory, should be coming from lower rate of return countries to higher rate of return countries. In equilibrium, rate of return will, to some degree, converge to a certain level everywhere. In other words, if Indonesia reform its capital account further, its interest rate will be reduced, closing the gap between its interest rate to that of the developed world, *ceteris paribus*.

This is essentially the basis of the argument of McKibbin (1999). He calculate the cost of capital to his G-Cube model under the interest rate parity equation:

$$r_t^i = r_t^U +_t e_{t-1} - e_t + \xi_t \tag{1}$$

where the real interest rate of country i at time t equals one in the U.S. plus the expected change of the future exchange rate. The term ξ is a wedge reflecting all other factors which avert real interest rate to converge, including financial restriction, which is assumed to be 50% of the total ξ. Big number on the wedge suggests big capital cost, or risk premia if you will, from having more restricted financial policy in country i compared to the US (McKibbin, 1999).

Historically, Indonesia's real interest rate does not exactly follow the movement of that of the U.S., as shown in figure 8. While the U.S.' real interest rate has visibly less volatility, Indonesia's real interest rate have a more volatile movement over time, with visible spikes in certain years. Real interest rate reached its peak in 1992, reaching as high as 15.6%, while dived the deepest during the 1998 Asian Financial Crisis.
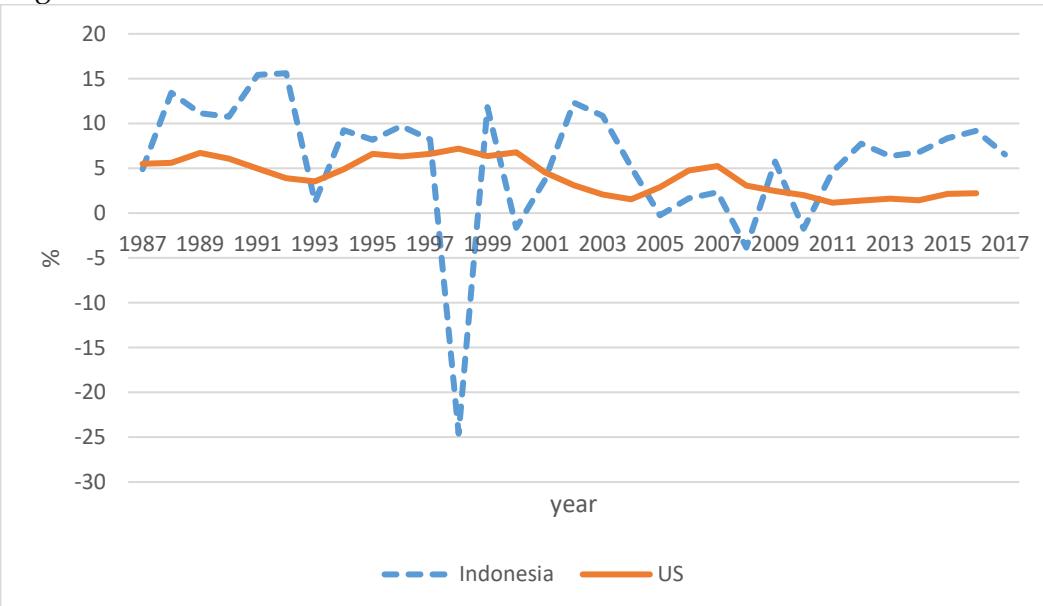
Figure 8 Real Interest Rate (%) for Indonesia and the U.S, 1987-2017.

Source: World Bank.

As expected, Indonesia experienced higher real interest rate at the beginning of the last banking deregulation policy package, as suggested in figure 8. According to Goeltom (1995), Indonesia set very low interest rate ceiling to allow cheap credit for conglomerates during the 70s and early 80s. Letting it float helps bank readjust to a more market-oriented interest rates. After the fall of Soeharto, the real interest rate follows the narrative of Patunru and Rahardja (2015), where 2002 to 2006 is the range where tariff harmonization and the new investment law happened. Around this range, Indonesia's real interest rate fell sharply below the U.S.' level, which seems to be resulted from a sudden drop of its national currency (Titiheruw and Atje 2008). It then spiked again after 2010, where it was the time where the increasing trend of non-tariff measures and FDI restrictions happened (Patunru and Rahardja, 2015). The year 2010 also marks the beginning of ASEAN free trade agreement with China, South Korea and India (Pangestu et al., 2015).

The volatility of Indonesia's real interest rate makes it hard to determine the wedge. It is possible that various local and international events affect Indonesia quite significantly but not the U.S. However, there are reasons to pick circa 2011 onwards as the right years to calculate the wedge. Firstly, 2011 onward is probably the most stable real interest rate fluctuation compared to other years. Volatility of the real interest rate is also experienced by other developing countries, and other developing countries also experienced a more stable real interest rate around this years. Secondly, during this years, Indonesia's statistics, such as current account deficits and investment, are also seeing a less volatile figures. Thirdly, Indonesia did not get any big change of policy during these years (Patunru and Rahardja, 2015), fourthly, it is more current hence more relevant to the environment into which new policies are being introduced. It would also have a better synchronization with the current GTAP database used in this paper. It seems appropriate to see the evolution of Indonesia's wedge during this time-span.

Table 1. Wedge Calculation for Indonesia's real interest rate to the U.S.'. From 2011 to 2016, in percentage except for REER which is an index.

	2011	2012	2013	2014	2015	2016	AVG
REER	100	97.04	95.04	89.52	91.52	93.92	
Expectation	-2.96	-2.061	-5.81	2.23	2.62	-1.19	
r^1	4.59	7.75	6.37	6.79	8.35	9.18	
r^U	1.16	1.38	1.61	1.43	2.15	2.21	
Wedge	6.39	8.43	10.57	3.13	3.58	8.17	6.72

Source: Author calculation`s, UNCTAD, World Development Indicators (World Bank).

Table 1 shows the wedge calculation from 2011 to 2016. Real Effective Exchange Rate (REER) obtained from UNCTAD, while the real interest rate for Indonesia (r^I) and the U.S. (r^U) is taken from the World Bank. REER is an index which uses 2011 as the base year. The data suggests Indonesia is experiencing a depreciation of its currency in 2016 compared to 2011. Expectation is calculated as a percentage change from next year's REER to the current year. 2016's Expectation is calculated using the average of the previous year's expectation. Wedge's average is calculated from averaging the wedge from 2011 to 2016.

GTAP's wedge is calculated in a slightly different way. GTAP does not explicitly calculates interest rate. What it has is the value of output created by endowment commodity (EVOA in the database). GTAP database also has capital stock called VKB in the database. Therefore, the (gross) return to capital is simply a division between the output value of capital and the capital stock. Taking capital depreciation from the output provides the net return to capital. Table 2 shows the return to capital of both Indonesia and the U.S., and the wedge.

Table 2. Wedge Calculation from GTAP Database, for Indonesia's real interest rate to the U.S.'

	Gross rate of return	Net rate of return	Wedge	50% of IDN-US wedge	%point change	% change
	%	%	% points	% points		
Indonesia	15.78	11.78	8.33	4.17	4.16	35.37
U.S.A	7.45	3.45				

Source: Author calculation`s based on GTAP 2011 v9.a data base.

The rate of return difference between Indonesia and the U.S. is 8.33 percent according to the GTAP's database using 2011 reference year. Although the rate of return is different compared to World Bank's real interest rate, the wedge is arguably quite corroborating with each other, particularly to the year 2012.

Half of the wedge is then used as the policy shock in the GTAP. Half of the wedge is translated to 4.16 percentage points change (416 basis point). In other words, the 50% wedge reduction translates to a 416 bps less than 11.78%, which is 7.61%. In GTAP, the applied shock needs to be in percentage term from the baseline, which is roughly –35.37%. GTAP then calculates how much capital needed to reach the reduced rate of return in the equilibrium, and adds that to Indonesia's capital stock. The shock will translate to change of GDP, real wage, and real income of Indonesia. How the increased in capital affect industries also discussed.

The shock will be applied in three different magnitude. 1% shock is conducted as a sensitivity test. The second shock is 10%, which shows a modest financial reform. The third shock is half the wedge, following McKibbin's (1999) approach, which is 35.37%. With the starting net current rate of return of 11.78%, These

three shocks translate to reductions as much as 11.78 bps, 117.8 bps, and 416 bps respectively.

4. Results and Discussion

The shock is applied on the interest rate on Indonesian economy. Three shocks are applied, which are 11.78 bps, 117.8 bps, and 416 bps from the baseline to see how sensitive it is to Indonesian economy. Table 3 shows the result of the simulation on the percent change on GDP and real variables, including export and import and balance of trade.

Interpretation of the table needs to be done in care, as the GTAP version being used is a linear comparative static model with a longer-run closure. With the addition of the fixed RoR and endogenous capital stocks closure being used, the result can be interpreted as a long run result. Being comparative static, the results do not project what happens during the transition period. To such information, a dynamic model would be required. The results can be interpreted as showing how the Indonesian economy could to differ from the current situation (as represented by the GTAP database) from full implementation of policies that lower returns required on new investment in line with the modelling scenarios.

Table 3 shows the same direction for the results of the three shocks. The results to suggest modest reform will be enough for Indonesia to reach its growth target. 10% rate of return reduction, which translates to 117.8 basis point reduction, is enough to accumulate 10.79% more capital in the long run. This amount of capital is enough to get 5.06% more GDP. Real wages for both unskilled and skilled labor suggest the increased capital is potentially benefit them, and also with no skill-biased gain.

Table 3. Simulation Result of longer-run impacts, using rate of return reduction shock

		11.78 bps	117.8 bps	416 bps
GDP	% change	0.5	5.06	19.26
Real capital stocks	% change	1.04	10.79	42.78
Real wages, unskilled	% change	0.34	3.4	12.02
Real wages, skilled	% change	0.38	3.78	13.63
Balance of Trade	USD mil.	1,699.16	18,190.92	78,390.81
Import volume	% change	0.13	1.3	4.59
Export volume	% change	1.15	12.28	52.18
Import price	% change	0.00	0.04	0.17
Export price	% change	-0.2	-2.06	-7.84
Terms of trade	% change	-0.21	-2.1	-8.00
Real income	% change	0.39	3.84	13.54

Source: Author's calculation

Indonesia gets higher Balance of Trade (BoT) with the higher capital stock. This seems counter intuitive with the increased capital from abroad. In the short run, higher capital inflow should result in negative BoT, since the increased capital allows Indonesia to purchase more import. BoT equation in GTAP calculates solely on export minus import. Moreover, since GTAP is a comparative static model, the new capital injection, which do not suffer any short-term adjustment cost, translate to the increased production with no delay whatsoever. While increased capacity could come from importing machineries and technologies in the short run, GTAP only capture increased import for intermediate input.

The results from trade seem to corroborate the explanation. Indonesia in this scenario has a much higher increase of export volume than import volume. This is a welcomed result also because Indonesia is exposed with currency risk due to high foreign denominated bonds even in the current level of capital stock. To understand the result of the trade balance and export import relationship, we need to look at the result for industries. Moreover, we need to return to the model and see how firm behave in GTAP.

Firm's final output in GTAP consists of two perfectly complementing values, which are the value-added nest and intermediary input nest. The value-added nest, named QVA, is a Constant Elasticity of Substitution production function from five factors. Meanwhile, intermediary input nest QF is a CES of input from all industries, including imported input. QFE is the demand of factors, while QFD and QFM are inputs from domestic and import respectively. Figure 9 illustrates this very structure.
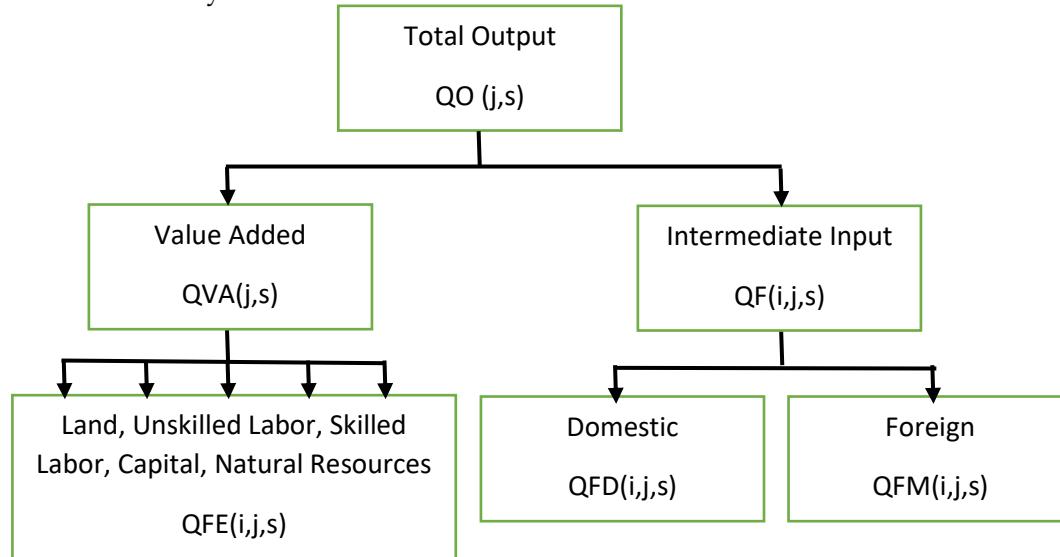

Figure 9 GTAP's Production Nest.

Source: Hertel and Tsigas (1996).

With the increased capital, free flow of factors between industries and fixed other endowments, all factors flow up to a point where the return from all industries are equal. Capital shifts up generally, with agriculture and food industries having the least increase of capital. While both service and manufacture gaining a similar level of capital, labor behave much differently. Service sectors have decreased number of both unskilled and skilled labors, with the highest decrease on construction. In manufacturing sectors, some sectors have a small decrease of labor, but mostly have a high number of labors flowing from other sectors.

Table 4 illustrates the result of a 117.8 bps reduction on required rate of return to output change and balance of trade change per sector. A higher capital and efficient factor allocation lead to a generally increased output from most industries. The result suggests that the growth is skewed toward manufacturing, especially in electronic equipment, transportation equipment, and apparels. This is possibly due to a higher expansion of manufacturing, with both capital and labor have an increase, while the extra labors come from mainly service sectors. The new capital also makes both skilled and unskilled labor become scarcer, thus increasing their value.

BoT per sector also experience different result among each other. Primary industries in general decrease Indonesia's BoT, possibly due to required input for secondary industries. Apart from oil, most manufacturing contributes to Indonesia's export, in line with their higher output compared to the baseline. This result seems to follow Indonesia's manufacturing export led strategy.

Table 4. Potential longer-run effects of a 117.8 basis points reduction in required returns on capital by sector, percent

Industry	Δoutput %	BoT (USD Mil.)	Industry	Δoutput %	BoT (USD Mil.)
Paddy rice	0.96	-4.91	Lumber	8.77	967.44
Wheat	-7.14	-79.86	Paper and paper products	8.26	604.50
Other grains	1.94	-71.63	Petroleum and coke	6.00	-1,339.49
Vegetables and fruits	0.78	-191.98	Chemical rubber products	11.68	4,176.29
Oil seeds	2.45	-239.41	Non-Metallic minerals	2.57	327.96
Sugar cane and beet	2.04	-0.04	Iron and Steel	10.28	510.10
Plant fibres	-0.43	-271.35	Non-ferrous metal	18.01	1,477.17
Other crops	1.40	-533.12	Fabricated metal products	2.70	780.72
Cattle, sheep, goats, etc	2.76	-34.99	Motor vehicles and parts	10.34	757.90
Other animal products	2.43	-9.76	Other transport equipment	11.29	640.71
Raw milk	3.06	-0.32	Electronic equipment	19.04	2,204.82
Wool, silk	2.95	-0.89	Other machinery equipment	16.98	2,296.77
Forestry and logging	6.06	9.43	Other manufacturing	8.27	506.53

Industry	Δoutput %	BoT (USD Mil.)	Industry	Δoutput %	BoT (USD Mil.)
Fishing, hunting, trapping	2.22	-4.24	Electricity generation	5.86	0.01
Coal	3.21	492.91	Gas distribution	9.89	121.57
Oil extraction	4.13	-564.63	Water	5.06	4.88
Gas	3.99	328.41	Construction	-0.14	112.84
Other mineral and gems mining	6.98	8.55	Trade: retail, wholesale	4.75	108.11
Cattle meat, Sheep, goats	3.86	-10.43	Other transport equipment	6.25	137.15
Other meat	3.84	13.38	Water transport	6.92	25.97
Vegetable oil	4.03	691.70	Air transport	5.05	93.90
Milk and dairy products	4.37	40.88	Communications	8.09	357.74
Processed rice	0.74	-132.24	Other financial intermediation	7.09	149.91
Sugar	2.03	-52.72	Insurance and pension funding	6.01	14.87
Other food	3.93	355.18	Other business services	6.71	86.32
Beverages and tobacco	2.30	6.04	Recreational activities	5.25	47.55
Textiles	12.67	990.97	Other services and government	2.64	43.73
Apparel	16.41	1,208.31	Dwellings	7.28	0.00
Leather	15.57	1,031.74			

Source: Author's calculation

The change of Indonesia's rate of return impacts not only Indonesia's own economy, but also the rest of the world. With the shock on Indonesia's RoR, not only it changes Indonesia's capital endowment, but also the expected rate of return. This is the consequence of equation (4), where the negative shift of rorc of Indonesia affects rore to the same direction. Since the model adopt the same expected rate of return to all regions, all other regions also have a negative shift to their expected rate of return. With the addition of fixed RoR, other countries also experience higher increase to capital endowment, albeit small compared to Indonesia. Consequently, the world's capital stock increases.

Table 5 captures the impact of Indonesia's reduction of capital cost on the rest of the world in terms of BoT and capital change. The Δ Capital Stock for the world increases, with some exception. The total changes of the whole region is positive, which means the capital stock of the world is increased. This seems to be counter-intuitive to what I expected, at least in the short run.

Reduction of rate of return coming from flowing capital to Indonesia should mean negative capital increase on other countries, assuming the total capital of the world is fixed. However, this is not true in the model, given the endogeneity of capital creation I apply on the closure. One way to translate this closure is that this scenario happens in the long run. When Indonesia lowers its rate of return,

the aggregate cost of capital in the whole world decrease as well. This leads to higher demand of capital for investment in the whole world, thus increasing the world's level of capital stock. With no adjustment cost assumed in the model, this model captures the long run scenario of the RoR reduction in Indonesia, with new level of global capital stock already reached, fixing rate of return in other countries.

Table 5. Potential longer-run effects of a 117.8 basis points reduction in required returns on capital by sector, percent

| Regions | ΔBoT | Δ Capital Stock | | Regions | ΔBoT | Δ Capital Stock | |
	USD Mill.	USD Mil.	%		USD Mill.	USD Mil.	%
Australia	-435.64	-65.19	-0.01	Singapore	65.16	284.67	0.20
New Zealand	-47.88	-2.56	0.00	Thailand	-91.68	329.22	0.18
China	-2,394.27	731.75	0.03	Vietnam	-50.94	29.13	0.06
Rest of East Asia	-80.28	53.28	0.03	Rest of SE Asia	-17.25	-2.95	-0.01
Japan	-1,688.52	604.25	0.03	South Asia	-110.34	26.59	0.01
South Korea	-335.58	171.31	0.03	India	-428.26	233.19	0.03
Taiwan	-57.09	43.41	0.03	North America	-656.26	17.25	0.00
Brunei	2.64	10.00	0.10	USA	-4,307.03	207.75	0.01
Cambodia	-1.58	-3.30	-0.06	Latin America	-1,280.07	209.13	0.01
Indonesia	18,190.92	42,475.38	10.79	EU28	-4,616.47	628.00	0.01
Lao PDR	-1.66	-2.43	-0.08	Rest of the World	-843.16	353.00	0.02
Malaysia	-75.55	162.75	0.12	MENA	-447.65	728.50	0.03
Philippines	-83.81	140.06	0.12	SS Africa	-207.75	76.44	0.01

Source: Author's calculation

Table 5 also shows the BoT of other regions. BoT for most countries are potentially decreased, with the exception of Singapore. The result shown in table 5 seems to suggest that with the capital comes the production basis as well, where Indonesia supplies goods to the rest of the world. Again, this result assumes long run closure. That is, all additional capital translates to factor of production, along with full movement of factors between industry. It is important to note that the total change of the BoTs is zero, which suggests that the world's addition of capital does not translate to higher production of goods and services.

It is hard to discuss about the movement of national capital in the short run, because in this case, the change of capital stock does not seem to reflect the change of BoT, at least in the short run sense. While the long run impact seems to suggest a clear benefit from Indonesia's economic growth, it is important to understand the short run transition. The G-CUBED simulation by McKibbin (1999) suggests the rate of return shock leads to negative BoT for at least 14 years after the 1996 baseline.

The main reason why short run transition is important is because Indonesia's macroeconomic institutions seems to be targeting short run indicators. Bank Indonesia is actively intervening current account deficit, limiting Indonesia's import. Bank Indonesia also is active at keeping Indonesian Rupiah stable, despite its floating exchange rate. Without a short run simulation, it is hard to understand how much deficit or currency depreciation can be tolerated until the long run gain is achieved.

Like the central bank, the government is also hindered from developing its bond market by the 3% GDP deficit fiscal rule. As suggested by Goeltom (2008), government bond is important to deepen Indonesia's capital market. Additionally, expansionary fiscal policy is especially important to finance infrastructure projects which could have high positive spillover effect across the economy. Indonesia has a good central government and State-Owned Enterprise bond market, but a discussion toward local government bonds might help deepening Indonesian bond market. Indonesia is a highly unequal country where most development happens on the Java island. A more effective local government bond market could help not only in deepening Indonesia's financial market, but also developing Indonesia's rural areas.

Aside from the fiscal rule, there is another issue concerning developing government bond market: it requires higher rate to be attractive. High rate of return is the main attraction of Indonesia's government bond (Lu 2018) and potentially crowds out private investment (Triggs et al 2019). Developing the government bond market seems to be counter-intuitive with the simulation which reduces capital cost and promote private investment, at least in the short run. Additionally, Indonesian government have a relatively low and stagnant tax ratio, which can make debt repayment hard without sacrificing government consumption, at least in the short run. With the right calculation to growth and tax ratio, however, issuing a longer run matured bond can be seen as a potential policy prescription.

Risk mitigation is also one more issue that Indonesia needs to address. The new law for dealing with banking crises has just been just implemented. A Tobin tax came into effective in 2018 (Triggs et al 2019) and central bank bill holding period is increased from one month to six months since the late 2015 (Lu 2018), which can help with short term capital flight risk.

Relaxing FDI also can be effective in managing risk since FDI is generally regarded as harder to move out of the country (Stiglitz 2000, Yu 2018). While simplifying red tape in the central government is likely to be the most beneficial course to improve efficiency of investment through FDI, the latest PTA with Australia opens a bilateral possibility for a foreign country to invest in industries in the negative investment list. Revising the negative investment list can be a good policy, especially in the sector which enjoys highest growth from the simulation.

6. Conclusion

The Indonesian economic development plan still built around the intention to get back to pre-AFC growth rates. The newest one, Making Indonesia 4.0, plans to exploit industry 4.0 in manufacturing to increase exports. Combined with Indonesia's current aggressive infrastructure development objectives, the need for more capital in the short run is massive. This study explores the option for Indonesia to pursue a further financial liberalization to attract capital to investment activities from home and abroad.

Simulations are conducted using a variant of the GTAP model with a longer run closure in which the rate of return on capital is assumed exogenous with endogenous capital stocks. With improved risk mitigation strategies, better supervised of domestic capital markets and a deeper, more diverse financial market, Indonesia may be able to reduce risk premia and institutional impediments to the efficient use of capital in the country, thereby reducing the gap between Indonesia's cost of capital with global benchmark costs such as those represented by the U.S.A., a country with a well-developed capital market. The result suggests that reducing Indonesia's current cost of capital by around 100 basis points, Indonesia potentially attract 10% more capital to the country and raise GDP by 5% above levels that it could otherwise achieve.

Indonesia's biggest financial reform was the banking deregulation in the 80s, where the country lifted the control over interest rate, and 99% foreign ownership of a bank was allowed. In 2003, the Indonesian government adopted a fiscal rule that set the current account balance in any one year at a maximum 3% deficit. This hindered in particular more expansive portfolio investment in Indonesia. FDI is also heavily constrained by regulatory requirements. With this condition in mind, Indonesia needs to develop its capital market more, and have a better supervisory and risk mitigation system. For example, through relaxing regulatory requirements on FDI and the negative listing of industries eligible for FDI.

The results are clear in suggesting a reduction to Indonesia's risk premia and reduction of impediment to international capital movement have a potential for Indonesia to have a higher GDP than otherwise. However, lowering impediment to international capital movement and reducing risk premia can be a hard objective, especially since liberalization tends to be associated with volatility. Indonesian policy makers are largely believing that having more investment in Indonesia is beneficial, but the discussion needs to advance to better narrative. In that regard, the simulation in this paper can be useful in at least two way.

First, it helps forecasting the benefit of having a better developed capital market, which may be highly important for Indonesia in its current state where development is still ongoing and needed. As the simulation suggests, a 10.79% more capital translates to a higher 5.06% of GDP, which suggest that capital in

Indonesia can help Indonesia boost a decent growth. Moreover, in this longer run setting, Indonesia potentially have more positive balance of trade due to higher export. This scenario not only follows Indonesia's export led growth strategy, but also help buffers Indonesia from high denominated bonds problem. If attracting foreign capital is adopted as a strategy, then higher export is favorable because it helps with managing the foreign denominated debts.

Second, the simulation provides a benchmark in formulating a better policy design. The benchmark may help Indonesia's planning board to give targets to different ministries and local governments, also set a target for a policy evaluation. GTAP's highly disaggregated industry gives valuable information as to which industry has the highest potential to grow. With the assumption of perfect flow of factors of production between industry adopted in GTAP, Indonesian policy makers can concentrate in reducing impediment for factors of production to move to different industries.

The modelling approach reported in this paper is comparative static and focuses on the longer run impacts of the policy scenarios considered. In the longer run, it is shown that effective financial market liberalization that lowers risk and institutional impediments to efficient investment has the potential to benefit Indonesia economically. However, the comparative static approach does not provide information on short run adjustment impacts or the transition path towards that long run condition, nor does it provide information on how long it may take for that long run to be achieved. To provide information on short-run effects and the transition path question, a dynamic framework needs to be used.

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