How Investment and Trade Shape the Economic Transformation of Indonesia

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Declaration of originality

The work underlying this thesis is my own. Insights, data, and methodology contributed by others are cited properly. All inaccuracies are mine.

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Abstract

Indonesian policy makers' appetite for manufacturing-based growth for economic transformation is still high. According to its latest development plans, Indonesia plans to utilise foreign investment and international trade to reduce the saving-investment gap, source important know-how, and exploit the Global Value Chain (GVC). However, Indonesia is growing more protectionist in its approach to international trade, while its openness to international capital is not progressing. The contrast between the plan and the policies could be traced to concern about current account deficit. Having a deficit on the current account is the consequence of importing capital, and this thesis tries to provide a framework to think about why short-term deficit on the current account is necessary for Indonesia's economic transformation.

Three papers organized in three chapters are used to argue the importance of openness in trade and investment for Indonesia's economic transformation toward manufacturing. The first paper utilises the GTAP model, a multi-sector, multi-region static, structured economic model to show the impact of higher investment on Indonesia's economy. The result suggests that opening the economy without any additional government intervention to capital distribution will lead to a higher growth of manufacturing sectors in a long-run scenario. Movement of factors would favour manufacturing sectors as growth is higher in these sectors, which will increase overall economic growth and welfare. Additionally, this paper provides discussion on the dynamics of Indonesia's investment policy since the new order, and on how Indonesia can improve its openness to the global capital market.

The long-run result shown in the first paper is not a linear one, however. There will be a transition from the investment phase, where deficit in the current account must be tolerated, to the production phase where investment is diminishing, and the interest rate is converging with the global economy. The second paper aims to show the dynamics of Indonesia's economic transition, due to the openness, using a dynamic version of GTAP model called GDyn-FS. Indeed, the simulation shows that Indonesia will have a larger current account deficit during the investment phase, which will last for 10 years since the implementation of more open policies. However,

in 2050, Indonesia will likely see a higher current account thanks to improvement in the productivity of manufacturing sectors. The second paper also discusses Indonesia's latest attempt for reform, the Omnibus Law, also called the Job Creation Law, which sees measures to improve Indonesia's business climate significantly.

Interestingly, along with the reform initiated by this Law, Indonesia's appetite for economic protectionism does not seem to fade. The government keeps discouraging imports through both Tariff and Non-Tariff measures such as quota restriction and local content requirement. These measures could potentially reduce competitiveness of manufacturing sectors since they restrict access to the international intermediate inputs market and prevent integration with the GVC.

The third paper uses data from Indonesian customs matched with Survey Industri, the manufacturing survey, to find relationship between import-reducing policies and firms' productivity. To reduce bias from potentially endogenous investment and intermediate input decisions by the firms, the Levinsohn-Petrin algorithm is added to the standard panel data fixed-effect regression. The result shows that import-reducing policies would reduce firms' total factor productivity as well as employment. More importantly, these policies hurt smaller firms more, which may put pressure on them to exit the market and affect competition negatively. While import-reducing policies are used with the intention of protecting local manufacturers, they are in fact hurting manufacturers in the higher chain of value and will be detrimental to Indonesia's goal toward economic transformation.

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Glossary

AFC	Asian Financial Crisis
CAD	Current Account Deficit
CGE	Computable General Equilibrium
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GTAP	Global Trade Analysis Project
GVC	Global Value Chain
ISS	Import Substitution Strategy
LCR	Local Content Requirement
NTM	Non-Tariff Measure
RPJMN	*Rencana Pembangunan Jangka Menengah Nasional* (medium-term development plan)
SOE	State-Owned Enterprise
SWF	Sovereign Wealth Fund

Chapter 1
Introduction

Economic growth has always been the main theme for Indonesia's political landscape. The current President, Joko 'Jokowi' Widodo always stresses the need to improve Indonesia's economic growth. Blessed with a high fraction of a young population and growing middle-class, economic growth is needed to make sure everyone has decent jobs. Moreover, the demographic bonus will fade away in the future. Increasing per capita income quickly has always been stressed by Jokowi to make sure that Indonesia is "rich before getting old". Ever since Jokowi's inauguration, economic growth has always been his government's main target.

Generally, the economic growth of Indonesia can be divided into three big phases (Aswicahyono, Hill, and Narjoko 2010; Hill 2018; Lindblad 2015; Pangestu, Rahardja, and Ing 2015). The first is the early 1970s when the oil boom started. As an oil exporter and a member of OPEC, an oil cartel, Indonesia benefited from the high price of oil. The revenue was used to finance many development targets, but also to subsidize the Import Substitution Strategy (ISS). The second phase started around 1981, where the oil boom had ended, and Indonesia needed another engine for growth. Financial liberalization took place, and the driver of growth was then export-oriented manufacturing, which was financed by international capital. However, 1998 saw the Asian Financial Crisis (AFC), which stopped Indonesia's growth trajectory. In this third phase, Indonesia's economic growth has never returned to the growth rate before the AFC.

Throughout the first two phases, manufacturing growth had always been the main driver of economic growth. Before the AFC, manufacturing growth was almost always above overall economic growth, providing jobs and prosperity to the Indonesian economy. However, the role of this sector was greatly weakened and never returned to its previous glory after the AFC. The start of a commodity boom in 2004 even provoked a classic Dutch disease, which saw another decrease of manufacturing growth (Pangestu, Rahardja, and Ing 2015).

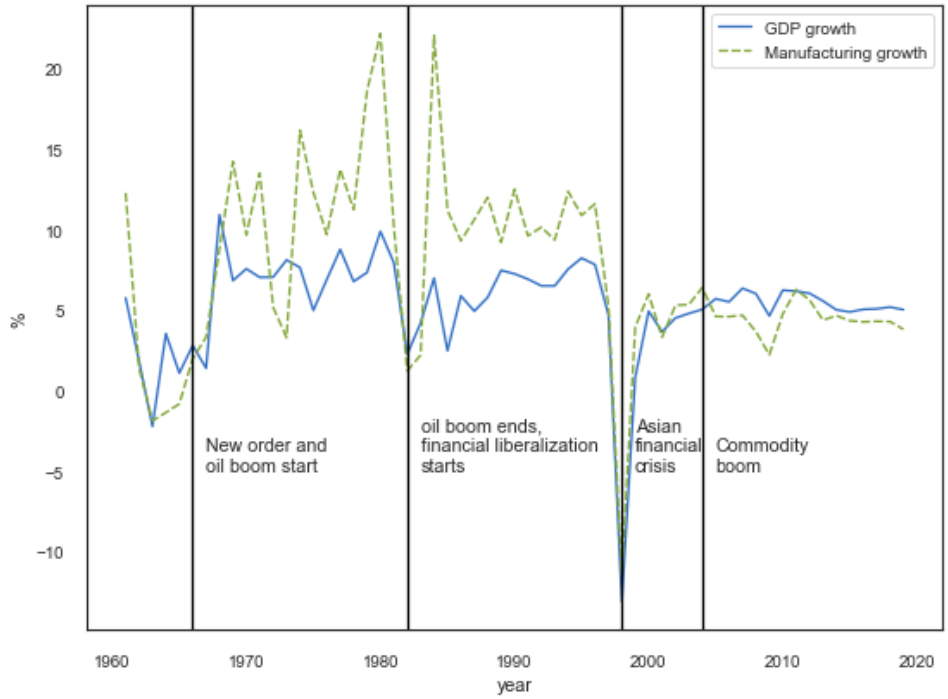

Figure 1.1. Indonesia's economic and manufacturing growth, 1960–2019
Source: World Development Indicators

The Indonesian Government has always been trying to use manufacturing as the engine for growth and to return to the pre-AFC economic growth rate. One of the latest development plans is called 'Making Indonesia 4.0', released on April 4th, 2018. It documents the Indonesian Government's new strategy in improving manufacturing's competitiveness, using the fourth industrial revolution's framework. In it, the Indonesian Government targets 7% growth, in which 25% is contributed by the manufacturing sector.

In the medium-term development plan (*Rancangan Pembangunan Jangka Menengah Nasional*, or RPJMN) 2020-2024, the contribution of the manufacturing sector to economic growth, job creation and net exports is once again highlighted. In fact, the Indonesian Government aims to do an economic transformation, a term coined to express a different state of transition from an agriculturally based economy to resource based, then manufacturing based, and then service based as the most advanced and complex economy. Most advanced economies went through this transition in their development process.

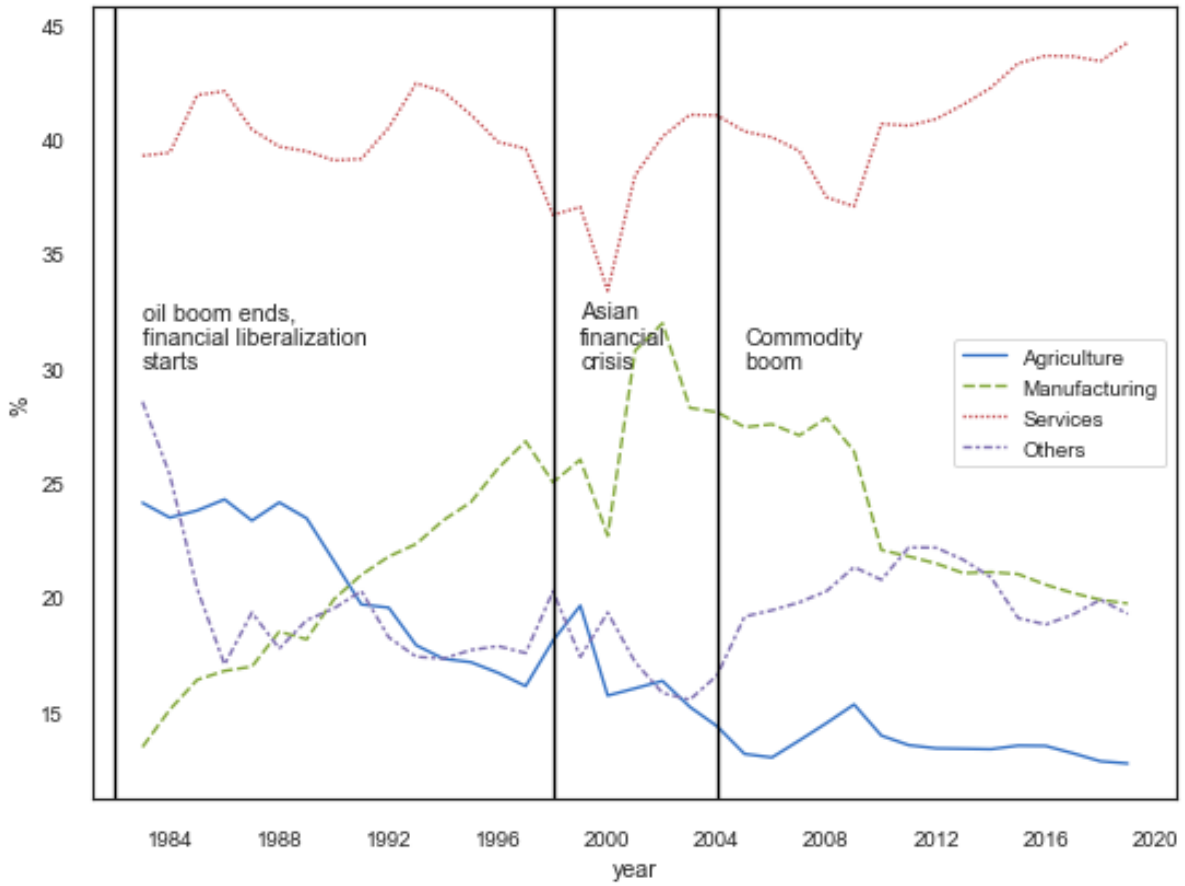

Figure 1.2. Indonesia's broad sectoral output share, 1981–2019
Source: World Development Indicators

Figure 1.2 shows sectoral contributions to Indonesian GDP, with "others" consisting of mainly extraction and construction sectors. Figure 1.2 highlights the rise of manufacturing contribution during the financial liberalization phase as agriculture and extraction sectors' contribution to GDP decrease. During this phase, the Indonesian economy transitions from simple extraction to a more complex manufacturing production in the 90s (Aswicahyono, Hill, and Narjoko 2010). The trajectory of the manufacturing sector's contribution to GDP stopped somewhat after the financial crisis, but really declined during the commodity boom phase until around

2011 when the globalisation started to wane[1] (Pangestu et al., 2015). Returning to a manufacturing sector transition is one of the main goals in the RPJMN.

The RPJMN contains a handful of targets that may or may not be aligned with Indonesia's path to economic transition. For example, a target that asks for increased contribution of agriculture to Indonesia's economy, while seeming to make sense for the Ministry of Agriculture, is not aligned with the economic transition which aims for an increased manufacturing contribution with a reduction in agriculture's contribution to the GDP. More importantly, RPJMN targets are the main basis for regulations created by the various ministries. It is important to ensure that these regulations are indeed the correct ones to pursue economic reform, which translates to economic transition.

This thesis explores two of the main aspects of a successful economic transition toward manufacturing: namely investment and trade policies (Yeaple, 2006; Ito, 2013). Foreign investment plays a huge role in Indonesian manufacturing, especially in the more complex industries such as motor vehicles and electronics (Aswicahyono, Hill, and Narjoko 2010; Hill 2018). Globalization and the rise of China leads to even greater importance to attract foreign firms if a country wants to be a global player in manufacturing (World Bank 2020). During the liberalization period, the Indonesian Government relaxed the flow of funds coming into Indonesia, which financed investment in exporting industries. These days, Foreign Direct Investment (FDI) is prioritized to help with Indonesia's lack of capital and know-how. Indonesia should be able to attract a significant amount of foreign investment with a big market base and competitive price of labour. Various incentives to encourage vocational and research growth are devised to improve Indonesia's human capital growth and improve its attractiveness to investors.

The role of international trade in manufacturing growth has never been as important as it is today. The improvement in shipping and communication technology leads to what economists call Global Value Chain (GVC), which allows firms to source a chain of value of a final good from various countries, based on the countries'

[1] As can be noted from figure 1.2., the share of "others"and manufacturing (mainly tradable) decrease while services, which is relatively much less tradable, go up.

comparative advantage. Many countries that have no strong capabilities in research and development are able to produce complex goods by exploiting GVC (World Bank 2020). Understanding how to exploit GVC will be a key role in increasing Indonesia's competitiveness in the global market, transitioning away from resource-based exports to more manufacturing ones.

Chapter 2 examines Indonesia's investment policy. This thesis traces back Indonesia's foreign investment policy since the 1960s. Foreign investment was crucial for Indonesia's economic growth even during the resource extraction phase, but especially so during the export-oriented growth. The liberalization during 1990s allowed for a transition from simple extraction toward more complex manufacturing-based growth.

There is room for reform, as Indonesia's capital market is still shallow. International bank borrowing was reduced quite heavily since the AFC, while only the Government is active in the bond market. Capital financing is rather expensive with low competition in the banking industry, and foreign investment restriction is relatively high. It is important for Indonesia to be more open in its financial account management.

To show the benefit of opening Indonesia's financial account, this thesis employed a Computable General Equilibrium (CGE) model called GTAP. This is a multi-region, multi-sector model with one representative agent and one representative firm in each sector (Hertel and Tsigas 1997; Corong et al. 2017; Gretton 2016). Agents in this model maximize their behaviour based on the economic environment they are supplied with. The employment of the GTAP model allows for modelling what happened to the Indonesian economy when it decided to be more open in its financial account. The GTAP database employed for this thesis is the version 10A that uses 2014 as the base year.

Based on Indonesia's structure in the GTAP model and GTAP database, a more open Indonesia, shown by a lower interest rate differential with the U.S., leads to increases in GDP and manufacturing contribution in the economy in the long run. This result aligns with the Indonesian Government's economic transition goal. Net exports are also increased, mainly driven by manufactured goods. The result from Chapter 2

is useful for the Indonesian Government to compare with RPJMN, as well as RPJMN-based economic policies.

During the writing of this thesis, the world was struck by a global pandemic caused by a coronavirus called COVID-19. The COVID-19 pandemic put pressure on global investment, trade, and economic growth. In the middle of the pandemic, the Indonesian Government surprised many by introducing the Job Creation Law (widely known as the Omnibus Law), a single law which overwrote around 76 laws. This law would reform Indonesia's investment climate by reducing red tape, improving the business licensing system, and an introduction of a Sovereign Wealth Fund (SWF), among others. Chapter 3 discusses the economic reform introduces by the law in greater detail, and how it can potentially improve Indonesia's investment climate and reduce the interest rate gap with the rest of the world.

This is where the discussion on the economic reform becomes more detailed compared to chapter 2. Red tape reduction and business licensing system improvement are intended to increase the speed of doing business and reduce uncertainty from overlapping regulations. The law also introduces measure to control minimum wage and help Small and Medium Enterprise to go formal. All these measures, implemented successfully, should improve Indonesia's investment climate, improve capital accumulation on top of the SWF, and reduce the rate of return.

Chapter 3 also introduces the transition dynamics. While Chapter 2 discusses Indonesia's potential long-run growth and economic structure, Chapter 3 discusses its dynamic transitional path toward that result. Showing the dynamic transitional path is essential because the path toward economic transition is not linear. While the Indonesian economy accumulates foreign capital, pressure toward a Current Account Deficit (CAD) will naturally start to emerge, at least in the short run. Aside from simple accounting, an increase in investment demand will simply be above Indonesia's production capacity, which requires increased imports.

However, the Indonesian Government despises CAD. Indonesia was experiencing CAD prior to the AFC, while current account surplus was credited as one of the main reasons why Indonesia was affected only mildly by the Global Financial Crisis (GFC) in 2008. While capital controls are not heavily used by the

Indonesian Government, Bank Indonesia, the Indonesian central bank, often intervenes in the exchange rate market (McLeod 2014). However, it is the Government that heavily intervenes in the goods market, increasingly turning protectionist, making it hard for firms to import goods from abroad (Patunru 2018; Hill and Pane 2018). Import restriction will reduce demand for foreign currency, which could potentially push up Indonesia's exchange rate and lead Bank Indonesia to intervene.

To show the importance of allowing a short-term CAD, a dynamic version of the GTAP model, GDyn-FS, is used (Ianchovichina and McDougall 2012; Ianchovichina and Walmsley 2012; Gretton 2021). Improving Indonesia's investment climate, shown by a reduction in the interest rate gap between Indonesia and that of the U.S., would lead to an investment boom in the first 10 years of successful implementation of the Omnibus Law. Consequently, the appetite for capital goods will put pressure on Indonesia's current account in the first 10 years. In the long run, however, Indonesia's economy would by much larger compared to its baseline counterfactual.

The modelling exercise shows that tampering with international trade could have an adverse impact on the economic transition. The obvious impact would be the slow and expensive accumulation of capital goods. Indonesia's imports are dominated by capital goods and intermediate inputs, and a higher appetite for capital goods would only increase them. An import reduction scenario is also exercised in Chapter 3, which shows an increase in current account surplus. However, in the long run, Indonesia's economy would fall to a CAD with a much smaller economy compared to the baseline scenario.

Imports, while not immediately intuitive to a general audience, are important for global competitiveness in manufacturing. The GVC rises the importance of sourcing intermediate inputs from the global market for firms to be competitive. Access to cheaper and more advanced materials, which could not be sourced domestically, allows firm to produce more competitive goods and penetrate the developed countries market that usually demands high-quality goods (Amiti and Konings 2007; Ing, Yu, and Zhang 2019; Hill and Pane 2018). Moreover, once Indonesian firms are able to export, they will learn from the experience and be able to improve their competitiveness (Pane and Patunru 2021).

Chapter 4 builds on these findings to explore how tampering with imports affects Indonesian manufacturing firms' competitiveness. In this empirical chapter, administrative data collected by Indonesian customs is exploited, which provide information on HS-8-Digits goods imported by Indonesian firms from 2008-2012, the timeframe that is allowed by data availability. Indonesian firms' competitiveness is measured using Total Factor Productivity (TFP), estimated using Levinsohn-Petrin algorithm, which accounts for endogenous material and investment input choices (Levinsohn and Petrin 2003; Petrin, Poi, and Levinsohn 2004).

Chapter 4 shows a negative impact of increased trade barrier to Indonesian manufacturing firms' competitiveness. Higher tariff and more Non-Tariff Measures (NTMs) have not only reduced Indonesian firms' TFP in general, but they also have a heterogenous impact, where bigger firms will be able to better manage the negative impact compared to smaller firms. Not only could smaller firms potentially be pushed out of the market, but there will also be an adverse implication for Indonesian manufacturing's domestic competition.

This thesis is, first and foremost, a policy-focused thesis. Focusing on improvement to the investment climate to attract foreign capital, as well as a willingness to integrate itself with the global economy through GVC, is at odds with Indonesia's appetite for market protectionism. This thesis contributes to the policy discussion by revisiting Indonesia's experience prior to AFC and uses the insight from there to analyse Indonesia's current account management. Importantly, this thesis highlights the impact of such current account management to its plan for economic transition in the current context.

More importantly, this thesis contributes to Indonesia's policy discussion and development plan by employing a structured model to simulate Indonesia's long-term dynamics toward economic transition. Indeed, the modelling exercise helps emphasize the importance of having a CAD in the short run, as well as highlights the problem with a protectionism approach to trade. This thesis also adds empirical evidence in the role of openness to trade, in this case improving access to international intermediate input markets to improve Indonesia's manufacturing competitiveness, which greatly aids the economic transition program.

Empirically, this thesis adds another evidence on the impact of intermediate inputs to firms' productivity. The main contribution to the field is the important heterogenous impact of such policy. That is, bigger firms are better able to cushion the blow from higher tariff and higher number of NTMs. They do so by reducing employment which may be complementary to intermediate inputs.

As noted, using GTAP model is central to the analyses in this thesis. There are several reasons why GTAP model is chosen. First, GTAP model is widely used, well-documented, and often serves as the starting point for other CGE modelers when building their own specialized model. Second, using GTAP model with GTAP database is very intuitive. As a database used by many CGE modelers amidst its richness in information, working with GTAP database is attractive and so becomes one of the main databases used in this thesis.

GTAP is not without limitation, however. GTAP version used in chapter 2 is a static model with long run closure. The main driver of increased growth is the fixed factor of production. Capital stock is fixed, and the model calculates it at the given rate of returns in each country. Capital is not mobile across countries, but fully mobile between industries in a country, hence the equal rate of returns across industries. This fact does not allow one to devise a transition period for policy analysis.

The problem of the static GTAP is tackled in the chapter 3 when transition period is discussed. Chapter 3 uses GDyn-FS, a dynamic version of GTAP. In this version, capital is not fully mobile across sector, and requires some time to settle to the long run rate of returns. Moreover, the long run rate of returns in GDyn-FS is exogenous, allowing for a level for the current rate of return to converge to. This allows for dynamics of reform in shorter run and longer run.

However, the main weakness of using GTAP for both scenarios is the lack of explicit financial market. Without a proper financial market, any possible impact of monetary policy (i.e., interest rate and exchange rate targeting) is muted. While exchange rate can be seen as coming from the difference of terms of trade, the results in this thesis must be understood as assuming the central bank plays no role in the economy. This is a crucial drawback since Indonesian Central Bank often plays an active role.

The results from the GTAP exercise, hence, must be taken with caution. This thesis is complemented by extensive discussions on Indonesian monetary policies to complement the policy discussions. Additionally, the empirical chapter (i.e., chapter 4) exists to support the model with robust evidence. This thesis serves as an important starting point to discussion on Indonesian trade, investment, and monetary policy.

Chapter 2

The importance of financial liberalization in Indonesia's economic transformation

2.1. Abstract

Indonesia has been struggling to return to its pre-Asian Financial Crisis economic and manufacturing growth level (see figure 1.1). The latest development roadmap, dubbed 'Making Indonesia 4.0', aims to exploit high-tech manufacturing to pursue export-oriented growth. The Government, realizing the need 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 controlling 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 labour and capital, as well as attaining global best practice. The potential gains to the Indonesian economy are illustrated using a version of the Global Trade Analysis Project (GTAP) model – extended for 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 if the Government allowed a potentially short-term trade deficit.

2.2. 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 one 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, the plan goes, GDP is projected to grow 2% higher than the baseline. The plan concentrates on developing five industry sectors, namely: 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 when it comes to adopting new technologies. In terms of readiness for future 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 neighbours, such as Malaysia and Thailand, while comparable to Vietnam. For Indonesia to be successful in implementing new technology in its manufacturing sectors, effective national economic reform may be needed.

One such reform is financial market liberalization. Effective financial market liberalization can help to reduce the 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 labour (Gretton, 2016; McKibbin, 1999). The capital-to-sector matching will also be improved if impediments to efficient investment 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 they 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.

Financial liberalization is not an easy topic for Indonesia, mainly amid the distressing experience of the AFC back in the late 1990s. Indonesia's economic history is highly influenced by commodity prices, such as the oil boom in the 1970s and the commodity boom during the mid-2000s (Hill, 2018; Shrestha and Coxhead, 2018). To save itself from an oil price drop, Indonesia pursued financial liberalization in the 1980s, in part to finance the needs for diversification. The financial market crashed in 1997, followed by political reform soon after.

The current situation is different. The banking sector is somewhat dormant in the financial liberalization agenda and focuses more on stability and risk mitigation. The Government puts more emphasis on attracting Foreign Direct Investment using policies such as fiscal incentives, reducing red tape, and pursuing Comprehensive Economic Partnership Agreements (CEPAs). Indeed, FDI is seen as a safer alternative to finance long-term projects (Stiglitz, 2000), and can arguably be online faster.

This chapter aims to provide an analysis on the impact of increased capital to Indonesian economic growth using the standard GTAP model. This is a multi-region, multi-sector, static Computable General Equilibrium (CGE) model, mainly used to model policies such as for trade, climate change, and energy. It assumes the new addition of capital will flow to the most productive sector under one price of capital and a zero pure profit condition (Hertel and Tsigas, 1996).

It is argued that a financial reform along with better investment condition will reduce Indonesia's risk premia. This is reflected by a lower required rate of returns by investors. In other words, investors will accumulate capital with better investment climate, hence pushes down the cost of capital. This reduction of required rate of return, which reflects a better investing condition, is used as a shock in the GTAP model.

Note that the assumption made in this chapter is a long run one. The financial reform allows for additional accumulation of capital and sectoral adjustment in the short run. In the long run, the process has finished and the snapshot of the final allocation of the capital is made, where it settles the final rate of return to be lower than that before the reform. This chapter emphasizes more on the future snapshot of successful reform to give an approximate economic performance once the reform has been implemented successfully.

More importantly, the result from this chapter assumes no additional measure targeting specific manufacturing sector by the government. That is, the government in this study focuses on improving Indonesian capital market and investment environment without actively pushes the capital to flow into a specific industry. Results suggest that even without actively targeting a specific sector, the five

government priority sectors still grow more than the others, especially compared to agricultural sector.

Two arguments emerge from the results in this setting. First, even without actively engaging in sectoral targeting, the government can still achieve economic transition (that is, growing manufacturing relative to agriculture sector) just by improving the investment condition. Second, the result may suggest that the target imposed by the government is already conditional to the sector's output. This is important for future studies as other possible targeted industrial policies made by the Indonesian government are possibly endogenous to the sector's performance. This chapter uses the version extended by the Productivity Commission (2010), which allows for changing the rate of return. The rate of return variable is endogenous in the standard GTAP model. The version used in this chapter swaps the rate of return variable with one of the factors of production, namely the capital stock, which is exogenous in the standard GTAP model.

With an effective reform and a much more developed capital market, Indonesia should be able to reduce its risk premium, closing its interest rate parity gap with the frontier economies and reducing its cost of capital. The rate of return shock is applied to the model to let it distribute the new capital to each industry, showing which sector grows the most under the GTAP assumption.

The modelling results are discussed to conclude what realistic (upper bound) outcomes could be expected from effective reform and some policy changes that could help Indonesia reach its productive potential. Under the successful implementation of reform, manufacturing sectors would be the main beneficiaries, even without the explicit assumption that the government is targeting those sectors. These manufacturing sectors also stimulate growth of income through increased export.

The chapter is organized as follows. It discusses the financial liberalization experience in Indonesia in Section 2.3. The modeling and rate of return calculations are described in Section 2.4. In Section 2.5 resides the result and discussion, and Section 2.6 concludes.

2.3. Financial liberalization in Indonesia

The argument about financial liberalization goes back to the mid-30s, but only really became influential since the mid-70s, where the argument was mainly about efficient allocation (Schumpeter, 1934; Shaw, 1973; McKinnon, 1973; Goeltom, 2008). The critics of financial liberalization had started quite early, but it was really taking off after the AFC in 1998, stating the weak link of financial liberalization to growth, market asymmetric information, and the liberalization's pro-cyclical nature (Stiglitz 2000; Goeltom, 2008; Bumann et al., 2013). More importantly, Stiglitz (2000) pointed out that it is hard to imagine an entrepreneur investing in a long-term project using a short-term source of funds.[2]

The story of Indonesia's financial liberalization is no exception. During the oil boom in the 1970s, Indonesia's banking sector was characterized as similar to that of a financially repressed system (Goeltom, 1995). Things were starting to change in 1983, when 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 allowance for lower credit ceilings (Goeltom, 1995). The financial deregulation reform was advanced again in 1988 through a regulation called Pakto (a shorthand for *Paket Oktober* or October Policy Package), which had a much bigger impact than that in 1983[3] (Goeltom, 2008).

The lending boom led to inflation and increased long-term, import-intensive projects (Goeltom, 2008). International lenders were more interested in short-term instruments amid high differential interest rates and weak institutional infrastructure to foresee long-term instruments (Goeltom, 2008). Non-performing loans started to increase, and banks' balance sheets were not sustainable. With a more intense cronyism economy added to the mix (Patunru and Rahardja, 2015), misallocation of short-term funds couldn't be avoided. The closure of Bank Summa, a major private

[2] This seems to be the case for at least Argentina, Mexico and Turkey, where in the exposure to financial liberalization, firms tend to favour portfolio investment over fixed investment (Demir 2009).

[3] Pakto's impact to the deregulation was amplified by Bank Indonesia's accommodative monetary policy. I thank Examiner 1 for highlighting the role of Bank Indonesia to Indonesia's financial liberalization during the 1980s.

bank, was the first symptom, then the economic system collapsed not long after (Goeltom, 2008).

Indonesia had a revitalization program with the help of the International Monetary Fund (IMF), World Bank, and Asian Development Bank (ADB). Bank Indonesia's independence was introduced, effectively giving it more power to supervise the financial system (Goeltom, 2008). By 2002, Indonesia was ready to get back on its feet with the introduction of tariff harmonization and new investment law.

FDI was following a similar path, albeit with less magnitude compared to the short-term funds. Inheriting a dire state of economy from the first president, Sukarno, the new regime under Suharto signed a law inviting FDI in 1967. But negative sentiment towards foreign investment was quite formidable, especially during the Malari incident in the mid-70s (Lindblad, 2015). FDI started to increase around the end of the oil boom in the 1980s, coming mainly from United States and East Asia (Lindblad, 2015). After the AFC, Indonesia's FDI continued to be liberalized, but the risk of investing in Indonesia increased after decentralization in 2002 due to the increased uncertainty in regulation (Lindblad, 2015).

Figure 2.1 shows the movement of Indonesia's investment in its balance of payments. The AFC in 1998 drove Indonesia's financial account to the negative side. The fall of Suharto and the IMF recovery program enabled Indonesia's financial account to be in somewhat better shape, but it was not until the Global Financial Crisis (GFC) in 2008 that Indonesia saw a new level of capital account. Moreover, the post-GFC timeframe happened to be a time when Indonesia's capital account became much more volatile.

Figure 2.2 displays deeper detail on Indonesia's financial account, by breaking it down to three categories: foreign direct investment, 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 availability do not allow for pre-1981 financial account visualization, but it seems as though the high other investment of positive financial

account can possibly be attributed to the 1983 government program of banking deregulation.

By 1993, the role of other investment was reversed, making FDI and portfolio investment more important contributors 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 in Indonesia's financial account than FDI.

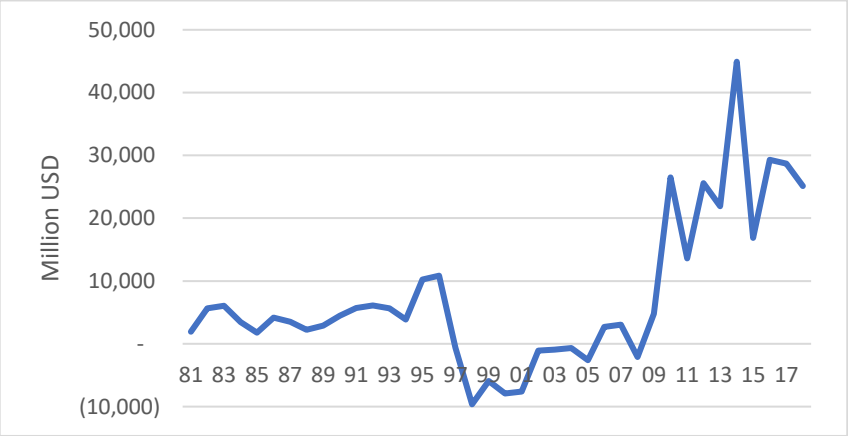

Figure 2.1. Financial Account, Balance of Payment of Indonesia, 1981–2018, current USD

Source: IMF and Bank Indonesia

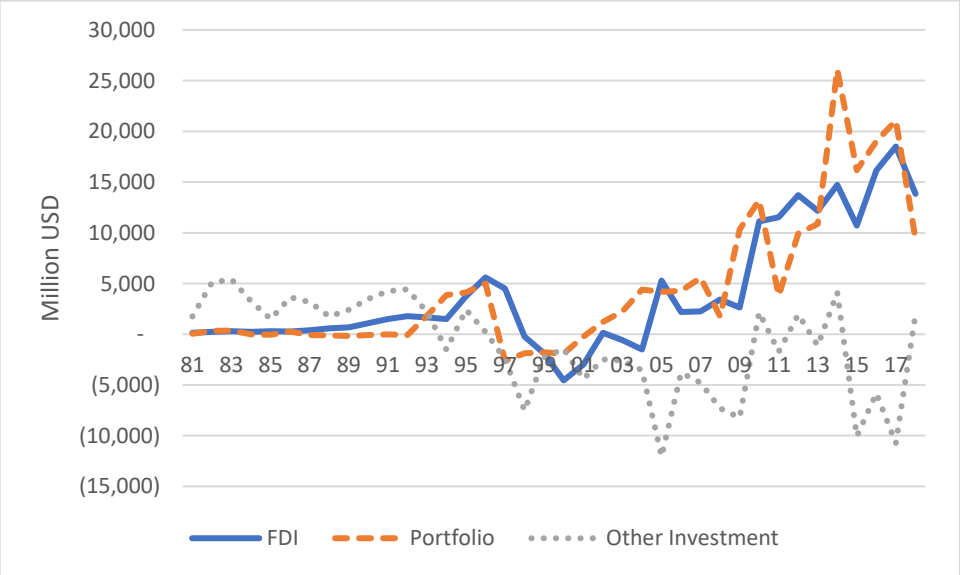

Figure 2.2. Indonesia's Financial Account Breakdown, 1981–2018, current USD

Source: IMF and Bank Indonesia

Figure 2.3 shows Indonesia's historical FDI inflow, which provides a somewhat different story. The portfolio spike in 1997 and other investment spike in 1998 are notably due to the Asian Financial Crisis (AFC). FDI followed the pattern soon after. The FDI only started to recover after 2001. There was a spike in 1975 that went 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.

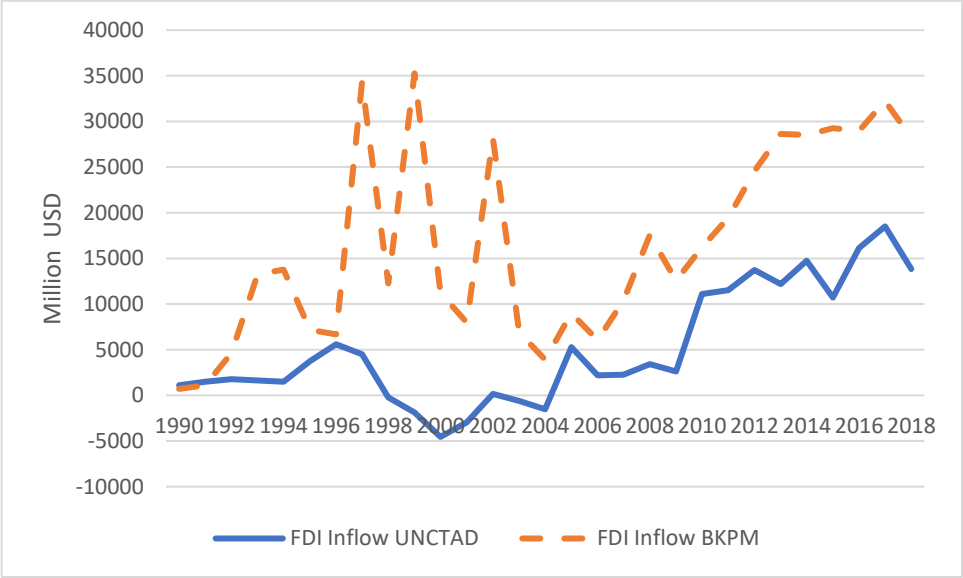

Figure 2.3. FDI Inflow in Indonesia, 1990–2018 in current USD
Source: UNCTAD, BKPM

Another interesting point from Figure 2.3 is the discrepancy between UNCTAD data with the data compiled by Badan Koordinasi 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 in figure 2.2., 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 of the investor (Lindblad, 2015).

A 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, the 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 laws that control FDI in their respective industries, particularly in logistics, education, health and telecommunications (Magiera, 2011).

The Financial Reform Index can show Indonesia's progress during the banking deregulation. This index measures how economies regulate their financial sectors in seven different dimensions: credit controls and reserve requirements; interest rate controls; entry barriers; state ownership; policies on securities markets; banking supervision, and restrictions on capital accounts (Abiad et al., 2005). Each dimension has several questions, adding up into one number. That number is then normalized between 0 and 1.

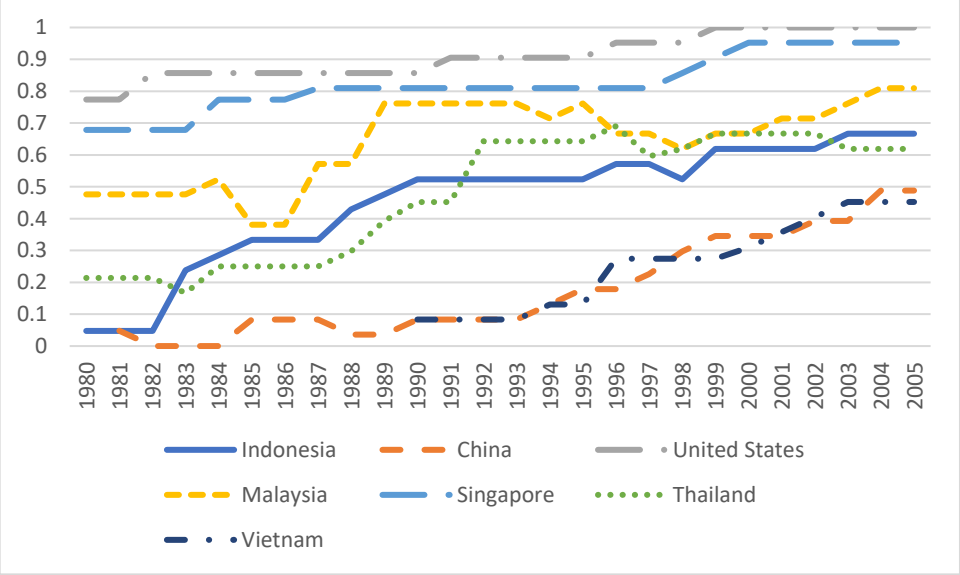

Figure 2.4. Financial Reform Index, seven selected economies, 1980–2005
Source: Abiad et al., 2005

Figure 2.4 shows the index of financial reforms from 1980 to 2005 of seven selected countries. As observed, notable increases of the financial reform index of Indonesia happened in 1983 and 1988, corresponding to a period of banking

deregulation. The increases in 1983 were mostly coming from measures such as interest rate control and directed credits. From 1987 onward, it was bank entry, capital account openness and securities market policies that were the drivers. However, banking supervision did not improve at all through those years.

The fastest increase in the liberalization in Indonesia seems to be between 1980 and 1990, which coincides with the banking deregulation timeframe. The main driver for the improvement, according to the data, are measures such as relaxation of the credit ceiling and interest rate controls. The slowest were privatization and international capital inflow. The data stops in 2005, restricting us from seeing the picture painted by the FDI law in 2007.

According to this index, Indonesia's financial reform is comparable with that of Thailand and Malaysia, and freer than that of Vietnam and China. However, on domestic credit provision, Indonesia is falling behind. Figure 2.5 shows the share of domestic credit provided by financial institutions of seven selected economies as a percentage of the nation's GDP. Indonesia barely increased its credit provision since 1960. Vietnam even surpassed Indonesia's credit share in 2003, converging with other Southeast Asian economies.

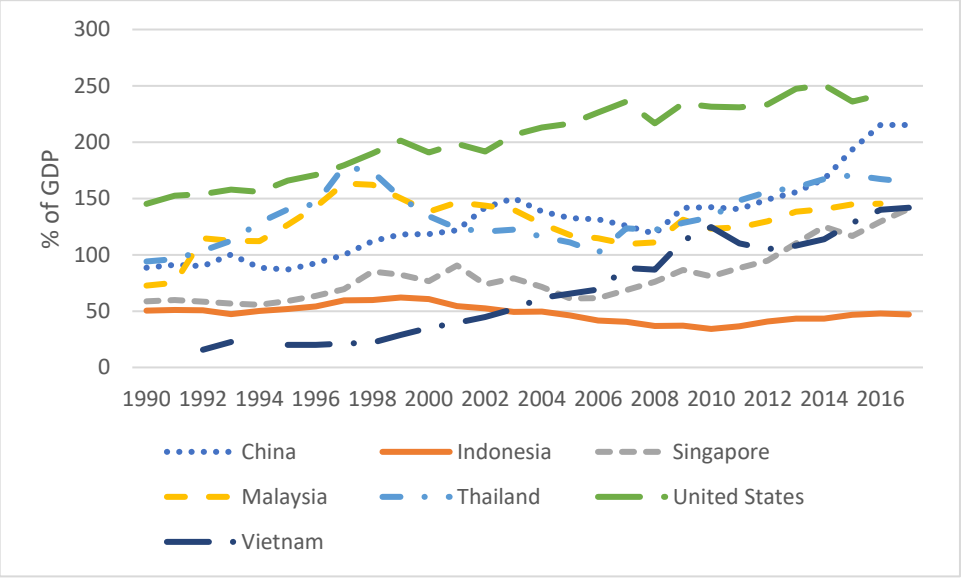

Figure 2.5. Domestic credit provided by financial institutions, % of GDP 1990–2017
Source: World Development Indicators, World Bank

The story is somewhat different using the Financial Development (FD) Index developed by the IMF, presented in Figure 2.6. The FD Index is a normalized index containing various metrics of depth, access, and efficiency of financial institutions (banks, insurance funds, pension funds) and financial markets (stock and bond markets) (Svirydzenka, 2016). Under the FD Index, Indonesia is still less developed, although it fares better than Vietnam. The U.S. remains at the frontier, Singapore fares a bit better, and China's position is less impressive compared to Figure 2.4. The addition of financial markets thus matters.

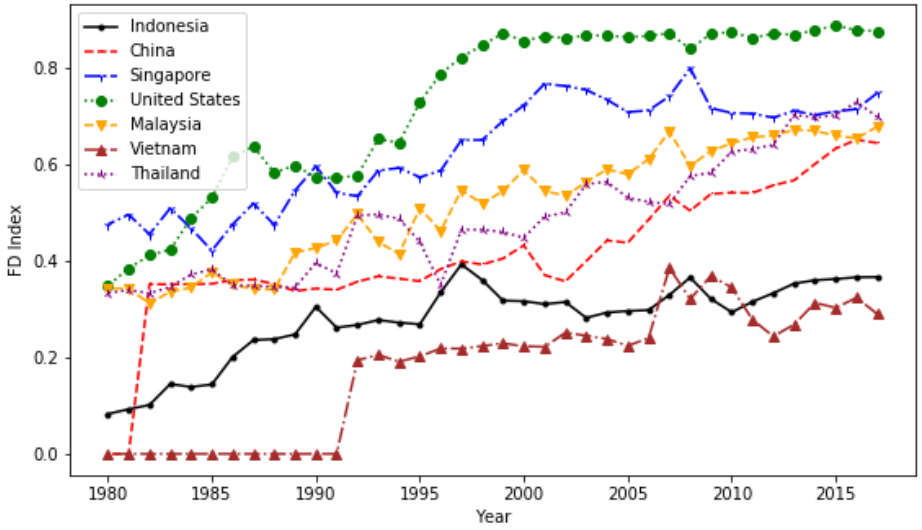

Figure 2.6. Financial Development Index, 1980–2018, seven selected economies
Source: International Monetary Fund

Figure 2.7 shows more detail of Indonesia's depth, access, and efficiency for both financial institutions and financial markets, respectively. Despite Indonesia's financial institution efficiency being comparable to those at the frontiers, it has not achieved similar level of financial depth. The financial market is slightly deeper, but the efficiency is highly variable and seems to trend downward after the GFC. In this index, market efficiency is measured by the stock market turnover ratio, with the higher rate of trading reflecting high market efficiency.

Indonesia's capital market requires more supply to grow faster than baseline and to lessen its dependencies on external shock. In the next section I discuss 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 its capital account in the 1980s, it hasn't experienced any further financial liberalization in recent years. Jahan and Wang (2016) construct several capital account openness indices, which are 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 at 0.5 (on a 0–1 range), the difference in types of assets is quite interesting to look at. This is illustrated in Figure 2.8.

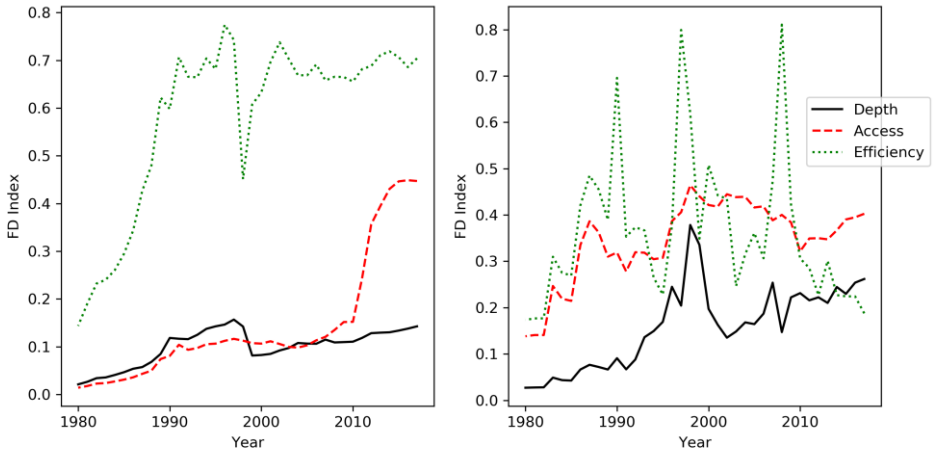

Figure 2.7. Financial Institution Index (left) and Financial Market Index (right), 1980–2018, Indonesia

Source: International Monetary Fund

Figure 2.8 presents six selected asset types. Indonesia's capital account openness index seems to have changed quite dramatically in 2009, after the GFC. Commercial credit and bond market gained extra openness in that year, while equity fell to zero from 0.25. Meanwhile, collective investment is arguably the most open type of investment in Indonesia, which has a 0.75 score. Apart from what is presented in Figure 2.8, there are direct investment, which sits at 0.5 from 2000-2013, and real estate ownership and derivative, which stays at 0.0. Interestingly, personal capital transaction scores at 1.0, or fully liberalized.

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 money coming to its own market. This is also the time when Indonesia's amount of portfolio, derivative and other components of the capital account increased, as presented by Figure 2.2. While it doesn't seem like much happened in 2010s, it is possible that Indonesia may be able to see a similar jump in its financial account if further liberalization is done, assuming that entrepreneurs' demand for fresh money is still high.

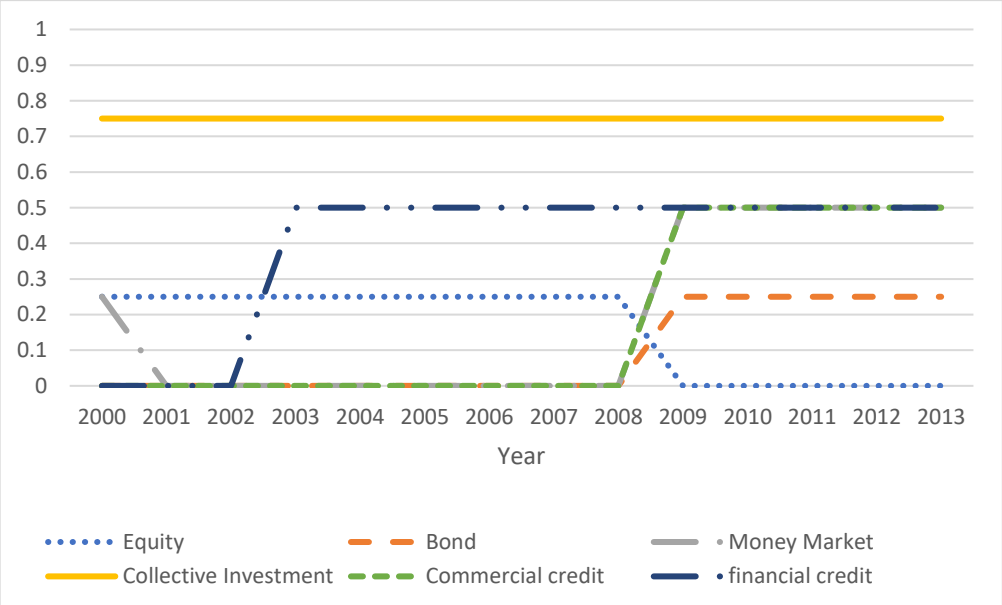

Figure 2.8. Indonesia's Capital Account Openness Index, selected asset types, 2000–2013

Source: IMF, 2018

Note: The money market graph overlaps with commercial credit after 2001

These indices suggest that Indonesia still has room to open its capital account further. However, after the AFC, the case for a more liberal approach to the capital account needs to be dealt with care. It needs to be done in a way that it is free enough to deepen Indonesia's financial market, but mitigates the risks associated with financial liberalization. Indonesia needs to identify its own risk, and 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 happening to banks 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 institutions. Second, Bank Indonesia in 2017 reduced its partial reserve requirement, benefiting small banks facing liquidity problems (International Monetary Fund 2018).

Developing the 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 bonds issuance. While corporate bonds in Indonesia remain small, government bonds are becoming the alternative for deepening its financial market. One possible way to further develop the 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) assessed Indonesia's most current risk and crisis prevention method. It seems that the main risk comes from a high foreign ownership of government bonds, which exposes Indonesia to a currency risk. The bond can reach a relatively high interest rate – as in June 2018 when it reached 7.8% – which potentially crowds out private investment (Rosengard and Prasetyantoko, 2011; Hamada, 2018; Triggs et al 2019). Moreover, 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 of the central government to issue more bonds. Additionally, Indonesia implemented a Tobin tax in 2018 to further 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, known locally as Pencegahan dan Penanganan Krisis Sistem Keuangan (PPKSK). This law creates a new ad-hoc body called KSSK, whose role is to advise the President when to declare a crisis, which then lets relevant agencies act accordingly. Triggs et al (2019), however, are rather pessimistic on the role of this Law. It lessens the central bank's lender of the last resort power, increases the length of red tape, and slows down technocratic institutions to

act fast. Time is essential as a problematic bank can quickly lose its equity value in a crisis.

To add to matter, financial deepening does not always translate into higher investment, especially in Indonesia. It is well known that small, medium and micro enterprises often have a hard time accessing credit amid perception of high risk and lack of collateral (Tambunan, 2007). Indonesian banks, both domestically- and foreign-owned, are more interested in investing in consumption credit and Bank Indonesia's instrument, especially foreign owned (Rosengard and Prasetyantoko, 2011; Hamada, 2018). BI's ruling, such as banking license and Arsitektur Perbankan Indonesia (API), makes it hard for banks to innovate in the micro credit market, and increase oligopoly in the banking industry[4] (Rosengard and Prasetyantoko, 2011).

Perhaps the better way to avoid short-term capital flight risk and promote real investment is to have a better direct investment regime, as FDI is much less volatile compared to portfolio investment (Stiglitz 2000). In early 2018, BKPM simplified its investment regulation by issuing BKPM Regulation 13 on Guidelines and Procedures for Investment Licensing and Facilities, effectively replacing five of its own previous regulations. The new regulation aims to make investment much easier, especially if it is in the special economic zones. Investors need 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 control of Indonesia's direct investment from other ministries, which is one of the problems mentioned by Magiera (2011). The government aims to streamline its investment regulation further by making two Omnibus Laws, although it is not clear yet what the regulation will cover. However, if these new laws do not change the Negative Investment List, the attractiveness of these laws may be limited only to current investors or new investors trying to enter the already open industries.

The new Free Trade Agreements (FTAs) signed by Indonesia might also help in this case. Indonesia just recently signed an FTA with Australia, dubbed the Indonesia-

[4] After AFC, BI seems to think a small number of uniform big banks is easier to manage. Although banking access has increased since the AFC, the number of all types of banks was declining. This is not ideal since the micro enterprise market needs a specialized bank. See Rosengard and Prasetyantoko (2011) for the complete analysis.

Australia Comprehensive Economic Partnership Agreement (IACEPA); this is a comprehensive FTA, also touching the issue of direct investment, among others, as the first for both countries. This means Australia can enter the Indonesian industries opened by the IACEPA, regardless of Indonesia's unilateral Negative Investment List, at least on paper. Some industries including logistics, mining, education and tourism allow for majority foreign ownership for Australia. While Indonesia-Australia's economic interdependence is relatively limited, IACEPA is the first agreement to specifically regulate 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 prove to be hard, especially after the AFC. These new reforms, which are still ongoing, potentially can attract new flows of funds without having to hike interest rates.

2.4. Modeling Indonesian investment

Several papers use CGE to model economic reform. McKibbin (1999) uses the difference in the cost of capital between a particular country and the U.S. as a measure of the scope for financial market liberalization in that country. It is argued that foreign capital will flow to the higher interest rate country, which later reduces the price of capital due to its increased overseas supply (McKibbin 1999, Goeltom 2008). McKibbin (1999) uses G-cubed, a dynamic CGE model, to run such simulation.

The 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 introduced measures to the banking industries to reduce risks, such as increasing bank reserve requirements. All these 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 affect the overall economy, which relies on financial services as intermediate input.

Other work that uses the GTAP to model financial liberalization is that of Gretton (2016). He uses a similar version of GTAP as the Productivity Commission (2009) to model the potential impact of China's economic reform on Australia's economy. He uses a similar approach as McKibbin (1999), reducing 50% of China's wedge, which equals 10% of the required rate of return, and applies it to the GTAP model. The results suggest an increased 5.7 percentage points increase in GDP from the base.

The basic approach to financial liberalization in these studies rests on a similar basic principle: more fluid movement of finance leads to convergence of the cost of capital. If there is no friction of capital movement across countries, then investment will move from lower interest rate countries where capital is less appreciated, to countries with higher rate. This movement will continue as long as there are rate differences between countries, until the rates of all countries in the world converge.

If, however, the movement of capital is not as fluid, then rate differences will exist. High-rate countries with less fluid capital market are unable to effectively receive capital from lower rate countries and prevent the convergence. The argument goes, once a high-rate country with less fluid capital market opens, capital will start coming in and the interest rate 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 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 assumed 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 a decreasing marginal rate of productivity of capital, it will stop accumulating when investment equals depreciation. During the capital accumulation period, output grows to a steady state level.

Consider a reform that allows capital (and other factors of production) to move. Next, capital will flow to sectors that value it the highest (i.e., high interest rate),

enhancing economic efficiency as capital become more abundant and interest rate starts to reduce, and is reflected in increased productivity to the sector amid lower overall factor prices compared to outputs (Francois et al., 1997). In turn, this will shift productivity up, hence more accumulation of capital, which in turn moves the economy to a new steady state.

The GTAP model is a CGE model developed by Purdue University, built to quantitatively model the world trade (Hertel and Tsigas 1996). It consists of many regions and many sectors interacting in a general equilibrium framework. While the model was originally used to analyze trade in goods, many researchers modify the GTAP model to fit other purposes as well. The one used in this paper is a modified version of the GTAP.

In the GTAP, each sector in each region has one representative producer, one representative consumer, and one government, each making their own decisions. Saving and investment in this model are facilitated by a hypothetical 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 long-run closure for its investment problem. That is, it equalizes 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 long-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 and 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 assumption of no capital movement between countries adds to another caveat in interpreting the results from this model. No movement of capital across region means liberalization will not affect international flow of capital. Capital can only be as productive as the regional rate of return amidst its inability to find a higher return sector abroad. Again, we can consider this a long-run case where actual capital

inflow happens in the short-run and the Indonesian economy has finished paying back the foreign capital in the snapshotted long-run.

For this study, we adopt a modified GTAP version used by the Productivity Commission (2009) and Gretton (2016). This version of GTAP allows for endogeneity of capital stock by swapping it with an exogenous rate of return. Instead of letting GTAP calculate rate of return from a constant amount of capital, this version holds rate of return and lets GTAP calculate the capital stock accumulation.

The swap closure allows for changing the rate of return. In GTAP it is set exogenously to reflect the static (long-run) state of the economy. I assume the reform will reduce the risk of doing business in Indonesia, and hence attract more investment to the country. It can be said that this closure allows for a longer run scenario where the implementation of the reform has finished and allows one to shock the rate of return changes to the lower long-run rate.

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

$$ke(r) = IKR(r) * qcgds(r) + [1 - iker(r)] * kb(r) \quad (2.1)$$

where *ke(r)* is the percentage change of the end-of-period capital stock in the *r* region. *IKR(r)*[5] is the ratio of investment to the end-of-period capital stock, which makes *1-IKR(r)* the existing capital stock.

Required rate of return, or RORC in the GTAP, is defined as the rate of rental price of capital over price of saving, less depreciation rate. In other words, this is the net return of capital, reflecting the difference between gross return and cost. Defining *GNR*[6] as gross return over net return, the change of the RORC for each region can be expressed as:

$$rorc(r) = GNR(r) * [rental(r) - pcgds(r)] \quad (2.2)$$

[5] IKR(r) is INVKERATIO(r) in the standard GTAP. The variable name is changed in this piece for convenience.
[6] GNR(r) is GRNETRATIO(r) in the standard GTAP.

where rental(r) is the change of rental rate (i.e., value of output received by capital owners) in region r and pcgds(r) is the price of capital good (i.e., the cost of capital) in region r.

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

$$RORE(r) = RORC(r) * [KE(r) - KB(r)]^{-\sigma(r)} \quad (2.3)$$

where KE(r) is the end-of-period capital stock in region *r* and KB(r) is the beginning-of-period capital stock. In percentage change form:

$$rore(r) = rorc(r) - \sigma(r) * [ke(r) - kb(r)] \quad (2.4)$$

where σ reflects the elasticity of RORC to the change of capital stock. This standard set-up with exogenous capital stock allows for calculation of different rates of return between regions. In other words, the capital stock dictates the rate of return of each country. Steady state is reached when *ke(r)* = *kb(r)* and the change in rate of return expected by the investor equals to actual rate of return (or rore(r) = rorc(r)). At this point, investor no longer accumulates capital more than its depreciation.

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

$$capital = sum\{r, reg, \frac{VKB(r)}{sum\{s, reg, VKB(s)\}} * qo(\text{"capital"}, r)\} \quad (2.5)$$

$$rorc(r) = rorc\_r + f\_rorc(r) \quad (2.6)$$

In the standard closure where capital is internationally immobile, f rorc(r) is endogenous and equation (2.6) is redundant. However, when capital is internationally mobile, *f_rorc(r)* is exogenous and is set equal to zero, so equation (2.6) reduces to *rorc(r)* = *rorc r*, forcing the percentage change in international rates of return on capital in all regions *rorc(r)* to be equal. In the GTAP version that we use, the *rorc(r)* is kept exogenous and a slack variable is added to enable its shock. A negative shock to the *rorc(r)*, keeping GNR constant, will force the changes in rental price less price of capital goods to turn negative, driving up the demand of capital goods. The economy will supply the good through domestic saving and net borrowing from abroad. The model 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 which should be to liquify financial flow. The flow of finance, in theory, should come 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 reforms its capital account further, its interest rate will be reduced, closing the gap between it and that of the developed world, *ceteris paribus*.

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

$$r_t^i = r_t^U +_t e_{t+1} - e_t + \xi_t \qquad (2.7)$$

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 that avert real interest rate to converge, including financial restriction. McKibbin (1999) assumes the financial restriction to be 50% of the total ξ. Therefore, in his study, McKibbin (1999) shocks half of rate difference as a hypothetical case of financial liberalization. A large number on the wedge suggests big capital cost, or risk

premia, from having more restricted financial policy in country *i* compared to the U.S. (McKibbin, 1999).

Historically, Indonesia's real interest rate does not exactly follow the movement of that of the U.S., as shown in Figure 2.9. While the U.S.' real interest rate is visibly less volatile, Indonesia's real interest rate has a more volatile movement over time, with visible spikes in certain years. Real interest rate peaked in 1992, reaching as high as 15.6%, while it dived the deepest during the 1998 Asian Financial Crisis.

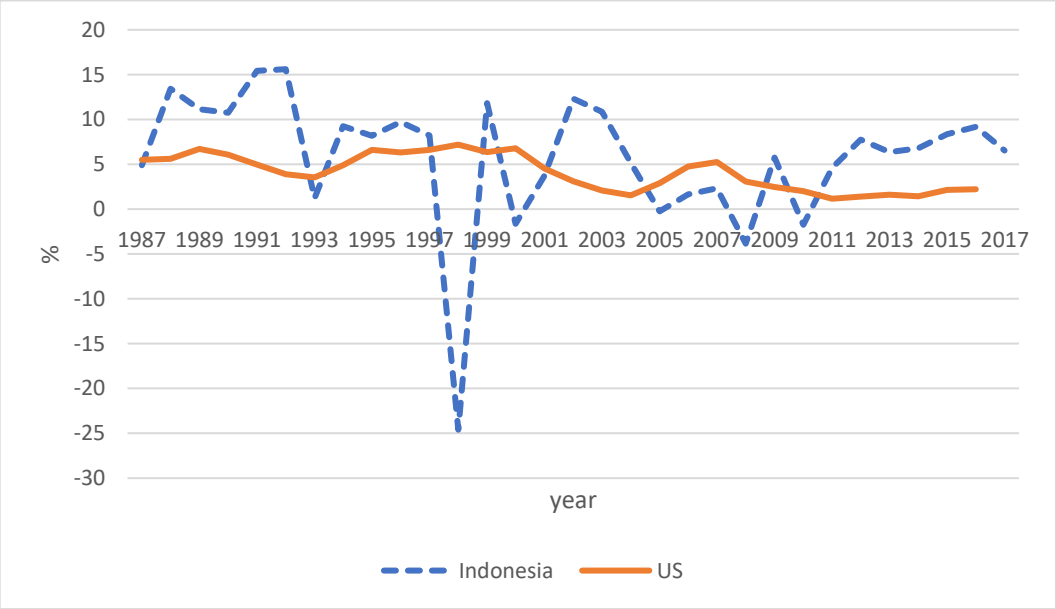

Figure 2.9. Real interest rate (%) for Indonesia and the U.S., 1987–2017
Source: World Bank

As expected, Indonesia experienced a higher real interest rate at the beginning of the last banking deregulation policy package around 1988, as suggested in Figure 2.9. According to Goeltom (1995), Indonesia set a very low interest rate ceiling to allow cheap credit for conglomerates during the 1970s and early 1980s. Letting it float helps bank readjust to a more market-oriented interest rate. After the fall of Suharto in 1998, the real interest rate followed the narrative of Patunru and Rahardja (2015), and 2002 to 2006 was 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 have resulted from a sudden drop of its national currency

(Titiheruw and Atje 2008). Indonesian interest rate spiked again after 2010, when the increasing trend of non-tariff measures and FDI restrictions took place (Patunru and Rahardja, 2015). The year 2010 also marks the beginning of the ASEAN free trade agreement with China, South Korea and India (Pangestu et al., 2015).

As can be seen from figure 2.9., 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 choose the years 2011 onwards as the right years to calculate the wedge. Firstly, this period is probably the one with the most stable real interest rate fluctuation compared to other periods. Volatility of the real interest rate is also experienced by other developing countries, but they experienced a more stable real interest rate during these years. Secondly, during this period, Indonesia's statistics, such as current account deficits and investment, also show less volatile figures. Thirdly, Indonesia did not get any big change of policy during these years (Patunru and Rahardja, 2015). Finally, 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. Therefore, it seems appropriate to see the evolution of Indonesia's wedge during this time span.

Table 2.1 shows the wedge calculation from 2011 to 2016. The wedge calculation uses McKibbin's (1999) formula, the equation 2.7. The Exchange Rate (ER) and forecasted exchange rate data is obtained from CEIC, while the real interest rates for Indonesia (r^I) and the U.S. (r^U) are taken from the World Bank. Exchange rate data is an annual average of monthly averages nominal exchange rate, while the forecasted nominal exchange rate is sourced from Indonesian national budget assumption. Expectation is calculated as a percentage change from next year's forecasted ER to the current year ER.[7] The simple average of the wedge from 2011 to 2016 is 4.878 percentage points.

[7] The small value of the expectation variable suggests that the government never expects the future to stray too far from the current situation. This may or may not reflect the expectation of private institutions, albeit arguably a good proxy.

Table 2.1. Wedge calculation for Indonesia's real interest rate to the U.S.' from 2011 to 2016, in percentages except for the ER and forecasted, which are IDR/USD

	2011	2012	2013	2014	2015	2016	2017
ER	8,770	9,386	10,461	11,865	13,389	13,308	
Forecasted		8,800	9,300	10,500	11,900	13,900	13,300
Expectation	0.337	-0.923	0.371	0.293	3.831	-0.063	
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	3.096	7.291	4.395	5.069	2.384	7.035	

Source: Author calculations, CEIC, World Development Indicators (World Bank)

The GTAP's wedge is calculated in a slightly different way; the GTAP does not explicitly calculate interest rate. What it has is the value of output created by endowment commodity (EVOA in the database). The GTAP database also has capital stock called VKB. 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 2.2 shows the return to capital of both Indonesia and the U.S., and the wedge.

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

Table 2.2. Wedge calculation from GTAP Database, for Indonesia's real interest rate compared 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.	7.45	3.45				

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

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

The shock is applied in three different magnitudes: a 1.0% shock is conducted as a sensitivity test; the second shock is 10.0%, which shows a modest financial reform; and 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 416.0 bps respectively.

2.5. Results and discussion

Each shock is applied on the interest rate in the Indonesian economy. As noted, three shocks are applied, which are 11.78 bps, 117.8 bps, and 416.0 bps from the baseline, to see how sensitive the rate is to the economy. Table 2.3 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 with caution, 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, the result can be interpreted as a long-run result. Being comparatively static, the results do not project what happens during the transition period. To obtain such information, a dynamic model would be required. The results can be interpreted as showing how the Indonesian economy could differ from the current situation (as represented by the GTAP database) with full implementation of policies that lower returns required on new investment, in line with the modeling scenarios.

Table 2.3 shows the same direction for the results of the three shocks. The results suggest that a modest reform will be enough for Indonesia to reach its growth target. A 10% rate of return reduction, which translates to a 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.

The increase in real wages is to be expected since in this closure, labour is fixed. Given the same amount of labour, more capital improves the workers' productivity and, in turn, increases their wages. Real wages for both unskilled and skilled labour suggest the increased capital will potentially benefit them, and also with a no skill-biased gain where both skilled and unskilled labour enjoy similar rate of wage growth. Improvement in real wages also comes with higher consumption for both the government and household.

Table 2.3. 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
Household consumption	% change	0.234	0.895	2.65
Government consumption	% change	0.172	0.267	1.474

Source: Author's calculations

Indonesia gets a more positive Balance of Trade (BoT) with higher capital stock. This seems counter intuitive with the increased capital from abroad. In the short run,

higher capital inflow should result in a negative BoT, since the increased capital allows Indonesia to purchase more import. The BoT equation in GTAP calculates solely on export minus import. Moreover, since GTAP is a comparative static model, the new capital injection, which does not suffer from any short-term adjustment cost, translates to increased production with no delay whatsoever. While increased capacity could come from importing machineries and technologies in the short run, GTAP only captures increased import for intermediate input.

The results from trade seem to corroborate this explanation. Indonesia in this scenario has a much higher increase of export volume than import volume. This is a welcome result because Indonesia is exposed to 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 results for industries. Moreover, we need to return to the model and see how firms behave in GTAP.

Firms' final output in GTAP consists of two perfectly complementary 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, the 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 2.10 illustrates this very structure.

With the increased capital, free flow of factors between industries and other endowments fixed, all factors flow up to a point where the returns from all industries are equal. Capital shifts up generally, with agriculture and food industries having the least increase of capital, arguably because of the relatively less capital intensity compared to heavy manufacturing. While both service and manufacturing gain a similar level of capital, labour behaves much differently. Service sectors have decreased the number of both unskilled and skilled labourers, with the highest decrease in construction. In manufacturing sectors, some have had a small decrease of labour, but most have a high number of labour flowing from other sectors.

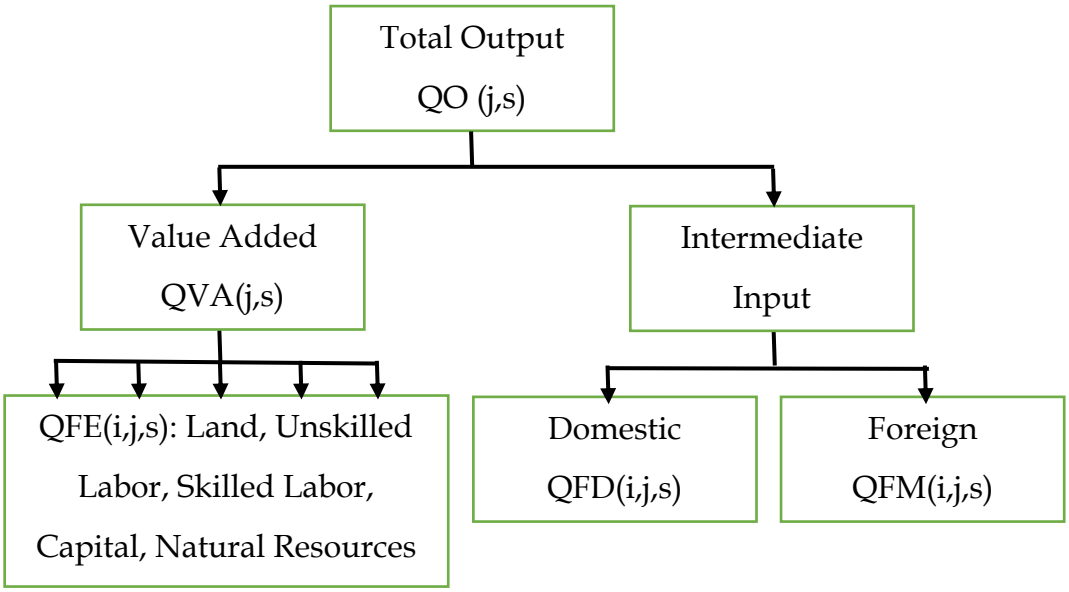

Figure 2.10 GTAP's production nest

Source: Hertel and Tsigas (1996)

Table 2.4 illustrates the 10 top performers and 10 least performing sectors of a 117.8 bps reduction on required rate of return in terms of output change, while Table 2.5 shows terms of balance of trade change. 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 an increase in both capital and labour, while the extra labour comes from mainly service sectors. A small-sized sector such as wheat even shrinks amid losing so many factors to the manufacturing sectors. The new capital also makes both skilled and unskilled labour become scarcer, thus increasing their value.

BoT per sector also experience different results 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 2.4. 10 top performers and 10 least performing sectors from a 117.8 basis points reduction in required returns on capital in terms of output growth, percent

Industry	Δoutput	Industry	Δoutput
Electronic equipment	19.04	Sugar cane and beet	2.04
Non-ferrous metal	18.01	Sugar	2.03
Other machinery equipment	16.98	Other grains	1.94
Apparel	16.41	Other crops	1.40
Leather	15.57	Paddy rice	0.96
Textiles	12.67	Vegetables and fruits	0.78
Chemical rubber products	11.68	Processed rice	0.74
Other transport equipment	11.29	Construction	-0.14
Motor vehicles and parts	10.34	Plant fibres	-0.43
Iron and Steel	10.28	Wheat	-7.14

Source: Author's calculation

Table 2.5. 10 top performers and 10 least performing sectors from a 117.8 basis points reduction in required returns on capital in terms of balance of trade change, USD mil

Industry	ΔboT	Industry	ΔboT
Chemical rubber products	4,176.29	Sugar	-52.72
Other machinery equipment	2,296.77	Other grains	-71.63
Electronic equipment	2,204.82	Wheat	-79.86
Non-ferrous metal	1,477.17	Processed rice	-132.24
Apparel	1,208.31	Vegetables and fruits	-191.98
Leather	1,031.74	Oil seeds	-239.41
Textiles	990.97	Plant fibres	-271.35
Lumber	967.44	Other crops	-533.12
Fabricated metal products	780.72	Oil extraction	-564.63
Motor vehicles and parts	757.90	Petroleum and coke	-1,339.49

Source: Author's calculation

Both tables 2.4 and 2.5 show the economic transformation at work. In this model, investment flows to sector with high capital gain. Hence, the more capital-intensive sector, in this case manufacturing, enjoys much of the increase of capital. At the same time, less capital-intensive sectors, mostly agriculture, grow smaller. While these sectors receive capital as well, labours are following the higher return from capital-

intensive industries, hence reducing agricultural outputs and trade balance. The economy is transitioned toward manufacturing just by having higher investment.

There are three important aspects of the model when discussing industry. First, GTAP assumes free movement of capital between industries. There are two consequences with this assumption: 1) it leads to an equal rate of return between industries, which is empirically not true, and it is also theoretically hard to accept if the government still includes many of these industries in the negative investment list; and 2) it is also unrealistic to assume that capital can freely flow to different industries in the short run without adjustment cost. However, this problem has minor consequence in this paper, due to the additive nature of the capital. The capital is freshly entering Indonesia without having to move a settled capital.

Second, there is no role of the government except in setting fiscal policy. This means the capital would flow naturally to these industries based solely on the rate of return. The consequence of this point is that even when the government does not promote the five main industries to absorb new capital, the market alone would come mainly to these industries. Alternatively, it can be said that the government need only to promote capital to come to Indonesia in general, let the investors advise themselves on where to invest, and they would allocate their capital to the five targeted industries.

Third, when investment comes from abroad in a vast amount in a short time, BoT will become negative in the short run. Additionally, trade balance for agriculture sectors is negative even in the long run. It is important for the government to allow a negative trade balance and loosen its trade policy on agriculture, at least in the short run. If the reform is successful, Indonesia's reliance on commodities can be relaxed and its manufacture can take over in driving Indonesia's export growth in the long run.

The change of Indonesia's rate of return impacts not only its own economy, but also the rest of the world. With the shock on Indonesia's RoR, it not only changes its 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 in the same direction. Since the model adopts the same expected rate of return for 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 increases to capital endowment, albeit small compared to Indonesia. Consequently, the world's capital stock increases.

Table 2.6 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 exceptions. The total change of the whole region is positive, which means the capital stock of the world has increased. This seems to be counter-intuitive to what we expected, at least in the short run.

Table 2.6. The impact of the shock on returns on capital to balance of trade and capital stock, 26 regions

Regions	ΔBoT	Δ Capital Stock		Regions	ΔBoT	Δ Capital Stock	
	USD Mil.	USD Mil.	%		USD Mil.	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

Reduction of rate of return from flowing capital to Indonesia should mean negative capital increase in 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 that we 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 decreases 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 captures the long-run scenario of the RoR reduction in Indonesia, with a new level of global capital stock already reached, fixing rate of return in other countries.

Table 2.6 also shows the BoT of other regions.[8] The BoT for most countries potentially decreases, except for Singapore. The results shown in Table 2.6 seem 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 industries. 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 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. 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 the current account deficit, limiting Indonesia's import. Bank Indonesia is also active at keeping the Indonesian Rupiah stable, despite its floating exchange rate regime. 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 bonds are important to deepen Indonesia's capital market. Additionally, expansionary fiscal policy is especially important to finance infrastructure projects that could have a high positive spillover effect across the

[8] The GTAP database consists of 140 different countries, which for practicality reasons, is aggregated to 26 regions in this paper.

economy. Indonesia has a good central government and state-owned enterprise bond market, but a discussion toward local government bonds might help in deepening the Indonesian bond market. Indonesia is a highly unequal country where most development happens on the island of Java. A more effective local government bond market could help not only in deepening Indonesia's financial market, but also developing its rural areas.

Aside from the fiscal rule, there is another issue concerning developing the government bond market: it requires a 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 promotes private investment, at least in the short run. Additionally, the Indonesian government has 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 of growth and tax ratio, however, issuing a longer run matured bond can be seen as a potential policy prescription.

Another possible, less often cited, approach is to pursue increased domestic savings. This can potentially mitigate the trade deficit the government is concerned with right now. However, now is possibly not the best time to encourage a savings mobilizing policy. Pardede and Zahro (2018), in fact, are concerned about Indonesia's excess saving, stating that gross domestic saving is still growing despite declining gross fixed capital formation. This explanation can further complement concerns expressed by Rosengard and Prasetyantoko (2011) and Hamada (2018) on the problem the banking industry has in channeling funds to small and medium enterprises.

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

Relaxing FDI also can be effective in managing risk since it is generally regarded as harder to move out of the country (Stiglitz 2000, Yu 2018). Additionally, it can

potentially solve the problem of using short-run instruments to finance long-run projects – the main reason why deficit can be problematic. 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 Preferential Trade Agreement (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 for the sectors which enjoy highest growth from the simulation.

2.6. Conclusion

The Indonesian economic development plan is built around the intention to get back to its 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 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 supervision of domestic capital markets and a deeper, and more diverse, financial market, Indonesia may be able to reduce risk premia and institutional impediments to the efficient use of capital in the country. This will reduce the gap between Indonesia's cost of capital with global benchmark costs, such as those represented by the U.S., a country with a well-developed capital market. The result suggests that by reducing Indonesia's current cost of capital by around 100 basis points, it can potentially attract 10% more capital to the country and raise GDP by 5% above levels that it could otherwise achieve.

Indonesia's boldest financial reform to date was the banking deregulation in the 1980s, when the country lifted the control over interest rates, 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 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 in that reduction of impediments to international capital movement has potential for Indonesia to have a higher GDP than otherwise. Additionally, the five industries targeted by the government will receive capital anyway, just by relying on the market force. The government needs only to attract more capital in general by doing the reform.

However, lowering the 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 largely believe that having more investment in Indonesia is beneficial, but the discussion needs to advance to better narratives. In this regard, the simulation in this paper can be useful in at least two ways.

First, it helps forecast 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, 10.79% more capital translates to a higher 5.06% of GDP, which suggest that capital in Indonesia can help it boost a decent growth. Moreover, in this longer run setting, Indonesia potentially has a more positive balance of trade due to higher export. This scenario not only follows Indonesia's export-led growth strategy, but also helps buffer Indonesia from a high proportion of foreign-denominated bonds problem. If attracting foreign capital is adopted as a strategy, then higher export is favourable 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, as well as to set a target for a policy evaluation. The GTAP's highly disaggregated industry gives valuable information as

to which industry has the highest potential to grow. With the assumption of a perfect flow of factors of production between industries adopted by GTAP, Indonesian policy makers can concentrate on reducing impediment for factors of production to move to different industries.

The result of the model can be used as an upper benchmark for the Indonesian Government's evaluation of the program. BKPM should expect an increased flow of new capital in mostly manufacturing sectors. Short-run decrease of BoT and shrinking agricultural share of growth should be expected. The government only needs to minimize investment risks without having to force investment into a certain sector.

As noted, the modeling approach reported in this paper is comparatively 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.

Chapter 3
Dynamics of Indonesia's economic transformation

3.1. Abstract

Indonesia has been trying to improve its investment climate. A recent development is the issuance of the 'Job Creation Law', which emphasizes risk-based business regulation, promotion of a new Ministry of Investment, and aims for a better investment climate overall. On top of that, the Indonesian Government established a new body called 'Indonesia Investment Authority'. This paper discusses the changes introduced by the Job Creation Law and how they can be captured by policy simulations. It then looks to simulate the impact of successful implementation of the reform. The paper uses the GDyn-FS, a modified Dynamic GTAP model proposed by Gretton (2021) that captures the recursive dynamic changes in investment to a country's macroeconomic and industrial level changes. The analysis also takes into account changes caused by COVID-19 to Indonesia's trajectory baseline. The result reflects a new trajectory of Indonesia's economy in a situation where the risk premium is lower, shown by reduced targeted rate of return.

3.2. Introduction

The COVID-19 pandemic brought about a new episode of economic reform by the Indonesian Government. The new Law no. 11/2020 dubbed the Job Creation Law is arguably the most important institutional change since the Asian Financial Crisis (AFC) on economic reform. The key point of this law is to simplify complicated red tape and large numbers of overlapping regulations amid Indonesia's lack of regulatory discipline since decentralisation (Surianta and Patunru 2021). The new law is supposed to help encourage investment both domestically and attract investment from abroad. Through foreign investment it is hoped to bring additional expertise and know-how to improve economic performance.

At the same time, the Indonesian Government is pursuing an Import Substitution Strategy (ISS), aimed at reducing imports by up to 35% in 2022 (Yu 2020). Various regulations are used to limit imports, such as a national standard of products (SNI),

increased pre-shipment inspection, Local Content Requirements (TKDN), and tariff (Narjoko, Anas, and Herdiyanto 2018; Yu 2020; Patunru 2018). The widened trade deficit, need of foreign exchange, and protecting important State-Owned Enterprises (SOEs) such as Krakatau Steel are cited as the main reasons (Yu 2020). The two goals seem to counteract each other, as increased Current Account Deficit (CAD), at least in the short- to medium-term, and increased steel imports to make up any gaps between domestic demand and supply as investment is boosted, are to be expected.

It is important to understand the reasoning behind the Indonesian Government's fear of CAD. In particular, the experience of the AFC in 1998 is still fresh in the memory of many Indonesian Government personnel. While Indonesia managed to successfully navigate the Global Financial Crisis (GFC) in 2008 and the U.S.' Federal Reserve breaks in asset purchasing in 2013, the COVID-19 crisis remains a formidable challenge. This paper argues that the fear of CAD is mainly coming from these experiences, and discussion on Indonesian economic reform will not be improved unless this area is properly discussed.

This paper starts with a brief explanation about the economic reform that was introduced by the Indonesian Government through the Job Creation Law, and why it is needed. It is an omnibus law that revokes multiple laws controlling business licensing processes, environmental standards, trade, and the labour market. It also introduces new institutions such as the Sovereign Wealth Fund. This huge coverage is also the main reason why this bill is controversial, especially being introduced without proper public consultation in the middle of a pandemic.

This paper moves on to address the CAD issue. The AFC experience as well as the capital flight episode in 2013 might explain why CAD is of huge importance for the Indonesian Government. However, we argue that the current CAD is different compared to the AFC. Indonesia has a much lower short-term debt, and the component of direct investment is much higher. In fact, limiting trade may be counterproductive since it will undermine capital accumulation and reduces domestic competitiveness.

We then utilize a Computable General Equilibrium (CGE) model to resolve this issue. We use GDyn-FS, a recursive dynamic, multi-sector and multi-region CGE

model to simulate successful implementation of the economic reform. The better business and investment climate would reduce risk premium and financial market efficiency in Indonesia. This, in turn, would reduce the required rate of return for investors, boosting investment in the country. The recursive dynamic nature of the model allows for simulating the short-term CAD and seeing how it changes in the long run. Additionally, the use of adaptive expectation of investment theory in the recursive dynamics can avoid instantaneous smoothing of investment across periods.

The result shows that a reduction of required rate of return on investment by 100 basis points translates to an 8.27% higher Gross Domestic Product (GDP) of Indonesia in 2050, 29 years since implementation. The reform could potentially lower Indonesia's cost of capital by 11.77% with higher capital stock at 11.72% in the long run compared to the baseline. There will be an overshooting where investment will boom in five years' time before it cools off in the long run. At its peak, investment will be 48.95% higher compared to the baseline. The simulation also shows higher consumption and wage levels for both skilled and unskilled labour.

Importantly, we show a growing CAD in the first five years, when the investment boom is happening. Trade balance could potentially be 9.58 percentage points lower compared to the baseline during this phase. However, by 2050, the trade balance settles in the positive territory at 0.75 percentage points higher compared to the baseline. This is in line with foreign ownership of capital, where high influx of foreign investment as well as high outflow of interest payment happens around the same time. In the long run, however, the pressure to current account lowers significantly.

Our study makes for an important policy implication for the Indonesian Government. International trade is important to complement a better investment climate. As Indonesia increase its capital accumulation, a large demand of capital goods as well as important capital building of intermediate inputs, such as steel and aluminium, will increase. With a source from foreign countries being discouraged, it will only hike domestic prices of these goods and may undermine the impact of the effort to accumulate capital faster. Without quickly building up global

competitiveness, securing foreign exchange to pay for the foreign liabilities will pressure exchange rates in the future.

The next section of this chapter discusses the policy setting, where we provide a background on Indonesia's current inefficient capital market and why the reform is necessary. We also provide more information on the Job Creation Law and its potential, albeit controversial. We then describe the model and its investment mechanism, as well as how the reform comes into it. We then provide the results and discussion and close this paper with a conclusion.

3.3. Indonesia's recent development in economic reform

Indonesia still has an issue with its inefficient capital accumulation. Figure 3.1 shows Indonesia's Incremental Capital-Output Ratio (ICOR), which measures how much GDP increases as investment increases. While Indonesia's capital accumulation keeps growing, its ICOR has never returned to pre-AFC level. In fact, it seems to be increasing after the commodity boom ended.

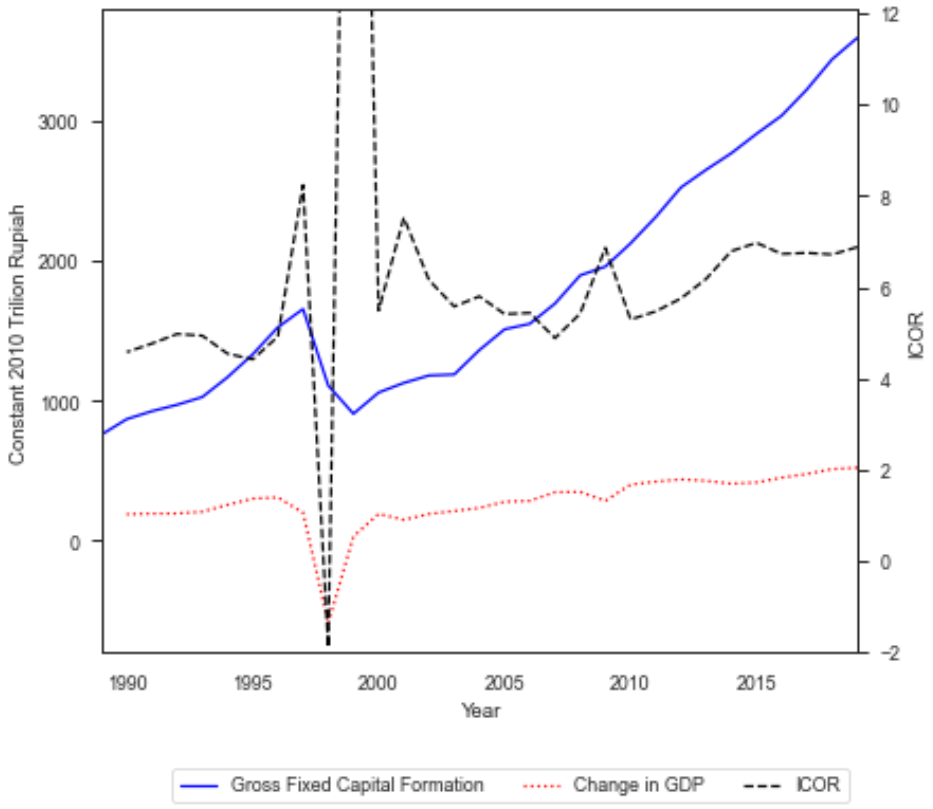

Figure 3.1. Incremental Capital-Output Ratio of Indonesia, 1980-2019

Source: World Development Indicators (World Bank)

Another useful indicator for the investment climate is risk premium. This can be measured by differentiating Indonesia's risk premium with that of a developed economy like the U.S. Defining risk premium as the difference between prime lending rate and 3-month treasury bill rate, Figure 3.2 shows the difference between Indonesia's risk premium and U.S.' risk premium. Indonesia's risk premium, using this measure, gradually closed its gap in mid-2018 to that of the U.S. However, by the end of 2019, the gap returned.

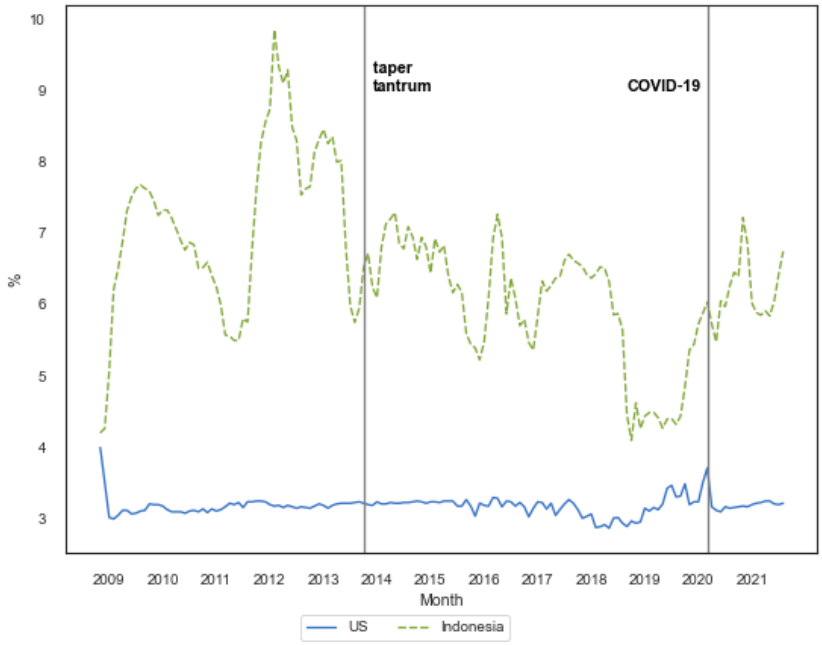

Figure 3.2. Lending rate less 3-month treasury bill, Indonesia and the U.S.
Source: Author's calculation, Bank Indonesia, Indonesia Bond Pricing Agency, U.S.' Federal Reserve via CEIC

More concerning is when we define risk premium as the difference between the rate of safe asset of Indonesia with U.S.' safe asset. Figure 3.3 plots the 10-year bond rate of Indonesia and U.S., adjusted for inflation. After the Fed's taper off episode, Indonesia's bond rate has trended upward, while the U.S.' bond rate has remained relatively flat. In 2017, the bond rate seems to show progress toward a lower rate but U.S.' interest rate hike in 2018 once again showed Indonesian economy's fragility to foreign rate changes. The Indonesian Government must improve its fundamentals if funds are to be attracted to IDN at real interest rates approaching the U.S. benchmark.

Structural reform may be necessary to reduce the risk premium of Indonesia and increase its investment efficiency. Indeed, structural policies have been shown to be the better predictor of the AFC for Indonesia than proximate factors associated with financial balances (Kenward 1999). Structural policies such as restrictive trade and investment, industrial protectionism, and cronyism in general, matter considerably to Indonesia's economic performance (Kenward 1999; Hill 2018; Basri and Hill 2004; Patunru and Rahardja 2015). The huge flow of capital to Indonesia was met with protectionist trade, which led to market-seeking foreign firms instead of factor-seeking exporters, most notably in the automotive sector (Lindblad 2015; Parker and Hutabarat 1996).

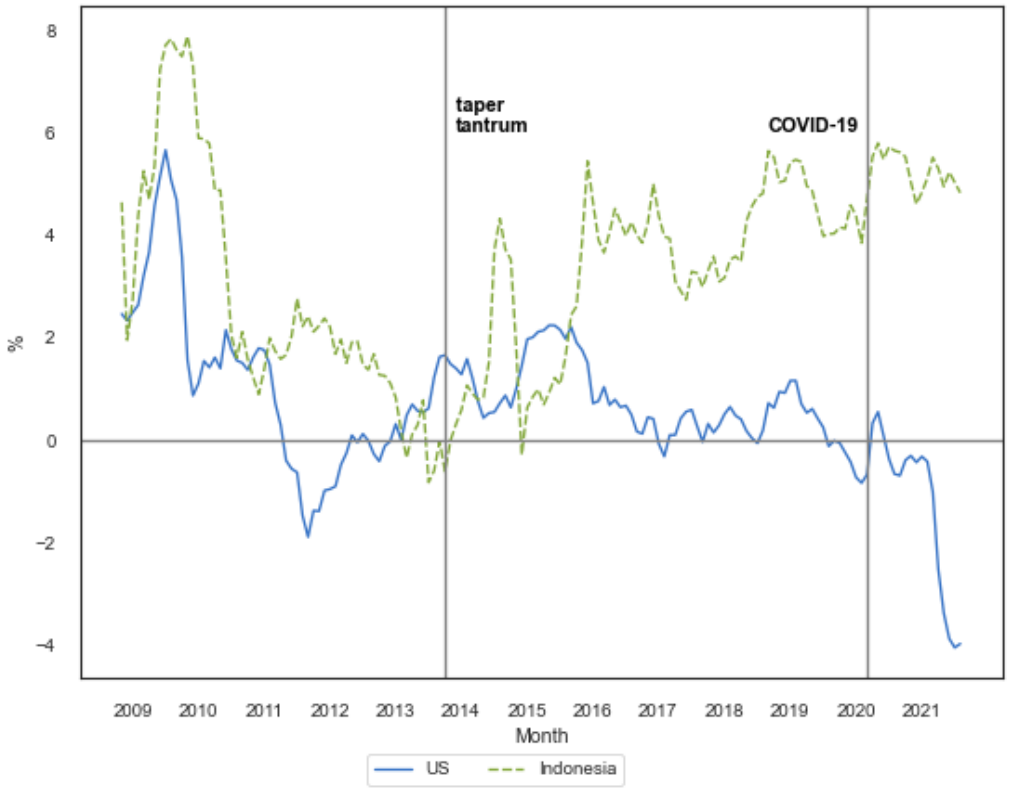

Figure 3.3. Inflation adjusted 10-year bond rate, Indonesia and the U.S.
Source: Author's calculation, Bank Indonesia, Indonesia Bond Pricing Agency, U.S.' Federal Reserve via CEIC

Other structural problems in Indonesia are also often cited. Among them is a restrictive and inefficient labour market (Coxhead 2014; Manning 2014). The business

climate is also less conducive amid regulatory obesity and overlapping authority among various levels of Ministerial and local governments (Surianta and Patunru 2021; Negara and Hutchinson 2020). Indonesia has been successful in improving investment while keeping fiscal discipline, at the cost of increasing SOEs' debt (Triggs, Kacaribu, and Wang 2019). Trading across the border, one of the most important conditions for successful participation in the Global Value Chain (GVC), was relatively restricted in the South East Asia region and is increasingly so (Patunru and Rahardja 2015; Patunru 2018).

Improving Indonesia's business climate was slow after the AFC (Lindblad 2015). Uncertainties even seemed to increase after decentralization when local governments could make their own regulations, leading to 'regulatory obesity' (Surianta and Patunru 2021; Negara and Hutchinson 2020). With the increased protectionist approach, it seemed that Indonesia returned to market-seeking foreign investors, which is increasingly alarming.

3.3.1. Potential for improvement: The Omnibus Law

The Indonesian Government tried changing many regulations for a long time with non-conclusive results. However, the economic and social crisis caused by the COVID-19 pandemic allowed the government to propose an Omnibus Law, which rules many regulations at the same time. The Omnibus Law, called Law 11/2020 on Job Creation, was passed by the Parliament in October 2020, albeit controversies (Temenggung et al. 2021; Surianta and Patunru 2021). The regulation overrules many other regulations on employment, investment, starting a business, and Sovereign Wealth Fund (SWF), among other things (Temenggung et al. 2021). The Indonesian Government argues the law is desperately needed to recover from the COVID-19 crisis, mainly by vast deregulation to reduce red tape. Various deregulation measures are hoped to improve the investment climate and create jobs.

The main deregulation feature is the introduction of the Risk-Based Assessment (RBA) approach in the business licensing process. RBA categorizes industries (by an ISIC-like classification) based on risk. The risk itself is classified into low, medium-low, medium-high and high risk, depending on the health and safety in the industry,

its impact on environment, as well as its use of natural resources. Firms operating in the low-risk industries get business permits much faster compared to higher risk industries (Temenggung et al. 2021). Moreover, follow-up regulation of the law shows an adaptation of 'silence is consent'. That is, if a document is not responded to by the authorized level of government, then the central government is allowed to take over. The law also mandates a more streamlined business licensing process via an online system. These approaches, especially the 'silence is consent' adoption, tackle the coordination problem and multiple layering of authorities.

The Job Creation Law introduced a new Sovereign Wealth Fund (SWF) (Temenggung et al. 2021). Unlike most SWFs, the Indonesian SWF is not financed from a surplus, but instead from a government deficit. The SWF is meant to pool investment funds from both domestic and abroad, to be injected to various projects in Indonesia, such as infrastructure, energy, and manufacturing. The funds channelled through SWF will receive added benefits, such as special tax treatment and the ability to navigate and accelerate regulation and permit issuance. Additionally, the SWF will have a full guarantee by the Government of Indonesia.

The SWF seems to want to tackle further the red tape problem and uncertainty in doing business in Indonesia. As the arm of the regulator, the SWF shows that the Indonesian Government will have a skin in the investment game. The full guarantee by the government should add an extra layer of safety to investors willing to put their funds in Indonesia through the SWF. Moreover, the SWF is shown to improve competitiveness and reduced investment risk in the industry they are investing in (Bertoni and Lugo 2014; Boubakri, Cosset, and Grira 2017). Indeed, many other investment funds from Singapore, Canada, the U.S., Abu Dhabi and Japan seem to have committed their own funds to the SWF (Temenggung et al. 2021).

The Job Creation Law also tries to reform Indonesia's rigid job market. Indonesia's high severance pay, uncertainty over the minimum wage and limited outsourcing are often cited as the main reasons investors are scared away, especially in the labour-intensive industries (Coxhead 2014; Manning 2014; Negara and Hutchinson 2020). The Job Creation Law aims to reduce severance pay, provide a more flexible contract, and looser use of outsourcing (Temenggung et al. 2021). The law also

introduces a form of unemployment benefit and training fund for workers to reskill themselves. Lastly, Small and Medium Enterprises (SMEs) are exempted from paying the minimum wage, which may help SMEs grow and reduce incentive to stay informal. The full implementation of the Job Creation Law may take some time. The law requires follow-up regulations drafted by various Ministries. It is also important to note that the new constitutional court ruling on the law could potentially add an extra layer of legal uncertainty. However, the reform introduced by the law is indeed trying to fix many issues in Indonesia's investment climate. If the government manages to accommodate criticisms regarding this law and is able to implement it, the potential of investment coming in from both domestic and foreign may be significant.

Another area where red tape could potentially be cut is trade. Indonesia has been using import licensing to control imports, especially after various tariff cuts after joining Free Trade Agreements (FTAs) (Munadi 2016, 2019). While the Job Creation Law will not abolish this, Indonesia introduces a new system called 'Neraca Komoditas'. Neraca Komoditas will contain information of supply and demand of a good for industry, and then use that information to automatically grant import licensing for firms (Gupta and Pane 2021; Gupta, Pane and Pasaribu 2022). It promises a faster licensing process as well as looser quota restrictions for industries. The government hopes that this will help industries access intermediate inputs from abroad, hence helping with global competitiveness.

3.3.2. Fear of Current Account Deficit

With the increased investment flow from abroad comes pressure to current account. However, the Indonesian Government seems to be reluctant to have a Current Account Deficit (CAD). The government has introduced an Import Substitution Strategy (ISS), with the aim to reduce imports by 35% by 2022 (Gareta and Liman 2021). The ISS involves a more aggressive use of Local Content Requirement (LCR) of several goods by up to 40%. Indonesia's fear of CAD is not new, as it started at the end of the commodity boom in 2011 (Basri and Patunru 2012; Patunru and Rahardja 2015). However, the more ambitious ISS being conducted at the same time as the start of the reform to attract Foreign Direct Investment (FDI) bears interest.

The Indonesian Government's fear of CAD is not unjustified. Following the mainstream policy prescription during the 1980s, Indonesia adopted an open financial account (mainly in the form of banking deregulation) at that time. Investment soared as international funds came into the country. Bank Indonesia kept real exchange rates fixed by accumulating foreign reserves, while allowing domestic inflation to rise (McLeod 2014). As Figure 3.4 illustrates, while the trade balance was generally positive, Bank Indonesia kept absorbing the foreign currency to its balance sheet. When foreign investors fled Indonesia amid the sudden depreciation of Thai Baht, Bank Indonesia, the Indonesian central bank, was forced to float its currency, an event that ultimately led to the AFC (Doraisami 2014; Cole and Slade 1998; McLeod 2014).

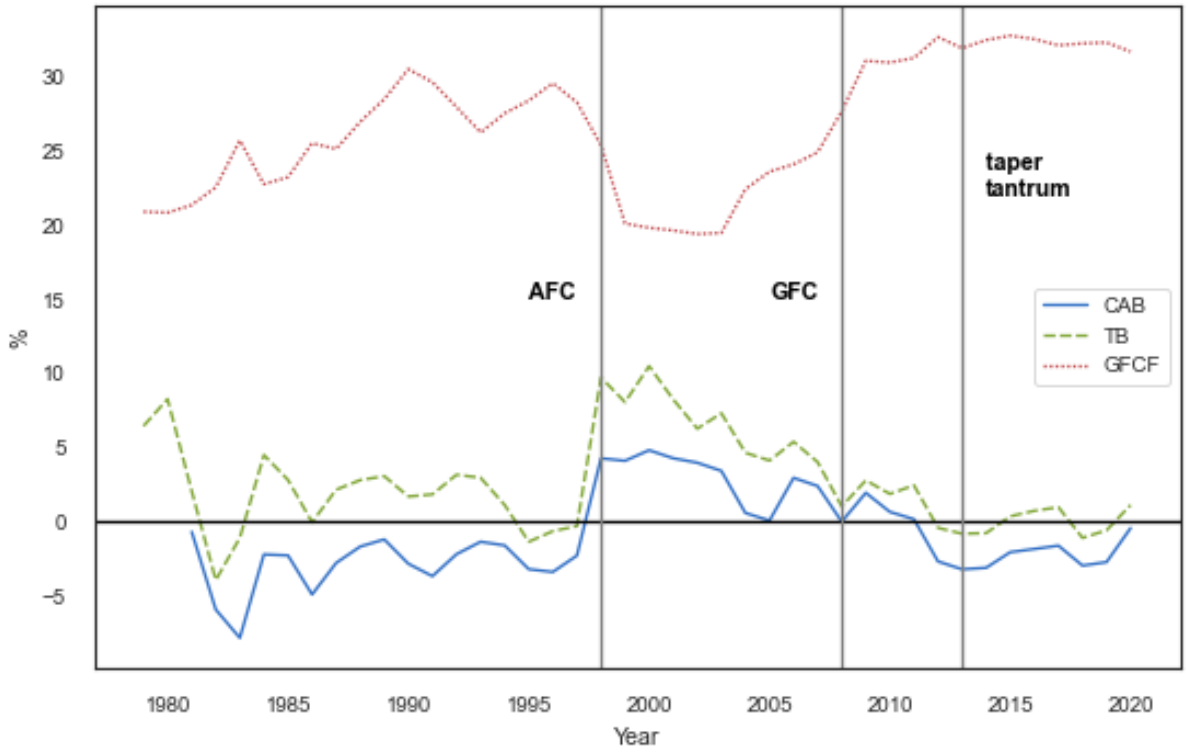

Figure 3.4. Current account balance, trade balance, and gross fixed capital formation, % of GDP, 1980-2020

Source: World Development Indicators (World Bank)

Avoiding a CAD was included in the mainstream policy advice given to countries to avoid the mistakes of Southeast Asian countries during the Asian Financial Crisis (AFC) in 1998 (Stiglitz 1999). After the (managed) floating exchange

rate, Indonesia has since run a current account surplus, supported in part by strong commodity prices (Pangestu, Rahardja, and Ing 2015; Basri and Hill 2011). The Global Financial Crisis (GFC) took place during this period. Indonesia's limited debt and strong balance of trade performance is credited as one reason why the impact of GFC was relatively mild (Siregar and Wihardja 2015; Doraisami 2014; Basri and Siregar 2009).

It is important to note that in the earlier stage of the GFC, Indonesia experienced a capital flight severe enough to shock its exchange rate (Basri and Siregar 2009). As illustrated by Figure 3.5, however, the quantitative easing in late 2008 arguably helped the situation. In December 2008, United States' Federal Reserve announced the Quantitative Easing (QE), a massive asset purchasing program to help stimulate the U.S. economy. The program stimulated capital outflow from the U.S., mainly in the form of portfolio investment, to emerging markets including Indonesia (Basri 2017). While there was a shock to the Indonesian Rupiah in the wake of GFC, early 2009 saw the Indonesian exchange rate revert to around the pre-GFC level almost immediately.

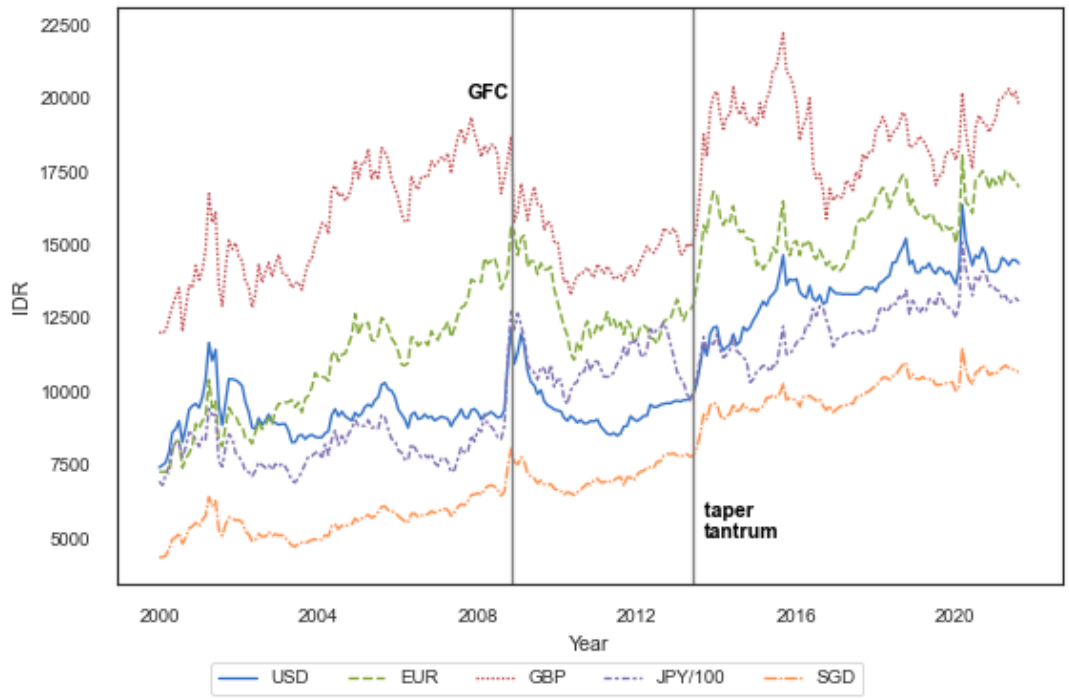

Figure 3.5. Indonesian Rupiah against important currencies, 2000-2020

Source: Bank Indonesia

Note: Scale is Indonesian Rupiah (IDR). Up means IDR depreciates.

In May 2013, The Fed announced an intention to gradually stop the QE. This event, dubbed a 'taper tantrum', led to massive capital outflows from emerging markets, including Indonesia (Basri 2017). The Indonesian Government and central bank reacted by a contractionary fiscal and monetary policy, as well as letting the Indonesian Rupiah depreciate (Basri 2017). Basri (2017) credited the government's willingness to increase the interest rate and accept a CAD with limiting the damage of the withdrawal of QE by the U.S. Since then, the Indonesian Rupiah has not returned to its pre-GFC level, which indicates how important QE was to the Indonesian economy (and emerging markets in general) (Basri 2017).

Siregar and Wihardja (2015) stated the need to watch the CAD, especially in the wake of withdrawal of QE. They note the huge increase of investment since 2013 as the main driver of CAD. Indeed, as can be inferred from Figure 3.6, CAD is associated with a high level of fixed capital formation in Indonesia. They also warned against how hugely globally interconnected foreign and Indonesian banks are, which could lead to more volatility in the economy.

It is important to note the role of international finance in the AFC. However, there are some key differences between the AFC and Indonesia's current situation with CAD. Figure 3.6 shows Indonesia's Financial Account from 1981 to 2020. Indonesia ran a CAD from the 1980s up to the AFC. As the AFC hit, the exchange rate plummeted, and funds flowed out of the country. The current account remained mostly positive until the end of commodity boom, and Indonesia has returned to a positive current account since then.

The first key difference is the type of investment driving CAD. Prior to the AFC, CAD was mostly accumulated through 'other' investment[9], a balance of payment term referring to mostly bank lending. Indonesia started banking deregulation around 1981 before other types of financial liberalization measures. This time around, CAD is driven mainly by portfolio investment and FDI. The smaller contribution of foreign direct bank lending might be due to stronger capital control since the AFC. These days,

[9] Note that figure 3.6 shows flow, not accumulation. That is, sustained small negative accumulates to a large negative. Additionally, note that Indonesian exchange rate prior the crisis in 1998 is much different than now. Indonesian Rupiah averaged around 1,530 per US Dollar between 1980-1996. In the time of writing, IDR is roughly 14,000 per USD.

Indonesian banks are financially more secure as a result of stricter control over banks since the AFC (Triggs, Kacaribu, and Wang 2019; Siregar, Gunawan, and Saputro 2021).

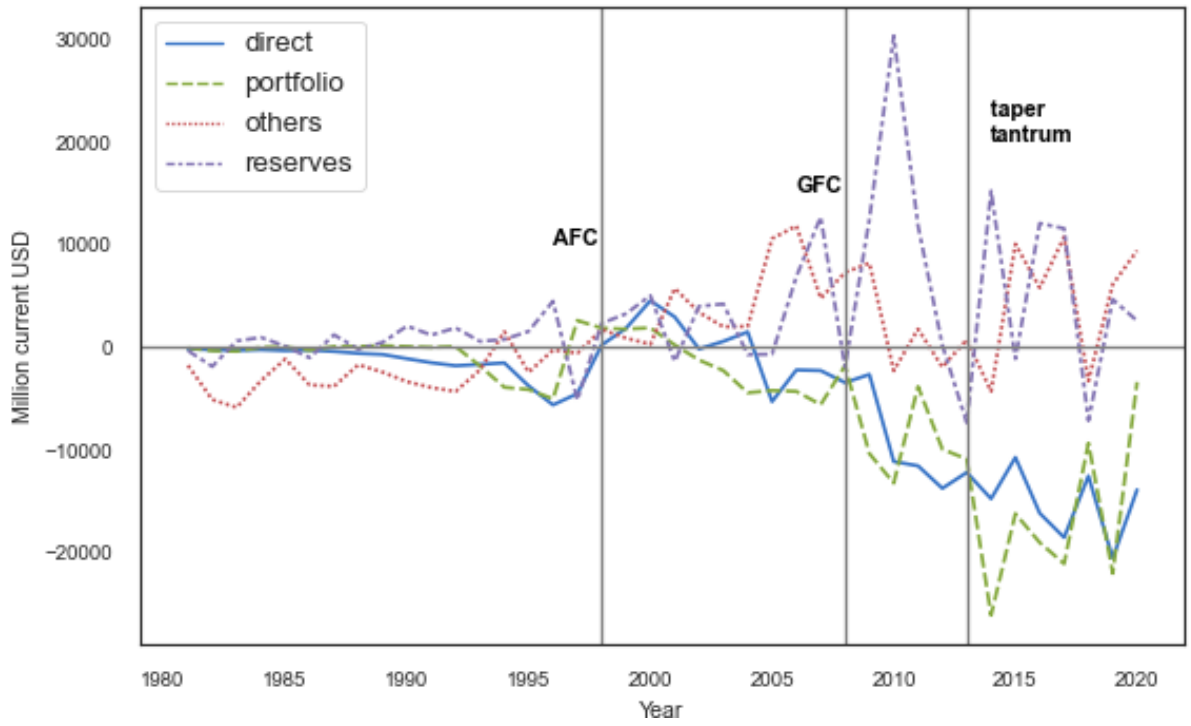

Figure 3.6. Indonesian financial account, 1980-2020

Source: Bank Indonesia

Moreover, Bank Indonesia has been continuing to absorb the foreign currencies coming to Indonesia. Bank Indonesia keeps building reserves, most notably during the QE period between 2008 and 2012. Foreign cash generated by exports also seems to flow out the country instead of being used for imports, as suggested by the accumulation of foreign balances via other investments. These phenomena lead to an overall positive CAD, which suggests Indonesian foreign investment to not be relatively significant.

However, portfolio investment can still be a problem if it is dominated by short-term securities (Rodrik and Velasco 1999; Kenward 1999). Kenward (1999) argues that CAD per se is not the main indicator to look at regarding financial stability, at least in

the context of the AFC. He argues that external debt indicators, especially short-term ones, are more useful to predict financial crises.

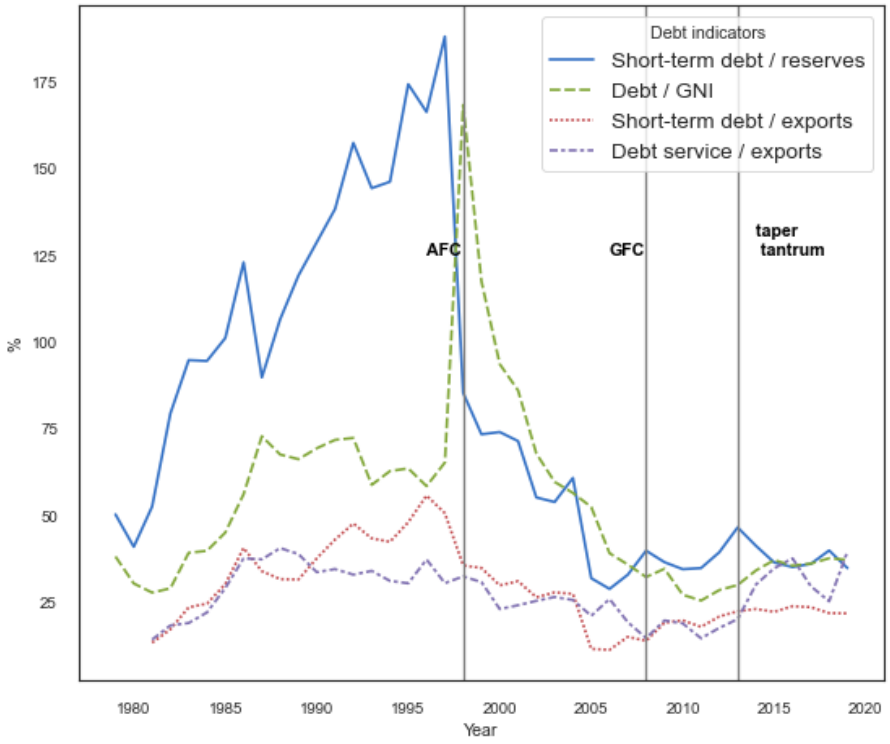

Figure 3.7. Indonesian various debt indicators, 1980-2020
Source: World Development Indicators

As can be seen in Figure 3.7, Indonesia's reliance on short-term debt is far lower now than in the 1990s. Bank Indonesia has accumulated reserves to help secure Indonesian financial stability. Lower reliance of short-term debt also comes from Indonesia's relatively high FDI in its balance sheet, which can be seen as a more long-term, less volatile form of investment (Stiglitz 2000). Notably, however, one of the indicators is converging to pre-AFC level, and that is debt service to export ratio.

Figure 3.8 shows the breakdown of Indonesia's current account. The Indonesian current account surplus moves in line with balance of trade in goods, which highlights the Indonesian Government's focus on balance of trade. However, it seems like Indonesian CAD is maintained by the trend of net primary income. Indonesia's primary account balance comes from portfolio investment interest payments, but also,

in large part, FDI. As Indonesia increases its foreign-owned domestic capital, the primary account deficit will likely keep growing (Siregar and Wihardja 2015).

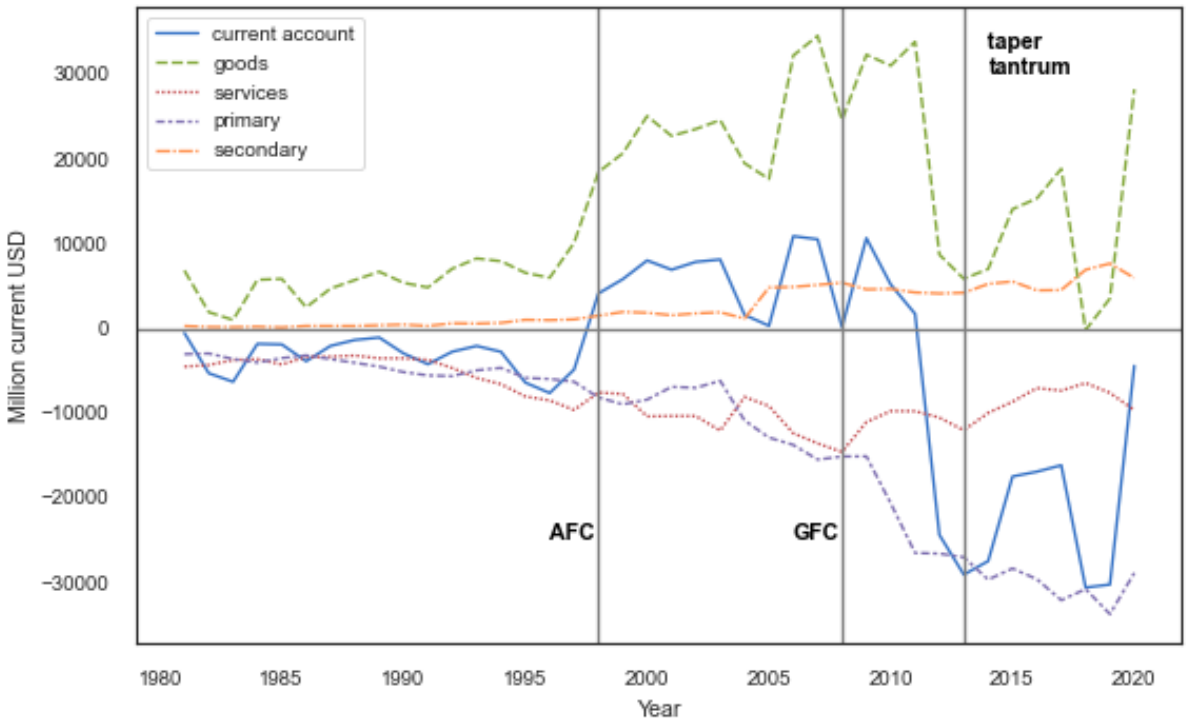

Figure 3.8. Current account balance of Indonesia, 1980-2020

Source: Bank Indonesia

As the primary account deficit increases in size, an even larger trade surplus is required to limit Indonesia's CAD. Two ways to get a higher trade balance is either improving exports or limiting imports. Figure 3.9 shows the breakdown of Indonesia's export and import. Exports have been dominated by fuels (mostly coal), and industrial primary inputs (mostly minerals). Exports of these categories dropped significantly since the end of the commodity boom. Increasing exports without strong global demand would be highly challenging, especially since Indonesian manufacturing firms export less since the AFC (Narjoko 2014).

The ISS is used mainly to reduce CAD. Indonesia successfully reduced its fuel import thanks to a huge reduction of fuel subsidy in 2015 (Siregar and Wihardja 2015; Basri 2017). However, further reduction in imports may be counterproductive. As Figure 3.9 suggests, most of Indonesia's imports are intermediate inputs and capital

goods. These imports complement Indonesia's investment, including inward foreign investment as the foreign currency is used to purchase more capital goods.

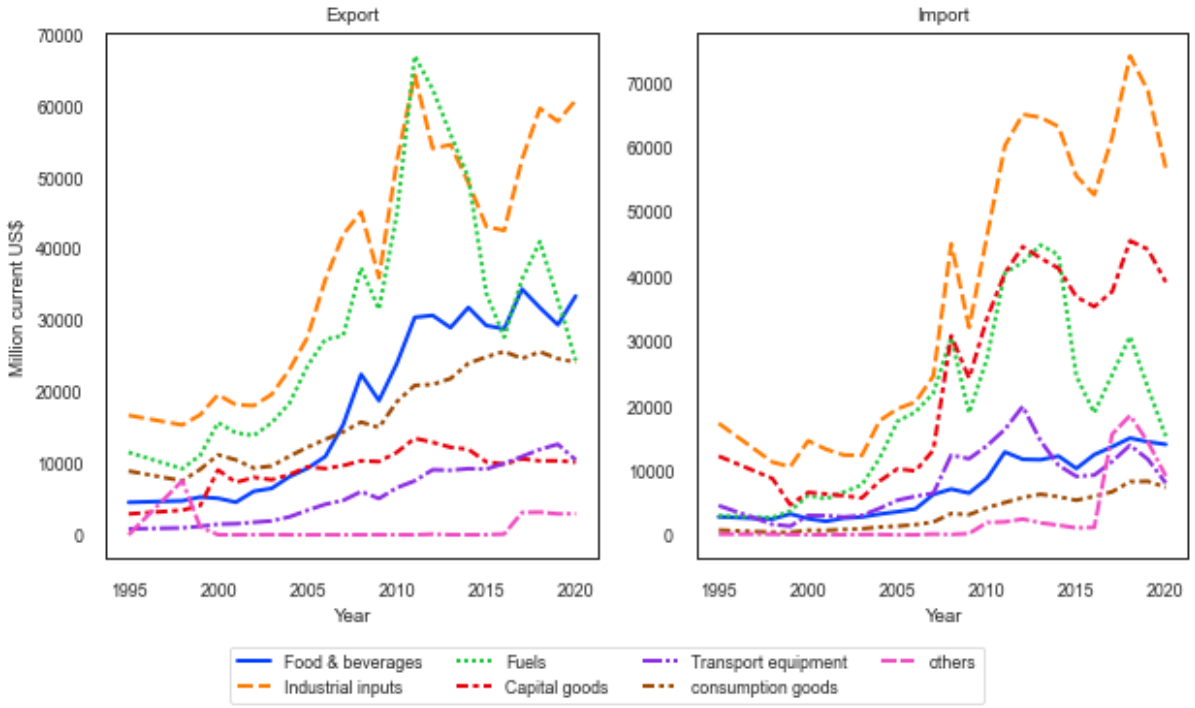

Figure 3.9. Composition of export and import of Indonesia, BEC rev.4 classification
Source: UN Comtrade

The direction Indonesia is heading to is a seemingly more protectionist approach to its economy, with tariff and non-tariff measures increase since 2015 (Patunru 2018; Patunru and Rahardja 2015; Munadi 2019). The climax of these measures is the Indonesian Government's goal to reduce imports by 35% in 2022. However, there are arguments against these measures, which are also called Import Substitution Strategy (ISS) (Narjoko, Anas, and Herdiyanto 2018). Such a strategy would limit Indonesia's backward linkage to Global Value Chain (GVC), reduce competitiveness, which in turn makes Indonesia even more reliant on commodities to secure foreign reserves. Additionally, protectionism will attract market-seeking foreign firms instead of resource-seeking ones, which in turn increases debt-to-exports even further.

Importantly, Indonesia needs to increase its export to balance the net primary income flow. Relying on commodity prices may not be sustainable. Indonesia must improve its competitiveness in the global market and expands its exporting industries.

CAD in the short run is not alarming for an investing country. If the fund is used wisely, it can improve Indonesia's competitiveness in the long run and may flip the current account around as more export options are opened.

A recursive dynamic Computable General Equilibrium (CGE) model can be used for such a scenario. If Indonesia increases its investment climate, then a massive capital inflow will drive Indonesia's CAD in the short run. In the longer run, however, the current account can reverse and show as relatively balanced. A discussion on the modeling is conducted in the next section.

3.4. Modeling framework and policy scenarios

How the Indonesian Government is able to realise the potential of the Omnibus Law remains to be seen. However, a benchmark of the full potential of reform with such a scale is needed to assess the potential benefits of effective reform. Assuming the reform can be implemented effectively, we would expect to see a better investment climate in Indonesia and an associated closing of the gap between the 10-year bond rates in IDN and U.S. The increased capital will be distributed across the countries after some time. More importantly, the benchmark can be useful to evaluate how CA could evolve over time.

This paper uses GDyn-FS, a modified version of GDyn, a recursive dynamic GTAP model (Gretton 2021; Ianchovichina and Walmsley 2012; Hertel and Tsigas 1997; Corong et al. 2017). The GTAP model is a widely used multi-region, multi-sector, static Computable General Equilibrium model with a utility maximizing representative agent in each region. Each sector consists of one representative firm with Constant Elasticity of Technology (CET) demand for input with profit maximizing behaviour. Each firm uses inputs from each industry as well as five types of production factors.

GDyn adds a recursive dynamic mechanism to the GTAP model by allowing movement of capital across regions as well as adaptive expectation theory of investment (Ianchovichina and McDougall 2012). That is, investors make decision based on their expected rate of return in the future. This expected rate adaptively changing to economic condition, reflected by current rate and the future steady-state

rate. The adaptive expectation theory of investment is what facilitates the transition of the economy to the next period in the short run. Decisions to invest are calculated based on a gradual convergence of actual and expected rates of return in a region toward an exogenous target rate of return. Movement of real capital-finance between regions is facilitated by a 'global trust', through which each region saves and borrows internationally[10].

In the GDyn model, there are three measures of the rate of return, which converge in the long run across regions:

$$RORGROSS_r = RORGE_r = RORGT_r \tag{3.1}$$

where *RORGROSSr* is the gross rate of return in region *r*, while *RORGEr* is expected rate of return and *RORGTr* is the target rate of return. All those rates are constant in the long run. Using lowercase as the first difference form, we get:

$$rorgross_r = rorge_r = rorgt_r = 0 \tag{3.2}$$

The target rate of return is a constant rate, which means *rorgtr* is an exogenous variable with the value of 0, unless shocked as part of a modeling scenario. *RORGROSSr* is the actual rate of return in the region *r* which is calculated as the ratio between the return to capital and the price of capital.

In GDyn model, capital grows with the rate of *ERG_RORGr*:

$$ERG\_RORG_r = -RORGFLEX_r \times \left(\frac{QCGDS_r}{QK_r} - RDEP_r - KHAT_r\right) \tag{3.3}$$

with lower case representing first difference and with the rate of depreciation fixed by assumption, total difference of (3.3) becomes:

$$erg\_rorg_r = -RORGFLEX_r \times \left(\frac{QCGDS_r}{QK_r} \times (qcgds_r - qk_r) - DKHAT_r\right) \tag{3.4}$$

where *erg_rorgr* is the expected rate of growth in the rate of return in region *r*. *QCGDSr* is investment in region *r*, while *QKr* is the capital stock. *RORGFLEXr* is the elasticity

[10] The consequence of using a global trust is GDyn and GDyn-FS cannot directly shows where the capital is coming from since all international financial transaction is happening through the global trust.

of how the expected rate of rate of return growth affects investment in region *r*. This means, investment will change as long as the expected rate of growth in the rate of return is not zero.

The path of *ergr* follows this equation:

$$erg\_rorg_r = LAMBRORGE_r \times (rorgt_r - rorge_r) \tag{3.5}$$

which tells us that the expected rate of growth in the rate of return will not equal zero as long as expected rate of return does still not align with a target rate of return. This means, investment accumulation is sensitive to the change in expected rate of return, *rorger*.

Expectation of investors is updated with an adaptive expectation:

$$\begin{aligned} rorge_r = &-RORGFLEX_r \times (qk_r - 100 \times KHAT_r) \\ &- 100 \times LAMRORGE_r \times \log\left(\frac{RORGE_r}{RORGROSS_r}\right) \end{aligned} \tag{3.6}$$

That is, expected rate of growth will change as long as there is discrepancy between expectation of rate of return with the actual rate of return, *RORGROSSr*. The bridging expected rate of return variable allows GDyn to prevent convergence right away to a target rate, which allows for an adjustment of investment. This process will continue until the three rates convergence and equation 3.2 holds.

The model used in this paper adopts GDyn-FS. This adds stability to GDyn by introducing an adjustment cost to capital from firms, in which investment may not become active immediately (Gretton 2021). GDyn-FS modifies GDyn's rule of change in expected rate of return, equation (3.5), with:

$$\begin{aligned} erg\_rorg_r = &\ LAMBRORGE_r \times (rorgt_r - rorge_r) \\ &+ \left(100 \times LAMBRORGE_r^2 \times \log\left(\frac{RORGT_r}{RORGE_r}\right)\right) \end{aligned} \tag{3.7}$$

where $LAMBRORGE_r$ indicates the elasticity of investment. That is, how much investment changes depends on the discrepancy between expected rate of investment with the long run target rate. This variables dictates how fast capital adjust.

Equation (3.7) adds additional adjustment of expected rate of return with the ratio of level rate of the target rate of return and expected rate of return. This implementation allows for a more flexible set of *rorgtr* (instead of having it always as zero) and ensure stability of the original GDyn (Gretton 2021). The better stability is

achieved by adding a level equation in the change equation and letting *RORGTr* vary across regions to reflect their risk premium (Gretton 2021; Ianchovichina and McDougall 2012).

Notably, GDyn and GDyn-FS's lack of explicit financial market can be seen as a disadvantage. The results coming from this model should be interpreted carefully, especially on balance of payment and exchange rate discussion. As noted from chapter 1, one can interpret the results from this exercise as having passive central bankers. That is, monetary policy does not exist, exchange rate is fully floating and fully reflected by the terms of trade.

3.4.1. Baseline and policy scenario

The typical simulation of the model involves creating a baseline scenario where business as usual is assumed. The second simulation is then conducted with the 'policy shock', which involves incorporating the policy change in the scenario modeled. With the baseline as a reference case, the simulation shows the policy's potential improvement. The baseline can be run as is, with capital accumulation as the source of transition to the next period. However, it is important to incorporate growth in population and labour supply to the model (Walmsley, Dimaranan, and McDougall 2012; Gretton 2021).

The model is calibrated with parameters and initial values from GTAP database version 10 (Aguiar et al. 2019), which provides 2014 as the reference year. The simulation then starts with 2014 and is designed to follow a baseline up to 2050. The Job Creation Law was legalised by the end of 2020, and most of its follow-up regulation only materialized in 2021. The shock is implemented in a two-year phase, namely 2022 and 2023, by half a percentage point each.

As with Gretton (2021), this paper utilises baseline characteristics from Chappuis and Walmsley (2011). They sourced the GDP projection from the World Economic Outlook of IMF and CEPII (Fouré, Bénassy-Quéré, and Fontagné 2010), which allowed them to create a baseline from 2010 to 2050. I update the baseline over the period 2014 to 2026 from the World Economic Outlook (IMF 2021). These data and projections include estimates of the impact of COVID-19 and its immediate aftermath. Population

projection is sourced from CEPII while skilled and unskilled labour projections come from IIASA educational attainment projection (Chappuis and Walmsley 2011).

Figure 3.10. Baseline projection of Indonesia

Source: Authors' calculation, GTAP 10 database, Chappuis and Walmsley (2011)

The main goal of the Job Creation Law is to reduce investment red tape, increasing investment from both domestic and foreign investors. The more accessible business licensing system and lower labour market rigidity reduces the cost to start a business in Indonesia. Moreover, the SWF can potentially help with pooling funds and provide a less risky investment platform for portfolio investors, with long-term funds. All these measures can potentially reduce required rate of return in investment, hence increase capital accumulation in Indonesia.

The implementation of a better investment climate comes in via shocking the variable *rorgtr*. Lowering *rorgtr* leads to higher *erg_rorgr*, which pushes investment up to balance equation 3.4. In other words, the economy undertakes investment (both funded from domestic saving and abroad) to converge to a lower level of target rate. The implemented shock is calculated in such a way that it decreases Indonesia's target rate of return by 1 percentage point (i.e., 100 basis points). That is, there is now

required a lesser rate of return for firms to invest in Indonesia by 1 percentage point. This amount is equal to closing the rate of return gap between Indonesia and the U.S. by around 12%. The shock is implemented in a two-year phase. The pre-shock and after-shock target rate of return are shown in Table 3.1.

Table 3.1. Target rate of return, before and after shock

Country	RORGT (%) pre-shock	RORGT (%) post-shock
Indonesia	15.5	14.5
U.S.	7.3	7.3

Source: GTAP 10 database, 2014 reference year

The reduction in Indonesia's required rate of return amidst no increase in that of any other regions means the average global required rate of return must come down. That is, if Indonesia managed to reduce its domestic risk level, then the world will also benefit from a reduction of overall global risk, which generally incentivise investment and increasing the global capital stock[11].

In addition to the better investment climate scenario, we also provide a second scenario in which Indonesia relaxes its control over trade. Inviting foreign capital can be complemented with trade relaxation, as there will be increasing flow of imported capital goods and intermediate inputs necessary to build capital such as steel. The faster licensing process promised by Neraca Komoditas should also help with reducing cost of trade, which can be reflected with a reduced ad-valorem tariff equivalent. Therefore, the second scenario adds a reduction of tariff in the model by 10%, also happening in a two-year phase.

Lastly, we simulate a third scenario where Indonesia reduces imports by 35% by 2022. There is no detailed knowledge about how Indonesia will achieve such a target, aside from the use of LCR, but this chapter uses an import tariff as the instrument to express such a scenario. The tariff enters the model through import price for local users, which may still be appropriate if other types of trade measures are used to bar

[11] Alternatively, if one wants to keep global capital stock unchanged, one must keep the level of global required risk of return. This can be achieved by a calibration or a closure swap.

import. That is, it is possible to find a tariff equivalent to most real-world import limiting measures (such as import quotas and non-tariff barriers).

We argue that the reduction of imports will limit the potential of a better investment climate in both attracting capital and improving economic growth. Afterall, import is needed to improve economic efficiency as well as ongoing capital replacement and accumulation. Therefore, the third policy scenario shows only the more restrictive tariff.

There are three scenarios in this exercise, as summarized in Table 3.2.

Table 3.2. Summary of implemented scenarios

Scenario	Increased financial market efficiency	Trade policy
scenario 1	Yes	No change
scenario 2	Yes	More open
scenario 3	No	More restrictive

Scenario 1 reflects the reduction of Indonesia's RORGT reduction shown in table 3.1 while no additional trade policy is given. Scenario 2 shows what happens if the government complements RORGT reduction with more open trade regime (which in theory should assists with capital accumulation and economic efficiency). Scenario 3 shows what happens if there is no RORGT reduction and the government decided to go with the 35% reduction plan.

3.5. Results

3.5.1. Scenario comparison

Figure 3.11 shows the main results from the three scenarios. The figure plots the deviation from the baseline[12] of four growth variables, namely: GDP, investment, trade balance and private consumption. A better investment climate shows higher cumulative growth relative to the baseline. Growth rates overshoot until around 2035 before cooling down. By 2050, according to scenario 1, the Indonesian economy is projected to be larger by around 6.4% compared to the baseline.

[12] Since the impact of the reform accrues across time, we cannot compare year-by-year difference. For example, GDP in the scenarios 1 and 2 get more than 10% higher in 2035 compared to the baseline. This does not mean economic growth in the year 2035 is 10% higher. The 10% bigger economy is due to the accruing difference in GDP which adds up since 2022 up to 2035.

Scenario 2 provides higher benefits than scenario 1. With the additional reduction of an import tariff by 10%, the path of convergence dominates scenario 1. After 29 years, the projection of scenario 2 leads to higher GDP than the baseline by more than 8%. On the contrary, scenario 3 leads to a smaller GDP compared to the baseline. Growth is somewhat recovered after 10 years, but never quite makes it back to the baseline level, permanently slightly smaller by 0.8%. The pattern of GDP highly correlates with the pattern of investment boom as seen in panel (b).

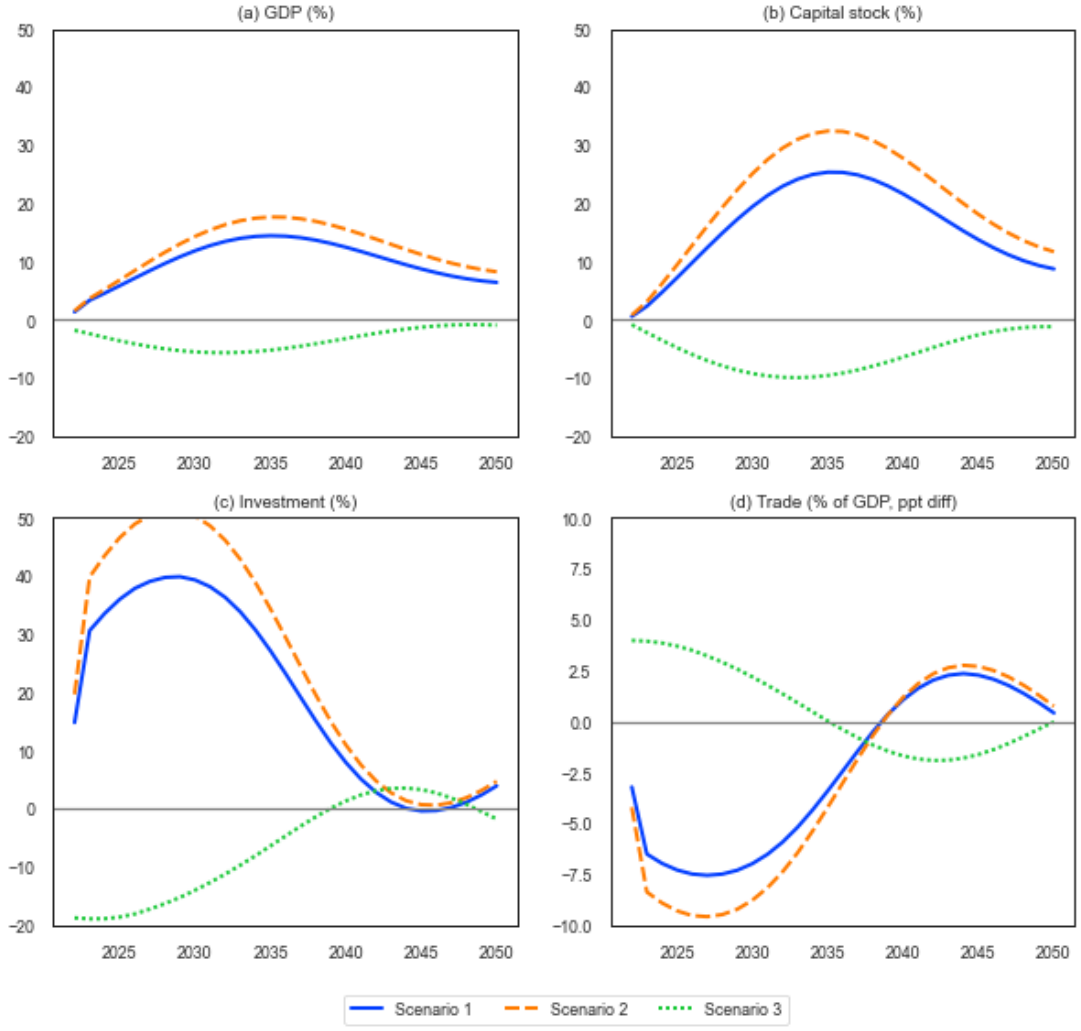

Figure 3.11. Deviation from baseline of the three scenarios on selected indicators, 2022-2050

Source: Authors' projection

The panel (c) on investment growth shows one possible explanation. Although both scenario 1 and scenario 2 have the same reduction of required rate of return, investment growth in scenario 2 jumps higher compared to scenario 1. This increase of scenario 2 over 1 is driven mainly by the availability of cheaper investment goods, which opens more quantity of investment goods coming in. While there is no reduction in required rate of return in scenario 3, investment suddenly jumps down amid more restrictive import.

The trade balance is projected to move in the opposite direction. While protectionism is aimed at reducing negative trade balance, the simulation indicates that any reduction is likely to be only temporary. As Figure 3.11 panel (d) shows, the ratio of the trade to GDP jumps to around 4% under scenario 3. However, after 15 years, the balance changes and Indonesia is faced with a negative trade balance once again before converging to zero by the end of 2050.

Without additional limitation to import, scenario 1 shows an increase in imports, hence more negative trade balance. Scenario 2 with more relaxed import leads to an even lower trade balance than scenario 1. However, by around 2035, scenario 2 leads to a higher trade balance. As capital builds up and firms can access inputs for production, they can be more competitive and increase exports. Eventually though, trade balances from scenario 1 and scenario 2 converge toward baseline levels.

The results from the three scenarios show that a temporary CAD could actually benefit Indonesia in the long run. We have argued that Indonesia's current level of short-term debt is relatively safe and there is still room for more CAD. In fact, with the primary income keeping on growing, Indonesia must compete for foreign exchange through export to counterbalance the net outflow of primary income. Building up capital quickly and productively is important to reduce reliance on the commodity market and improve global competitiveness of other types of tradable goods.

3.5.2. Long-run results of scenario 2

In this subsection, we explore scenario 2 more closely. We provide more details on scenario 2, the better investment climate and more relaxed trade, in Table 3. The more optimistic scenario can serve as a benchmark for the Indonesian Government on its

successful implementation of the Job Creation Law. Table 3.3 provides deviation from baseline of selected variables in 2022, 2026, 2031 and 2050. These years are chosen to serve different stages of the economy since beginning of the reform.

In 2022, there is a reduction of required rate of return by around 50 basis points and 5% of import cost reduction. These changes lead to higher investment by almost 20% compared to the baseline. The sudden increase in capital demand amid lower required rate of return pushes up the rental rate as capital producing industry adjusts to the new equilibrium. The higher investment leads to higher capital stock by 0.82% more than the baseline.

Table 3.3. Deviation from baseline of scenario 2

Year	2022	2026	2031	2050
Period after reform	1	5	10	29
GDP growth	1.56	8.49	15.47	8.27
Actual rate of return	3.18	-0.07	-8.10	-4.62
Target rate of return	-3.30	-6.49	-6.49	-6.49
Expected rate of return	-0.12	-2.86	-7.84	-4.99
Rental rate	3.49	-0.04	-10.45	-11.77
Capital stock	0.82	12.79	27.54	11.72
Investment	19.69	48.95	48.61	4.73
Return to land	-6.00	-6.29	8.29	24.71
Return to unskilled labour	4.55	15.51	21.51	8.03
Return to skilled labour	3.43	13.25	20.11	7.87
Return to capital	2.60	-0.18	-6.70	-3.85
Return to natural resources	-4.46	0.09	19.32	24.21
Terms of trade	0.38	0.49	-1.05	-5.98
Export	-1.40	-1.33	6.99	27.10
Import	17.18	43.89	45.96	18.64
Trade balance to GDP	-4.2	-9.58	-7.39	0.75
Trade balance (bill. USD)	-46.1	-141.5	-165.1	28.6
Foreign ownership in Indonesia	1.10	10.29	16.56	-0.71
Domestic ownership in Indonesia	1.12	13.13	25.29	3.86
Indonesian investment abroad	-0.22	0.11	0.92	0.68
Foreign interest payment	5.56	10.19	4.03	-6.89
Household payment from foreign asset	-0.30	0.02	0.86	0.51
Household consumption	1.64	8.67	15.25	6.51
Government expenditure	0.30	3.45	7.26	4.27

Source: Authors' projection

As discussed in the previous sub-chapter, GDyn-FS does not have an exchange rate market. However, terms of trade can represent some degree of exchange rate in the classic real market. It seems to corroborate possible exchange rate market behaviour due to the implementation of the Omnibus Law. That is, in the short term, Indonesian terms of trade seems to be in favour of exports (that is, weak exchange rate) amid high initial capital imports. However, in the long run, the now more productive tradable sectors eventually push terms of trade to the negative side.

The investment boom lasts until 2026, when investment accrues to 48.95% higher than the baseline. However, in 2031 the investment boom slows down as the investment is higher by only 48.61%. By 2050, investment accrues by 4.73% higher compared to the baseline. As Figure 3.11 panel (c) suggests, there is an overshooting until around five periods since the reform. The investment boom cools down after period 5 and converges to 4.73% higher than the baseline by 2050. Consequently, capital stock follows a similar path, where it peaks at around period 10 after shock, and settles down at 11.72% higher compared to the baseline in 2050.

There is a significant influx of foreign investment, as suggested by the foreign ownership numbers. Foreign-owned assets come in following the investment boom. Meanwhile, Indonesian purchase of foreign assets is not significantly different from baseline, as suggested by the numbers from Indonesian investment abroad. This suggests a net inflow of investment.

With a net inflow of investment, the counterbalance is the current account. As suggested by the numbers from trade balance, Indonesian trade balance follows the investment cycle in the opposite way. As foreign ownership increases, trade balance goes more negative. Strong domestic demands fuelled by the investment boom reduces exports and increasing imports. However, by 2050, Indonesian exports start to dominate imports, resulting in overall increase in trade balance. Indeed, by 2050, foreign interest payment is -6.89% lower compared to the baseline.

Figure 3.12 shows a clearer picture of the dynamics of the economic transition path. It shows the dynamics of the Indonesian economy's deviation from baseline by selected indicators. Panel (e) shows Indonesian liabilities dynamics, where it overshoots in the first 5 years since the shock. This leads to high net interest payment

in the early stage of investing. However, in the long run, the financial account starts to balance.

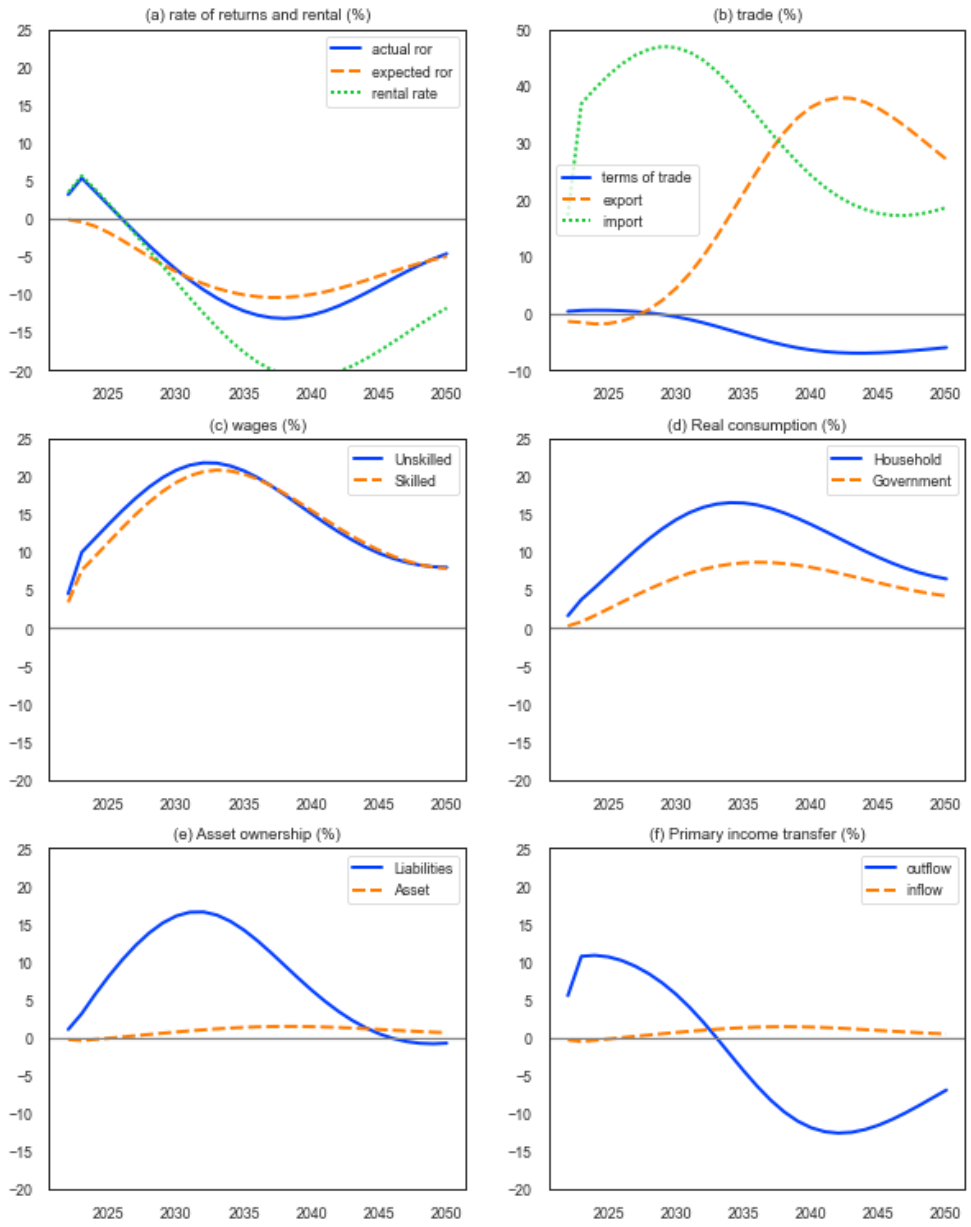

Figure 3.12. Deviation from baseline of scenario 2 on selected indicators, 2022-2050
Source: Authors' projection

The reform that takes two years to materialise leads to a permanently lower change in target rate of return by 6.49% compared to the baseline. This reduction is in line with 100 basis points of the target rate of return, which is essentially a required rate for investors to be willing to invest in Indonesia. The reduction of this rate jumps up the actual rate of return as investment comes in. The next year's expected rate is

starting to fall to converge with the target rate of return. With a high actual return comes high demand of capital, which pushes up rental rate. The rate, however, quickly decreases and converges along with the rest of the rate to fulfil the long-run condition as stated in equations 3.1 and 3.2. However, it seems like 2050 is not long enough to see the convergence.

Panel (c) shows wage growth of blue-collar and white-collar workers, while panel (d) shows growth of household and government consumption. As expected, with the higher investment and GDP, the economic condition is better compared to the baseline. The paths of wage growth and consumption growth follow the investment cycle, where there is a boom in around the first 5 years and settles down in the long run, higher than the baseline. The increase in government consumption in scenario 2 relative to scenario 1 suggests that the gain from relaxing tariffs outweighs the associated revenue loss.

3.5.3. Sectoral results

Sectoral results of scenario 2 can be seen in Figure 3.13. It is illustrated also with periods 1, 5, 10 and 29 after the shock. Construction sees the highest growth of all, which is expected since it is the main capital generating industry. As investment booms, construction absorbs a lot of factors to produce capital required to meet the investment demand. When investment settles down in 2050, construction is deviating less compared to the baseline.

As soon as the shock starts, the economy is stimulated by increased investment. Many sectors see weak growth with export reduction, while import increases. The relaxed import leads to the higher import as well as decreased export. The weak export and sectoral growth in the short run are also partially driven by the construction industry absorbing factors of production from other sectors.

The results differ in the long run. Sectors such as textiles and apparel, light manufacturing, and heavy manufacturing show a significant positive deviation from the baseline by 2050. Exports from these sectors become the main drivers of a more positive trade balance and the source of foreign reserves. Likewise, import growth

from these sectors are weakening, while imports from primary sectors are still relatively higher.

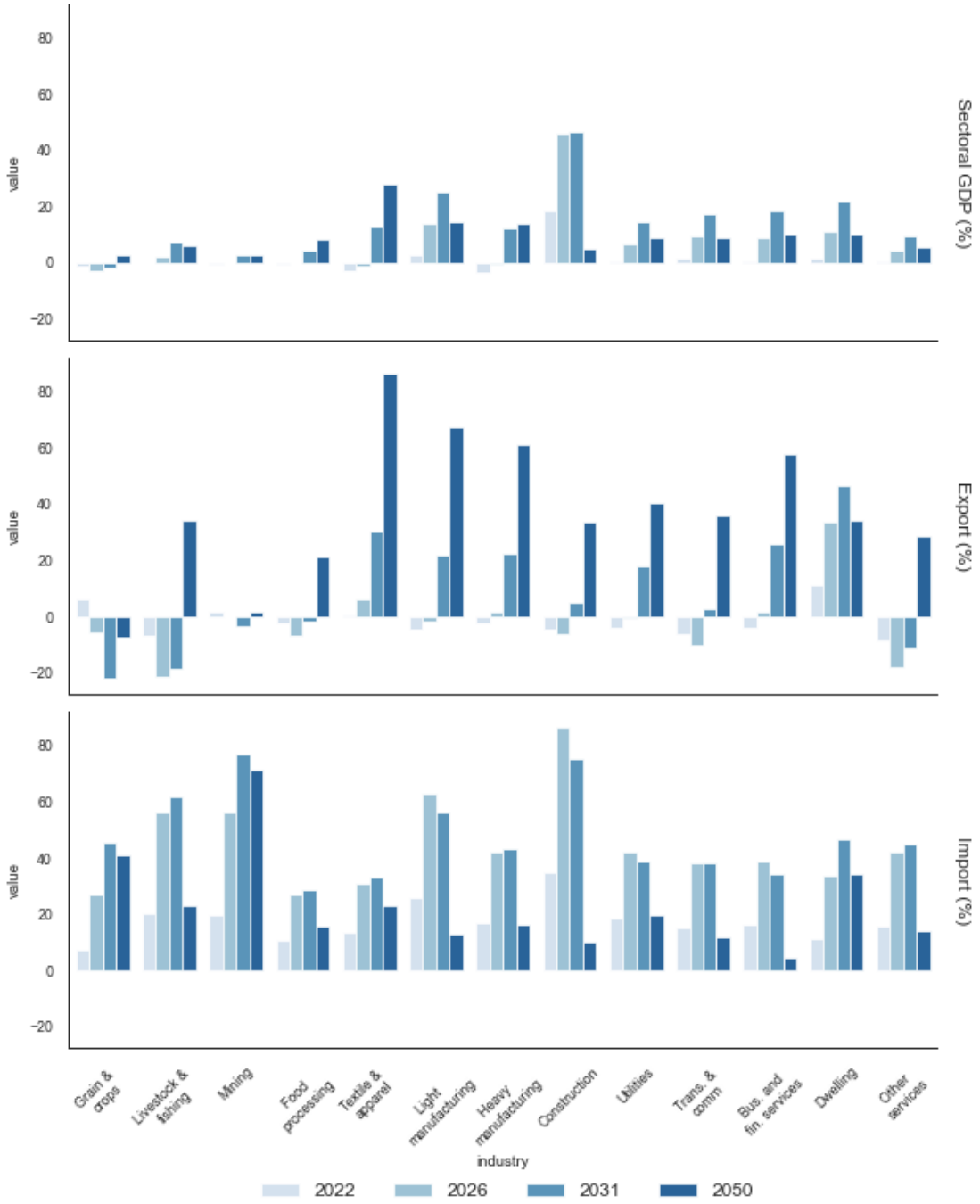

Figure 3.13. Deviation from baseline of scenario 2 on selected indicators per sector
Source: Authors' projection

Sectoral results confirm the economic transition shown in the previous chapter. Manufacturing sectors grows more quickly in all snapshotted periods, especially

compared to agriculture sectors. Moreover, agriculture growth is unable to catch-up with increased consumer and industrial demand. This increases imports and reduces exports in these sectors. Higher trade intensity (i.e., importing more agriculture products and exporting more manufacturing products) is a characteristic of the economic transition currently planned by the government. It is important for the government not to be too concerned with increased import of agriculture products.

It must be noted that sectoral results rely on the Elasticities of Technology (CET) parameter, which is using the GTAP database version 10A default. Factor allocation, starting with the base year 2014 on the GTAP database version 10A also plays an important role. Improvement can be made to fine tune the model in the future, such as estimating the parameters and using more refined baseline. However, the improvement seems to change mostly the magnitude only whereas the direction of the economic transition may not be very different.

3.6. Discussion and Conclusion

The Indonesian economy has been facing new challenges since the AFC. Indonesia adopted stricter trade and labour market regulations as well as a complicated business licensing process amid various layers of government. The end of the commodity boom as well as the taper-off of asset purchasing from the U.S. and the Euro zone exposed problems of the over-regulated economy.

The recession caused by the COVID-19 pandemic led Indonesian leaders to seriously reform the economy. The new law dubbed the Job Creation Law is an Omnibus Law which revokes many of Indonesia's existing regulations in just one law. It aims to build up a simplified, more centralized business licensing system, relax labour market regulation, and improve trade through an automatic import licensing system, among other things. It is argued that these measures would lead to more domestic and foreign investment, business creation, and more jobs being available in the economy.

At the same time, the government is aiming for a reduction of imports by 35% in 2022. We argue that this policy is the result of Indonesia's unwillingness to accept continuous current account deficit (CAD). The policy is at odds with attracting foreign

capital, one of the most important aims of the Job Creation Law. The inflow of foreign capital would pressure the current account, especially with Indonesia's import structure consisting mostly of capital goods and intermediate inputs. Without foreign goods and services, there will be a setback in capital accumulation, hence potentially undermining the reform.

This paper is an attempt to provide a justification for allowing a shorter run CAD. We argue that the CAD is in a relatively safe spot compare to the time of AFC. Additionally, we show that the problem with Indonesia's CAD is coming from net primary income flow and Indonesia's reliance on commodity exports. While building up capital and intermediate inputs may pressure CAD, they are needed to complement the economic reform and build up more globally competitive industries in the long run.

We emphasize this point using GDyn-FS, which is a recursive dynamic model of a multi-region, multi-sector CGE model. It adds the emphasis of regional capital distribution and adjustment cost of investment from the original version of GDyn, among other things. The model allows for a policy simulation where the Indonesian Government successfully implements the Job Creation Law and improves the efficiency of Indonesia's capital market. The better business climate is translated to a lower risk premium, hence a required less rate of return for investors and increased investment.

Our simulation shows that a permanent reduction of Indonesia's required rate of return by 100 basis points shows a larger GDP by 8.27% in 2050. The wage level of both skilled and unskilled labour is growing 10% faster compared to the baseline. Household consumption will be around 6.51% larger, while a 4.27% higher government expenditure is also to be expected by 2050. Meanwhile, reducing import by 35% is going to be harmful to the economy and may undermine the results from successful implementation of the Job Creation Law.

This exercise predicts a higher current account deficit. The Indonesian Government should expect a higher negative trade balance by almost 10 percentage points compared to the baseline. The dynamic path of the trade balance follows the path of foreign capital accumulation, which peaks around the same time as the

negative trade balance. However, our simulation shows that the investment boom will cool off in the long run, while the trade balance will be able to support the current account as a result of more competitive manufacturing sectors.

Making sure that the reform goes smoothly is important for Indonesia. Unfortunately, the law itself is controversial amid little public information, less rigid environmental measures, and the higher possible return to centralization. The public backlash, especially from labour unions, may undermine the coverage and depth of the reform. Additionally, the government's speed in making follow-up regulations from the law could also undermine the timing of the reform. More importantly, being too conservative with trade policy will reduce the effectiveness of capital accumulation and prevent successful implementation of the reform.

Chapter 4
On the role of trade policy in manufacturing growth

4.1. Abstract

While the Indonesian Government has been engaging with the world market by reducing its tariffs, it seems to follow the global trend; that is, relying on Non-Tariff Measures (NTM) to regulate its market and protect its industries. This paper inspects whether these measures are hurtful to firms by limiting their access to better quality and cheaper foreign inputs. It builds on Amiti and Konings (2007), inspecting the impact of trade policy shocks to firms' Total Factor Productivity (TFP). This study finds that tariffs and NTMs are hurting firms' TFP significantly and causing less employment. The impact is less severe for bigger firms, confirming a heterogenous effect of trade policy. The results suggest unintended consequences of protectionism in the Indonesian market. Moreover, as the country is looking to boost foreign investment, more protectionism may be regulated to keep mark-up in the domestic market high, as an incentive.

4.2. Introduction

Since the Asian Financial Crisis (AFC), Indonesia's manufacturing sector can't seem to be the driver of Indonesian economic growth anymore (Aswicahyono, Hill, & Narjoko, 2010; Resosudarmo & Abdurohman, 2018). The latest development plan, Making Indonesia 4.0, looks for an import substitution strategy and Foreign Direct Investment (FDI) to boost manufacturing-led growth, with a strong emphasis on using advanced technology. Indeed, manufacturing sector remains one of the most productive and well-paid jobs in Indonesia (Gupta, 2021).

In pursuing a manufacturing-centred strategy, industrial policy matters even more because it potentially distorts not only export, but also imported inputs such as energy, steel, and horticulture products. Moreover, it is argued that imported inputs can be a channel for technology upgrading (Castellani & Fassio, 2019). This fact is very important for a plan that relies on advancing technology in the short run.

Unfortunately, protectionism is on the rise (Rodrik, 2020). While the role of the tariff is getting smaller in reducing trade, the role of NTMs starts to gain importance. The World Trade Organization (WTO) and many Preferential Trade Agreements (PTAs) discussed reducing tariffs, without explicitly regulating NTM. This makes NTM a compelling tool for countries wishing to regulate trade policies.

Indonesia seems to follow this trend (Patunru, 2018; Patunru & Rahardja, 2015). While overall tariffs went down over time, the new emergence of various types of NTMs are rising. Figure 4.1 shows the increase of Indonesia's NTM as the tariff reduces. Indonesia joined a handful of PTAs, the most important being ASEAN, Japan and China, which have helped Indonesia to integrate more with the world economy (Pangestu, Rahardja, & Ing, 2015). However, NTM seems to play larger role in Indonesia's trade story, especially near the end of the commodity boom around 2012.

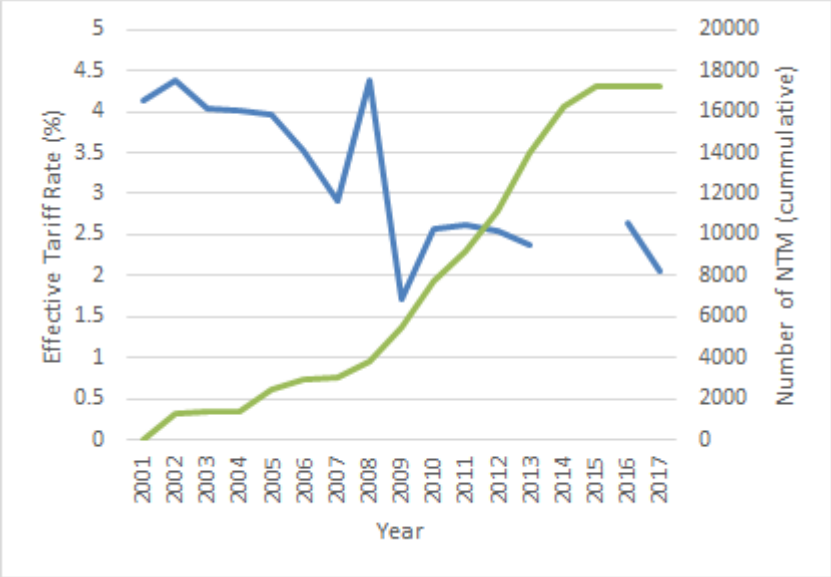

Figure 4.1. Indonesia's effective tariff rates and the number of NTMs

Source: Author's calculation based on UNCTAD and WITS

Note: Green line is the new NTM (non-cumulative), blue line is the effective tariff rate.

Unlike tariffs, NTM has the potential to enhance trade (Disdier, Fontagné, & Cadot, 2015). Moreover, industrial policies start to regain the attention of many economists as one of the important ways to grow low-to-medium income economies (Rodrik, 2007). With the Indonesian Government trying to get back to a pre-1998 level

of growth, studying NTM's impact on the firms is important. The fact that the Indonesian Government is willing to distort markets to do so makes this case extra compelling.

While the studies of the impact of NTMs largely focus on trade flows and development, the studies of NTM's impact on firms' performance and decision making remains scarce. According to Munadi (2016), 50% of Indonesia's total NTM was Technical Barrier to Trade (TBT), and 30% of total NTMs were enforced by The Ministry of Industry. This fact may suggest that these barriers were enacted as industrial policies.

UNCTAD's new database (UNCTAD, 2017) allows more researchers to pursue more rigorous studies on NTM. Most of the NTMs studies focus on estimating the cost of trade with Ad-Valorem Equivalent (AVE) of tariffs, and its impact on trade flows. Studying NTMs proposes technical challenges that are not present in tariff studies. The room to improve AVE estimation is still promising for future research.

This study builds on Amiti and Konings' (2007) research by constructing a Total Factor Productivity (TFP) variable to be used as the dependent variable to catch the direct effect of tariffs and NTMs on a firm's productivity. This method avoids endogenous variable complications introduced by using export as a proxy to measure firm performance. TFP is calculated by using a method first introduced by Levinsohn and Petrin (2003), while tariffs data used in this paper is collected by web-scrapping Indonesian Ministry of Finance documents, instead of relying on secondary data such as the World Integrated Trade Solutions (WITS).

I complement the literature by strengthening the evidence that access to imported inputs is essential for improving firm performance. A higher number of NTMs introduced to the Indonesian economy is also associated with lower TFP, albeit less important compared to tariffs. A heterogenous effect is also found in this study. That is, firms with a higher number of labours are impacted less negatively compared to their smaller peers.

Indeed, at least in the span of this chapter's observation, it is important for the government to be careful in introducing more NTMs, especially if the goal is to strengthen manufacturing. Global Value Chain (GVC) has been very important in

reducing poverty and helping a country grow. Instead of growing manufacturing sector, protectionism may produce the opposite effect.

The next section discusses literature covering the importance of imported inputs to firm performance as well as on TFP estimations. I show the method used in this chapter in the methodology section, and then discuss data used. I then discuss the results, and lastly, I conclude.

4.3. Literature Review

The Indonesian Government often relies on trade policy, especially limiting import, to protect its infant industries (Patunru & Rahardja, 2015). In fact, many governments do have an incentive to use trade barriers and NTM in particular to do this (Deardorff, 1987). Unfortunately, literature on trade and industry suggests the other direction (Costinot & Rodríguez-Clare, 2014). Access to cheaper or higher quality intermediate inputs from overseas brings a general benefit to firms in a country (Amiti & Konings, 2007; Bas & Strauss-Kahn, 2014; Castellani & Fassio, 2019; Ing, Yu, & Zhang, 2019; Olper, Curzi, & Raimondi, 2017; Pierola, Fernandes, & Farole, 2018).

Many of these studies use some measures of export as a proxy for a firm's performance. For example, Pierola et al. (2018) uses export value as their dependent variable to show correlation between higher import with higher export in Peru. Bas and Strauss-Kahn (2014) show that controlling for TFP, an increase of 10% of input varieties leads to a 10.5% higher market scope for exporters in the European Union (EU). Castellani and Fassio (2019) show that in Sweden, being a first-time importer is an important driver for a firm to have its first export. The more varied the import goods are, the more varied the exported goods. Fugazza, Olarreaga, and Ugarte (2017) show that the impact of NTMs in Latin America varies depending on firms' size; that is, bigger firm gained while smaller firms were forced to exit the export market.

Using export as a proxy for firm performance has its own challenge. One notable problem is possible reverse causality, even when controlling for productivity (Bas & Strauss-Kahn, 2014; Pierola et al., 2018). One way to go around that is to instrument import with tariff (Bas & Strauss-Kahn, 2014). However, this can still be problematic if the tariff is also not exogenous, especially in a country which actively targets current

account deficit. This approach also is not suitable in a NTM setting, as it can be trade promoting in some cases, mainly because of increased consumer trust coming from mutual implementation of product standardisation (An & Maskus, 2009; Cadot, Asprilla, Gourdon, Knebel, & Peters, 2015; Cadot, Ferrantino, Gourdon, & Reyes, 2018, Disdier et al., 2015).

One way to deal with this problem is to directly estimate the impact of NTM on TFP. While a NTM can have a reverse causality with trade balance, it is unlikely that the introduction of a NTM targets TFP. Directly relating trade policy to firm productivity is also proposed in many studies that use the Computable General Equilibrium (CGE) method (Walmsley & Strutt, 2019), which makes the result of this estimation more compelling for CGE parameterisation.

A widely-cited seminal paper investigating the relationship between trade policy and TFP directly was conducted by Amiti and Konings (2007). Specifically, using Indonesian manufacturing survey (Survey Industri), they saw the impact of import tariff reduction in inputs of Indonesian firms to their productivity. They estimate the TFP using a modified algorithm first proposed by Olley and Pakes (1996). Their result suggests that import tariff reduction significantly increases productivity of Indonesian firms. In particular, a reduction of 10 percentage points of import tariff leads to a 12% increase in a firm's productivity.

Olley and Pakes (1996) are among the first who dealt with the problem associated with unobserved productivity shock. That is, investment (and inputs) made by a firm is endogenous to a productivity shock observed only by the manager. They estimate a productivity shock follows a first order Markov process, which determines an investment decision. Amiti and Konings (2007) improved the method by adding export and import decisions as a variable that determines a firm's decision to invest. Assuming that trade policy is exogenous, firms use it to construct a production plan for the next period and then decide whether to invest, just like the unobserved productivity shock.

Levinsohn and Petrin (2003) extended the method by incorporating intermediate input. They argue that investment can be hard to adjust, limiting its capacity to absorb the unobserved productivity shock. Additionally, an investment proxy will not work

if many firms report zero investment. The method proposed by Levinsohn and Petrin (2003) has been tested on Indonesian manufacturing's dataset, by at least two papers with little comment on the problem (Pane & Patunru, 2019; Vial, 2006).

In the study of NTM, gravity estimation with a binary independent variable to capture the impact of NTMs seems to be the standard approach (Cadot et al., 2015; Disdier et al., 2015; Kee, Nicita, & Olarreaga, 2009). There are two main approaches to control for the impact of NTM on trade (Deardorff & Stern, 1997). The first is to use trade quantity, which is the approach of a highly cited paper by Kee et al. (2009). The second is to use price-based Ad-Valorem Equivalent (AVE) (Cadot et al., 2015; Marks, 2018). A quantity-based method has more straightforward data, but suffers from a lack of information on the impact of different prices and more subtle interpretation. Price-based captures are easier to interpret impacts of NTM on the cost of trade, but have problems particularly in differentiating the cost of trade or better-quality product.

Both measures also have their own criticisms (Deardorff & Stern, 1997). Impact of NTMs is harder to generalize, partly because some NTMs promote trade (An & Maskus, 2009; Cadot et al., 2015). Moreover, a generalized count database of NTMs, while broad, lack depth. It is one thing to know how a NTM affects a certain good; it is another to know how restrictive that NTM is across time and countries (Cadot et al., 2015).

In the Indonesian context, one of the earliest studies related to NTM was conducted by Marks (2018). He compared prices in Indonesia and Singapore for 140 tradable goods, which are controlled by NTMs, and he found in general Indonesian goods to be more expensive. He used survey data in which some are confidential. All taxes, tariffs and subsidies are accounted for. Econometrics estimation is not exploited in this study. However, this paper generally showed that NTM leads to higher prices.

4.4. Methodology

This chapter builds upon work by Amiti and Konings (2007), and Pane and Patunru (2019). Both studies describe their need to control for possible endogeneity of material inputs, therefore use a semi-parametric approach, first proposed by Olley and Pakes (1996). The estimation is conducted in two stages, where the first is to estimate TFP,

and then use TFP as a dependent variable for, among others, the change in trade policy, namely tariff and NTM.

Following Amiti and Konings (2007), I assume a firm to have a Cobb-Douglass production function:

$$Y_{it} = A_{it}(\tau, \zeta) L_{it}^{\beta_l} K_{it}^{\beta_k} M_{it}^{\beta_m} N_{it}^{\beta_n} \quad (4.1)$$

where the output Y of a firm i in time t is a function of a productivity A_{it}, its labour input L_{it}, its capital K_{it}, material input M_{it}, and energy consumption N_{it}. In this setting, productivity is a function of a trade policy τ and other possible factors, a vector ζ. That is, a change in trade policy is translated to be a productivity shock for firms. This change is assumed to be exogenous.

To estimate equation (4.1), a simple way is to take logs:

$$y_{it} = \beta_0 + \beta_l l_{it} + \beta_k k_{it} + \beta_m m_{it} + \beta_n n_{it} + \epsilon_{it} \quad (4.2)$$

where lower case letters represent the log form of its uppercase counterparts. Firms' revenue is used for y_{it}, deflated using a wholesale price index sourced from Bureau of Statistics [Badan Pusast Statistik] (BPS). L_{it} is the number of labourers employed by the firm, K_{it} is fixed capital, and M_{it} is material input deflated by input price index for manufacturing, also sourced from BPS. Lastly, N_{it} is energy consumption deflated by electricity price index, again, sourced from BPS.

Estimating equation (4.2) provides an estimated coefficient for each variable, which allows for constructing a predicted revenue for firms. TFP is then calculated by subtracting the predicted revenue from the observed revenue:

$$tfp_{it} = y_{it} - \hat{\beta}_l l_{it} - \hat{\beta}_k k_{it} - \hat{\beta}_m m_{it} - \hat{\beta}_n n_{it} \quad (4.3)$$

where tfp_{it} is the firm i's log of TFP in time t. With this estimation, the variable tfp_{it} contains all the information in the residual, such as firm's characteristics, and any unobserved impact of trade policy on productivity shock (τ).

The estimated TFP is then used in the second stage to look for associated changes of trade policy, namely tariff and NTM.

$$tfp_{it} = \gamma_0 + \gamma_{tarff} tariff_{it} + \alpha_i + \eta_{it} \quad (4.4)$$

with η_{it} fixed effect included.

Essentially, two main deviations from Amiti and Konings (2007) emerged. Firstly, instead of using their modification of Olley and Pakes (1996), I am using the latest method of estimating TFP as proposed by Levinsohn and Petrin (2003). As discussed in the literature review, Olley and Pakes (1996) were concerned that there is information about unobserved productivity shock in the error term from equation (4.2). They absorbed the information using investment as a proxy. Levinsohn and Petrin (2003) suggested that using intermediate input is better, especially in the existence of zero investment. This is the case for the Indonesian dataset (Vial, 2006).

The problem with the estimation from equation (4.2) is that the error term may contain a productivity shock observed only by the firm's manager. Observing a shock, a firm may adjust their level of input and investment, causing a correlation between factors and the error term. The first notable work to address this is Olley and Pakes (1996). They separate the error term ϵ_{it} to two separate residuals:

$$y_{it} = \beta_0 + \beta_l l_{it} + \beta_k k_{it} + \beta_m m_{it} + \beta_n n_{it} + \omega_{it} + \mu_{it} \quad (4.5)$$

where ω_{it} is a shock observed only by the firm i's manager while μ_{it} represents an independent error term.

They use investment as a proxy to observe ω_{it} and re-write (4.4):

$$y_{it} = \beta_l l_{it} + \phi_{it}(i_{it}, k_{it}) + \beta_m m_{it} + \beta_n n_{it} + \mu_{it} \quad (4.6)$$

where

$$\phi_{it}(i_{it}, k_{it}) = \beta_0 + \beta_k k_t + \omega_{it}(i_{it}, k_{it})$$

To avoid bias from k_t entering the term ϕ_{it} twice, they added an extra assumption that ω_{it} follows a first-order Markov process (i.e., $E[\omega_{it}|\omega_{it-1}]$) to make sure that β_k is unbiased and consistent.

Levinsohn and Petrin (2003) argue that using investment as a proxy can have a problem. Firms which finish an investment and report zero investment on the next period may be wrongly observed as experiencing a negative productivity shock. Investment is costly to make and may not flexibly capture a productivity shock. They suggest using intermediate input instead, as it is easier to adjust and is naturally never zero as long as a firm produces.

Using Levinsohn and Petrin (2003), the first stage estimation used in this paper becomes:

$$\phi_{it}(m_{it}, k_{it}) = \beta_0 + \beta_k\, k_{it} + \beta_m\, m_{it} + \omega_{it}(k_{it}, m_{it}) \tag{4.7}$$

while the second stage becomes:

$$y^*_{it} = \beta_0 + \beta_k k_{it} + \beta_m\, m_{it} + E[\omega_{it}|\omega_{it-1}] + \mu^*_{it} \tag{4.8}$$

where $y^*_{it} = y_t - \beta_l l_{it} - \beta_n n_{it}$ and $\mu^*_{it} = \omega_{it} - E[\omega_{it}|\omega_{it-1}] + \mu_{it}$.

This way, β_k and β_m are less biased because the error term is independent from k_{it} and m_{it}.

The second deviation is in modelling the tariff (and NTM, essentially). Since I have the information about which good is imported from which country, I need to map these larger dimensions to each firm in each given time. To map these variables into each firm in each year, I use a coverage ratio calculation (UNCTAD, 2017). This calculation can be applied for both tariff and NTMs.

The tariff coverage ratio of firm *i* at time *t*, T_i, is defined as:

$$T_{it} = \frac{\sum tariff_{scit} V_{scit}}{\sum V_{scit}} * 100 \tag{4.9}$$

where $tariff_{scit}$ is a tariff imposed on good s from country c time t, while V_{scit} is the imported value of good s sourced from country c time t.

Coverage ratio for NTMs is defined as:

$$C_{\theta it} = \frac{\sum NTM_{\theta scit} V_{scit}}{\sum V_{scit}} * 100 \qquad (4.10)$$

for each type of NTM θ in the UNCTAD database that is imposed by Indonesia at time t. This formula allows for different coverage ratios for different types of NTM. One-digit NTM (i.e., the seven main categories of UNCTAD TRAINS, more on the next sub-section) is used in this paper, but it is easy to extend the type of NTM that is used for other contexts.

Having considered the two deviations, the final second stage regression is:

$$tfp_{it} = \gamma_0 + \gamma_T log(1 + T_{it}) + \sum_{\theta} \gamma_\theta \log(1 + C_{\theta it}) + FO_{it} + \alpha_i + ISIC_i + \eta_{it} \qquad (4.11)$$

where T_{it} represents the tariff coverage ratio, $C_{\theta it}$ represents coverage ratio for each type of 1-digit NTM faced by firm i in time t. Firm fixed effect and dummy ISIC is included in the equation, as well as percentage of foreign ownership (FO).

There is little doubt that tariffs under this setting would behave differently compared to Amiti and Konings (2007). That is, more tariffs should reduce TFP as they lose access to foreign goods that are either cheap or necessary to produce. As shown in previous literature, foreign ownership usually is associated with better productivity, so a positive relationship between FO_{it} and tfp_{it} should be expected. Finally, ISIC is important to control since exposure with GVC is different between sectors.

4.5. Data

The main dataset is a combination of two different datasets, namely Indonesian manufacturing survey, Survei Industri (SI), and Indonesian customs data, both provided by Indonesian Bureau of Statistics (BPS). The SI provides firms'

characteristics such as factors, output, value added, and foreign ownership, among other things. Customs data, meanwhile, contains information of firms' imports by source countries and 8-digit HS Code. The two datasets are connected using a same firm ID. The main data is mostly constrained by the customs data, which is only available from 2008-2012.

4.5.1. Customs data

The customs data in Indonesia is not widely available, and it is only published for 2008-2012 observations. It connects firms' export and import data with the firm survey data. This type of data is valuable for researchers wanting to investigate the relationship of international trade and firms' performance. The availability of data on actual imports by firms allows us to construct coverage ratio of tariff and NTMs per firm, which is the variable of interest (more detailed explanation on sub-chapter 4.5.5).

Table 4.1 shows the most traded goods by Indonesian firms in current million USD from 2008-2012. The firms import many goods necessary for production such as machinery, plastics, cotton, iron and steel. This is in line with Indonesia's import in general, as it imports mostly manufacturing inputs and capital goods. Similarly, Indonesia also exports a lot of machinery, suggesting a degree of GVC integration among its firms. Vehicles and textile products being among the most exported goods by Indonesian firms is not unexpected. Additionally, Indonesian firms also supply to the world many important inputs such as rubber and fats.

Table 4.1. Most imported and exported goods by 2-digit HS Code, in current million USD

IMPORT HS2012

HS-2	Description	2008	2009	2010	2011	2012
72	Iron and Steel	2,060	1,070	1,810	2,280	2,660
84	Mechanical Machinery	2,030	1,520	2,580	3,360	4,130
85	Electrical Machinery	1,610	1,580	2,300	2,880	2,540
29	Organic Chemicals	1,180	925	1,250	1,560	1,850
39	Plastics and articles	875	753	1,110	1,560	1,680

23	Food Waste	642	616	597	1,080	1,270
52	Cotton	571	465	710	1,090	854
	Total Import	17,192	13,271	19,617	29,656	32,455

EXPORT HS2012

HS-2	**Description**	**2008**	**2009**	**2010**	**2011**	**2012**
85	Electrical Machinery	2,070	2,990	4,340	4,890	4,750
40	Rubber and Articles	1,760	1,590	3,680	5,770	4,130
15	Animal or Vegetable Fats	1,330	1,700	2,730	4,270	4,540
87	Non-railway Vehicles	1,150	1,370	2,060	2,290	3,500
84	Mechanical Machinery	986	993	1,440	1,790	1,660
61	Knitted apparels	636	989	1,040	1,370	1,320
62	Non-knitted apparels	643	1,150	1,360	1,560	1,290
	Total Export	15,028	19,631	29,340	37,420	37,056

Source: Calculated by author from BPS customs data

4.5.2. Survei Industri (SI)

The original SI, extracted only for 2008-2012 to match the customs data, is an unbalanced panel dataset with 117,589 observations in total. This data allows for calculation of TFP which is the endogenous variable. Naturally, the merged dataset is a subset of SI. Table 4.2 displays summary statistics of firms' characteristics of the combined dataset. The first column is only for firms that do not exist in the customs data, while the second column is the dataset used in this paper. The third column contains the original SI.

The notable point from Table 4.2 is how different are firms presented in the customs data (column 2) compared with firms who are not presented (column 1) and firms in original SI (column 3). The firms in this study tend to be bigger, have higher value added, and have higher concentration of foreign ownership. Table 4.2 also suggests that importing firms also tend to have higher fraction of exported output.

Another point to note is about the fractions of imported input and exported output. There are 54,253 missing observations of fraction of output exported, somewhat equally distributed between importing and non-importing firms. This somewhat limits the suggestion that importing firms tend to export more. Moreover,

there are 14,514 firms which report a non-zero imported input that are not presented in the customs data. It is possible that some firms reported a non-zero import supplied by a third party. These observations would add to the problem contained in SI as reported by its previous users (Amiti & Konings, 2007; Pane & Patunru, 2019; Vial, 2006).

Table 4.2. Summary statistics of firms' characteristics in Indonesia from 2008-2012, mean (and standard deviation)

Firm's characteristics	*Not in customs data*	*Present in customs data*	*Original SI*
Foreign ownership (%)	5.96	34.77	8.15
	(22.60)	(45.06)	(26.17)
Fraction of output exported (%)	0.21	0.40	22.51
	(0.37)	(0.42)	(37.52)
Fraction of input imported (%)	0.07	0.31	0.08
	(0.21)	(0.38)	(0.24)
No. of labour employed	162.75	535.44	191.07
	(602.46)	(1,457.65)	(711.73)
Capital stock (Million IDR)	194	250	198.00
	(46,500)	(10,400)	(44,800.00)
Total intermediate input	41	170	50.80
(Million IDR)	(515)	(1,330)	(617.00)
Total output (Million IDR)	73.30	296	90.30
	(861)	(1,740)	(958.00)
Total value added (Million IDR)	31.60	123	38.50
	(414)	(789)	(455.00)
Value added per labour	126,074	282,857	137,987.10
(IDR)	(2,600,177)	(1,012,159)	(2,515,300.00)
No. of observations	108,662	8,915	117,598

Source: Author's calculation from BPS

4.5.3. TRAINS NTM database

The main data for NTM is the TRAINS database. TRAINS is a collection of NTMs related to many different goods in HS-6 digits made available by UNCTAD (2017). TRAINS follows many regulations made by each country, which are trade related, and

then assigns them manually to different HS codes and NTM classifications. The nature of their data collection allows for neutrality, in that they do not classify it as trade-enabling or trade-restricting (UNCTAD, 2017).

The NTM database consists of count variables which indicate the existence of official regulation in different areas. These areas are classified according to the Multi-Agency Support Team (MAST) group (UNCTAD, 2018, 2019). There are three broad classifications: technical measures; non-technical measures; and export-related measures. These classifications are narrowed down to 16 chapters, coded from A to P, but not all chapters are recorded to exist in Indonesia.

There is a challenge in using the data in a time series manner. The TRAINS database does not follow regulations, and only record an NTM in the time data is collected (UNCTAD, 2017). Indeed, there is not yet an existing use of the database in a time-series manner. The dataset does have information that shows the start-date of a given NTM as well as its end-date. In this paper, NTM is considered to exist if an observation lies between its start-date and end-date.

For ASEAN countries, UNCTAD worked together with ERIA in two different time points. The first NTM data collecting was conducted in 2015, and then the dataset was updated in 2018. Interestingly, there are inconsistencies from documents associated with the two datasets. In 2015, there existed as many as 199 trade-related regulations in Indonesia, issued by 14 different government institutions (Munadi, 2016). However, in Munadi (2019), the number of identified trade-related regulations in the 2015 dataset is said to be 169 instead of 199. The trade-related regulations in the 2018 dataset is 192, which is said to have increased from 169 (Munadi, 2019), but then this statistic is inconsistent with the previous publication.

Table 4.3 shows the average number of trade-related regulations per good (measured in HS-6-digit count) that are active in any given year, from 2008 to 2012, for both the 2015 version and the 2018 one. It seems that for all type of NTMs, the Indonesian Government is indeed increasing the number of goods regulated by its NTMs for SPS and TBT. The same thing can't be said for other more harmful interventions, such as pre-shipment inspections and quotas, as noted by Munadi (2019).

Table 4.3. TRAINS NTM dataset on Indonesia, started before each year and ended after each year, for 2015 dataset and 2018 dataset, mean (and standard deviation)

2015 set	***2008***	***2009***	***2010***	***2011***	***2012***
Sanitary & Phytosanitary (SPS)	1.715	2.337	2.222	2.255	2.774
	(2.644)	(4.018)	(3.950)	(4.054)	(5.128)
Technical Barrier to Trade (TBT)	0.481	0.455	0.641	0.682	0.663
	(0.962)	(0.978)	(1.334)	(1.361)	(1.352)
Pre-shipment inspections and other formalities	0.562	0.466	0.443	0.462	0.776
	(1.202)	(1.081)	(1.059)	(1.046)	(1.075)
Non-automatic licensing, quotas, prohibitions and quantity-control measures	0.623	0.560	0.605	0.618	0.594
	(0.809)	(0.818)	(0.873)	(0.861)	(0.853)
Price-control measures, including additional taxes and charges	0.000	0.000	0.015	0.014	0.016
	(0.000)	(0.000)	(0.168)	(0.165)	(0.168)
Measures affecting competition	0.019	0.052	0.050	0.048	0.046
	(0.139)	(0.238)	(0.233)	(0.229)	(0.224)
Export-related measures	0.901	0.704	0.708	0.683	1.172
	(1.172)	(1.132)	(1.109)	(1.098)	(1.465)
Observations	1,675	2,204	2,318	2,400	2,510
2018 set	***2008***	***2009***	***2010***	***2011***	***2012***
Sanitary & Phytosanitary (SPS)	1.690	2.529	2.453	2.432	3.204
	(2.577)	(4.704)	(4.652)	(4.638)	(5.852)
Technical Barrier to Trade (TBT)	0.489	0.445	0.621	0.656	0.637
	(0.984)	(0.989)	(1.387)	(1.438)	(1.424)
Pre-shipment inspections and other formalities	0.710	0.563	0.546	0.542	0.872
	(1.549)	(1.395)	(1.377)	(1.372)	(1.366)
Non-automatic licensing, quotas, prohibitions and quantity-control measures	0.599	0.526	0.588	0.583	0.558
	(0.740)	(0.759)	(0.828)	(0.827)	(0.817)
Price-control measures, including additional taxes and charges	0.000	0.000	0.015	0.015	0.014
	(0.000)	(0.000)	(0.171)	(0.170)	(0.166)
Measures affecting competition	0.018	0.053	0.051	0.051	0.048
	(0.139)	(0.239)	(0.236)	(0.235)	(0.229)
Export-related measures	1.060	0.836	0.811	0.804	1.511
	(1.430)	(1.363)	(1.350)	(1.346)	(1.803)
Observations	1,682	2,182	2,250	2,269	2,383

Source: UNCTAD TRAINS database

Both datasets have different numbers of observations and of NTMs applied. Additionally, NTM in the 2018 dataset version is generally larger than 2015. There is a possibility of duplication, but it is recommended by UNCTAD (2017) to keep it since the duplication might come from different regulations affecting the same goods. Since this paper observes 2008-2012 data points, the two different datasets should not matter, especially since the newer dataset kept codes from the older dataset (Munadi, 2019). Results from the two datasets are very similar in terms of direction and weight. While the use of datasets does not significantly change the regression result, this paper reports results using the 2015 dataset, since it is closer to the time of observation.

The use of SPS and TBT are the most extensive in Indonesia. The increased trend is driven by the use of Indonesian National Standard (Standar Nasional Indonesia or SNI) and labelling requirements (Munadi, 2018). Pre-shipment inspection and the requirement to pass through a specific port is considered to be too tedious (Munadi, 2018), and alarmingly these went up in 2012. There is also non-automatic licensing in the form of a Ministerial technical recommendation, and some additional taxes such as luxury and value-added. Measures affecting competition are mainly due to special privileges for State-Owned Enterprises (SOEs), and among the export-related measures is an export tax.

4.5.4. Tariffs

With highly granular data made available by the customs data, it makes more sense to use detailed tariff data from 2008-2012. Since a database of that detail is not made freely available, I rely on the Indonesian Ministry of Finance repository to find information of relevant regulations between the observation years. Indonesia is very active in updating its tariff line, having around seven regulations each year. Updated tariff line in accordance with Preferential Trade Agreements (PTAs) is extracted from websites for each agreement.

Table 4.4 shows the difference between author-collected tariff from Ministry of Finance regulations with tariff downloaded from the WITS website. The WITS database does not contain complete PTAs for Indonesia and ASEAN is involved such as IJEPA (Indonesia with Japan) and AANZFTA (ASEAN with Australia and New

Zealand). Most of the tariff reduction happened in 2009-2010 with ASEAN, China, India, Australia, and New Zealand in particular.

Table 4.4. Tariff collected by author compared to WITS tariff database, simple average, standard deviation in bracket

Author's database	***2008***	***2009***	***2010***	***2011***	***2012***
Most Favoured Nations	7.049	7.612	6.928	6.975	6.960
	(12.213)	(12.536)	(8.037)	(7.231)	(7.145)
ASEAN	2.478	2.490	0.150	0.150	0.150
	(11.094)	(11.206)	(4.559)	(4.559)	(4.559)
China	7.049	3.819	2.193	2.208	1.941
	(12.213)	(12.673)	(7.941)	(7.941)	(7.927)
South Korea	7.049	2.624	1.912	1.912	1.542
	(12.213)	(12.265)	(7.131)	(7.131)	(7.102)
India	7.049	7.612	6.394	5.874	5.341
	(12.213)	(12.536)	(7.809)	(7.517)	(7.322)
Japan	6.110	4.639	3.274	2.618	2.230
	(11.967)	(12.356)	(7.353)	(7.114)	(6.487)
Australia and New Zealand	7.049	6.446	2.948	2.278	1.545
	(12.213)	(11.922)	(6.765)	(6.318)	(6.065)
WITS Database	***2008***	***2009***	***2010***	***2011***	***2012***
Most Favoured Nations	7.762	7.595	7.564	7.051	7.053
	(12.631)	(12.456)	(12.412)	(7.015)	(7.016)
ASEAN	-	1.840	1.843	0.152	0.152
		(11.079)	(11.067)	(4.285)	(4.287)
China	-	3.665	2.743	1.850	1.579
		(12.342)	(12.392)	(6.853)	(6.823)
South Korea	-	2.564	2.560	1.698	1.326
		(12.087)	(12.084)	(6.395)	(6.349)
India	-	-	-	5.409	4.991
				(6.726)	(6.620)
Japan	-	-	-	-	-
Australia and New Zealand	-	-	-	-	-

Source: Ministry of Finance, ortax.org, WITS, and various sources with PTA partners

Chronologically, the author-collected tariff fits the regulations better. There is a delay in the implementation of regulations regarding ATIGA implementation in 2010 and AKFTA in 2009 in the WITS dataset. Moreover, there is no information on IJEPA's special tariff with Japan, also ANNZFTA with Australia and New Zealand, in the WITS dataset.

In general, the datasets confirm several observations made by the literature. Firstly, Indonesian tariff data was indeed decreasing, especially after the GFC as many PTAs are made between ASEAN and its main trading partners. Secondly, Indonesia increased its use of NTMs at roughly the same time. The increasing use of NTMs is sound, in particular with SPS and TBT. This trend seems to continue until 2018, with Standar Nasional Indonesia (SNI), or Indonesian National Standard, as the driver (Munadi, 2019).

4.5.5. Coverage ratio

With the customs data, tariff, and TRAINS combined, tariff and NTMs faced by Indonesian firms can be calculated. Moreover, we can also calculate the coverage ratio faced by each firm. Table 4.5 shows descriptive statistics of tariff and NTMs that are relevant to Indonesian firms based on the customs dataset, as well as coverage ratio for tariff (T in equation 4.11) and NTMs (C_θ in equation 4.11, where $\theta \in$ A,B,C,E,F,H,P).

Tariff faced by these firms lies between the MFN tariff and FTA tariffs from Table 4.5. This is to be expected, especially since Indonesian firms import much from European Union (EU) and United States (US), the two regions without any special FTA yet. Tariff coverage ratio (T) is not very different from the average tariff faced by these firms, which is expected.

The number of NTMs faced by these firms in general seems to be low, suggesting that firms mostly import less restrictive goods compared to general NTMs. Licensing and quota restrictions, however, seem to be more important, since many of the Indonesian quota restrictions target meat and horticulture products, an important input for firms in the food industry. In general, the coverage ratio is higher compared to the average number of NTMs, which means many important goods that firms buy are restricted with NTMs.

Table 4.5. Coverage ratio of tariff and NTMs compared to the original database[13]

Variable	*Observation*	*Mean*	*Std. Dev.*	*Min*	*Max*
Tariff (%)					
Tariff	407,532	3.503	4.971	0	150
Tariff Coverage Ratio (T)	407,532	3.420	5.646	0	150
NTMs					
SPS (A)	407,532	0.108	0.718	0	29
TBT (B)	407,532	0.140	0.663	0	13
Pre-shipment inspection (C)	407,532	0.028	0.214	0	5
Licensing, quota, etc (E)	407,532	0.321	0.550	0	6
Price control etc (F)	407,532	0.000	0.008	0	2
Competition measures (H)	407,532	0.007	0.083	0	2
Export-related (P)	407,532	0.063	0.376	0	7
Coverage ratio A	407,532	0.246	0.931	0	19
Coverage ratio B	407,532	0.202	0.478	0	9
Coverage ratio C	407,532	0.059	0.237	0	4
Coverage ratio E	407,532	0.337	0.468	0	6
Coverage ratio F	407,532	0.000	0.001	0	0
Coverage ratio H	407,532	0.014	0.083	0	1
Coverage ratio P	407,532	0.110	0.353	0	7

Source: Author's calculation based on the Indonesian Customs data and TRAINS

With the data completed, the next section discusses the results of the regression. Firstly, TFP estimation is conducted. This result is then used to regress the impact of trade policies on firms' performance.

4.6. Results and discussion

4.6.1. TFP estimation

The first part of the regression conducted in this chapter is estimating TFP using Levinsohn and Petrin (2003) methodology. As discussed in other papers (perhaps

[13] The mean for tariffs is calculated in terms of percentage while that of NTMs is of unit (that is, between 0 and 1). This is because NTM is a count data while tariff is presented as percentage, and it will be easier to interpret results.

most comprehensively by Vial (2006)), Indonesian SI has issues with unbalanced panel data as well as unmatched accounting in its aggregated variables. Missing data on investment is not uncommon, and among those who do report, they report zero investment. Levinsohn and Petrin's (2003) methodology can deal with zero investment.

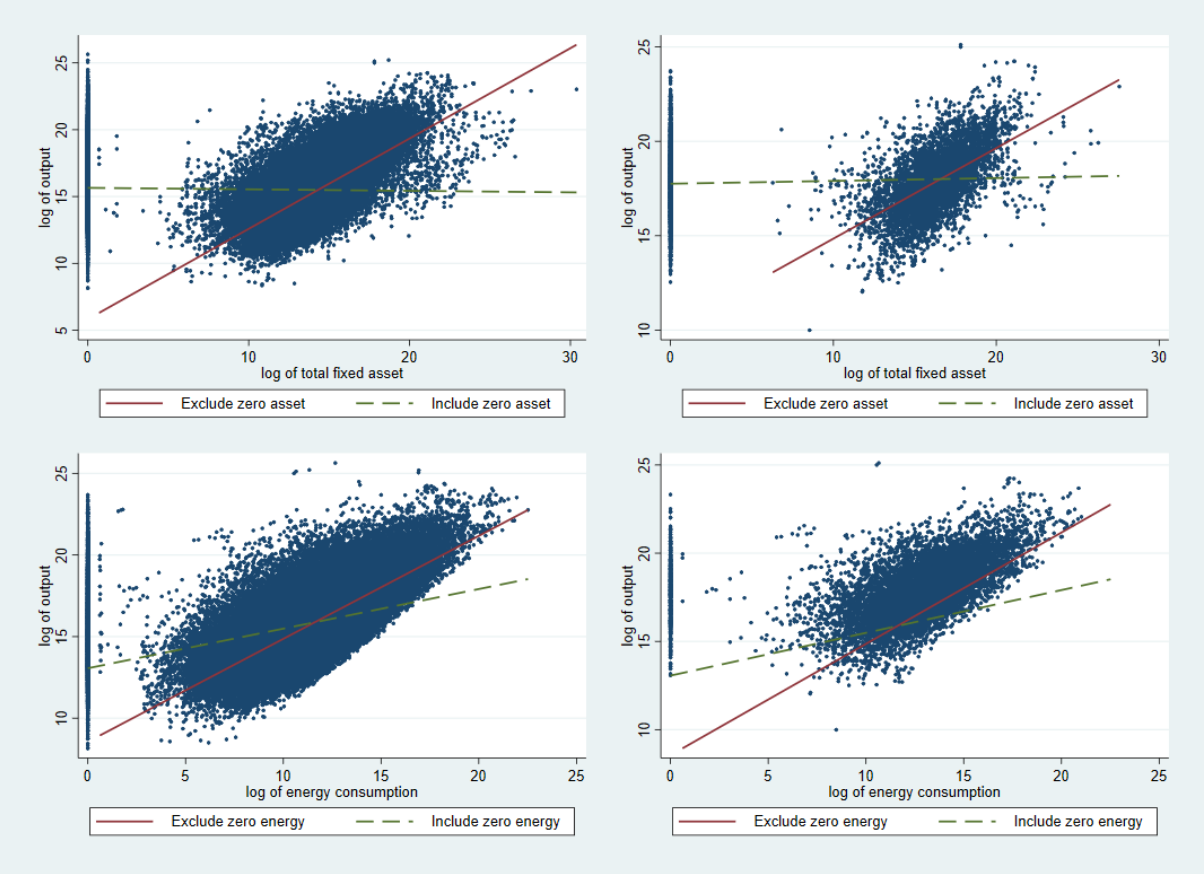

Figure 4.2. Capital, Energy output Scatterplot for total observation of SI (left) and for observations only on customs data (right), Capital-Output (top) and Energy-Output (bottom)

Source: Author's calculation based on the Survey Industri

However, SI data are also filled with zero reported fixed capital. Many of the zero capital data are accompanied by high output, which skew data to the left. Zero capital are reported on over 30% of the dataset, and this proportion is robust for firms that both exist and do not exist in the customs dataset. This problem is also detected on the reported energy consumption, but not in intermediate inputs.

Figure 4.2 plots log of capital and energy consumption on the x-axis with log output on the y-axis. There are four panels in the figure. The top row shows capital on the x-axis while the bottom rows show energy consumption on the x-axis. The left column represents all observations of SI while the right column only shows firms that exist in the customs data. Striped lines show correlation for all observation, while solid lines censor all zeroes.

Figure 4.2 suggests that the zeroes are very important and could possibly bias the regression. The impact is even stronger in the case of capital, as it leads to a negative correlation (i.e., downward sloping) for all observations (top left). For firms in the customs data, the effect is not as extreme but still not very different from zero. The zero impact is less clear on energy, but still important.

Table 4.6 shows the coefficient from Levinsohn and Petrin (2003) regression on three different datasets for all observations (odd columns) and for observations with strictly positive log of capital and energy consumption (even columns). Columns (1) and (2) are for all of SI, columns (3) and (4) are for firms not in the customs data, and the last two columns are for firms present in the customs data.

If the zeroes are included, capital's impact on output is not different from zero, which is not very realistic. While betas for energy consumption still show a positive significance on the non-censored observation, dropping the zeroes changes its coefficient relatively importantly. The return-to-scale measurement for the censored observations are also more consistent with the literature. The regression from Table 4.6 indeed provides strong support to exclude firms that report zero capital and energy.

Table 4.7 shows estimated TFPs from the TFP regression (i.e., equation 4.8). TFPs estimated on observations including zero capital and energy consumptions that are more than double higher compared to TFPs from all censored datasets. This is expected as they underestimate the ability for capital and energy consumption to produce output.

Table 4.6. TFP Regression Coefficient, for three different datasets – both all observations and censored observations

	Original SI		Not in customs data		Present in customs data	
Variables	all obs	only k,n>0	all obs	only k,n>0	all obs	only k,n>0
	(1)	(2)	(3)	(4)	(5)	(6)
Labour (l)	0.354***	0.307***	0.355***	0.307***	0.268***	0.254***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.011)	(0.015)
Capital (k)	0.000	0.223***	0.000	0.219***	0.000	0.161***
	(0.000)	(0.014)	(0.000)	(0.015)	(0.002)	(0.038)
Energy (n)	0.035***	0.114***	0.037***	0.114***	0.019***	0.097***
	(0.001)	(0.003)	(0.001)	(0.002)	(0.003)	(0.008)
Input (m)	0.234***	0.281***	0.251***	0.255***	0.344***	0.226***
	(0.013)	(0.024)	(0.017)	(0.024)	(0.056)	(0.075)
RTS	0.623	0.925	0.643	0.895	0.631	0.738
Observations	117,598	73,265	108,662	68,294	8,936	4,971

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.7. Estimated TFP, for three different datasets – both all observation and censored observation

	Original SI		Not in customs data		Present in customs data	
Variables	all obs	only k,n>0	all obs	only k,n>0	all obs	only k,n>0
	(1)	(2)	(3)	(4)	(5)	(6)
Estimated TFP	241,611.20	107,036.90	216,246.40	115,020.70	341,643.80	177,280.20
	(4,444,240)	(2,792,543)	(4,361,599)	(2,719,907)	(8,542,388)	(4,609,524)
Not in customs	221,284.30	98,534.27				
data	(4,542,027)	(2,826,922)				
Present in customs	488,787.80	210,429.20				
data	(3,000,124)	(2,331,985)				
Value Added	137,987.1	111,455.8	126,073.5	100,510.9	282,856.5	261,822.6
Labour	(2,515,300)	(2,538,721)	(2,600,177)	(2,614,048)	(1,012,159)	(1,043,383)

TFP for firms present in customs data is higher on average compared to firms outside, which is also expected. The difference in TFP is much more visible when it is estimated together, as shown in columns (1) and (2) in Table 4.7. When they are estimated separately, TFP from firms outside the customs dataset (columns (3) and (4)) is still lower than firms in the customs dataset (column (4) and (6)), albeit smaller.

To complement TFP calculation from Levinsohn and Petrin (2003), I also include another measure of TFP, namely value added per labour (for reasoning, see for example Pane and Patunru 2021). This variable allows me to keep all variables since the report for both value added and labour does not suffer from capital and energy. The descriptive statistic of this variable is presented in the last row of Table 4.7. Using this metric, it still holds that firms included in the customs dataset are more productive. Lower average of value added per labour for the censored firms may suggest there are more firms reporting high value added that are also reporting zero capital and/or energy consumptions.

4.6.2. Impact of policies on TFP

Finally, only firms included in the customs data are used in the second stage regression. There are three final variables used as independent variables. TFP1 is TFP of firms included in the customs data, estimated together with other firms in the original SI dataset. TFP2 is TFP of firms included in the customs data, estimated within its own subset. Va/L is measured by value added per labour of firms included in customs data and reports a strictly positive fixed capital and energy consumption.

Let $t = \log(1 + T_{it})$, $c_\theta = \log(1 + C_{\theta it})$, the three measures of TFP are then regressed using equation (4.7). The result is presented in Table 4.8 in six columns. Columns (1) to (3) are the four TFPs regressed using OLS, while columns (4) to (6) have ISIC-2-digit, year and firms fixed effects.

Tariff coverage ratio is not shown to be significant for most of the TFP measures, except for labour value added (Va/L). The significance of Va/L also goes when fixed effects are introduced. SPS seems to have a negative impact on firms' TFP, albeit weakly. These are also gone when controlled by fixed effects.

TBTs have a strong positive correlation, which may suggest that they allow firms to have better quality inputs. However, the correlation is gone when fixed effects are introduced. Price control measures also show similar behaviour. Notably, the fact that there are so few price control measurements introduced by Indonesia leads to a relatively high coefficient.

Trade policies may affect firms differently compared to the general population. As first argued by Melitz (2003), trade policies have a heterogenous effect on firms. That is, they may hurt bigger firms less, or even benefit them. To capture this phenomenon, I adapt the approach of Fugazza et al. (2017) by introducing interaction between trade policy variables with firm size. I use the number of labours (LAB) as a proxy for size. Equation (4.7) is then modified to become:

$$tfp_{it} = \gamma_0 + \gamma_T \log(1 + T_{it}) + \gamma_{TL} \log(1 + T_{it}) * \log(LAB) + \sum_{\theta} \gamma_\theta \log(1 + C_{\theta it}) + \sum_{\theta} \gamma_{\theta L} \log(1 + C_{\theta it}) * \log(LAB) + FO_{it} + \alpha_i + ISIC_i + \eta_{it} \quad (4.12)$$

Table 4.9 documents this result. Lower case represents log form. When size interaction is added, the average effect of tariff on a firm's TFP becomes significantly negative. TFP2 shows an impact twice as high compared to TFP1, while Va/L failed to show response to the tariff change. When fixed effects are introduced, the impact of tariff to TFP is weakened for TFP1 and TFP2, albeit still significant. Interestingly, Va/L become positively significant. The results from TFP1 are comparable to Amiti and Konings (2007).

Results from Table 4.9 confirm a heterogenous effect of international trade on firms. Interaction between tariff and firm's size, measured by the number of labours, shows positive and significant results. This means that bigger firms are impacted less compared to smaller firms, albeit still negative overall. Labour value added, however, shows a completely different sign, where bigger firms see smaller Va/L in the presence of higher tariffs.

Table 4.8. Impact of tariff and NTM on TFP

VARIABLES	TFP1	TFP2	Va/L	TFP1	TFP2	Va/L
	(1)	(2)	(3)	(4)	(5)	(6)

Tariff	-0.027	-0.025	-0.072***	-0.019	-0.013	0.002
	(0.020)	(0.019)	(0.023)	(0.022)	(0.021)	(0.028)
SPS	-0.094*	-0.079	-0.164**	-0.011	-0.025	-0.038
	(0.048)	(0.049)	(0.073)	(0.065)	(0.062)	(0.082)
TBT	0.289***	0.254***	0.379***	0.182**	0.142*	0.184*
	(0.092)	(0.078)	(0.099)	(0.078)	(0.074)	(0.098)
Pre-shipment	0.082	0.067	0.295*	-0.063	-0.077	-0.057
	(0.109)	(0.109)	(0.161)	(0.114)	(0.107)	(0.143)
Licensing	-0.064	-0.036	-0.004	-0.093	-0.095	-0.116
	(0.059)	(0.058)	(0.087)	(0.076)	(0.072)	(0.096)
Price control	281.992***	585.429***	539.567***	138.837	374.367	116.246
	(87.628)	(111.394)	(134.382)	(1,557.471)	(1,469.290)	(1,957.694)
Competition	0.114	0.084	0.111	0.270	0.238	-0.048
	(0.320)	(0.315)	(0.348)	(0.351)	(0.332)	(0.442)
Export-related	0.009	0.035	0.057	0.073	0.094	0.040
	(0.081)	(0.081)	(0.140)	(0.105)	(0.100)	(0.133)
Dummy FDI	0.171***	0.176***	0.153**	0.079	0.080	-0.030
	(0.059)	(0.054)	(0.074)	(0.066)	(0.062)	(0.083)
Foreign ownership	0.039***	0.040***	0.044***	0.021	0.020	0.026
	(0.013)	(0.012)	(0.016)	(0.015)	(0.014)	(0.019)
Constant	6.357***	8.761***	11.256***	6.512***	8.930***	11.421***
	(0.040)	(0.040)	(0.052)	(0.178)	(0.168)	(0.224)
firm-fe	no	no	no	yes	yes	yes
year-fe	no	no	no	yes	yes	yes
ISIC-2-digit-fe	no	no	no	yes	yes	yes
Observations	4,971	4,971	4,971	4,971	4,971	4,971
R-squared				0.023	0.025	0.061
No. of firms	1,512	1,512	1,512	1,512	1,512	1,512

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Impact of NTMs on firms' measures see a more negative result of TFP compared to Table 4.8, albeit remaining weak. SPS still shows a relatively weak negative impact of TFP but only when measured by TFP2. Non-automatic licensing (Ce) shows a significant, negative result while it also confirms a heterogenous effect; that is, bigger sized firms fare relatively better compared to their smaller counterparts.

Table 4.9. Impact of tariff and NTM on TFP including size interaction

VARIABLES	TFP1	TFP2	Va/L	TFP1	TFP2	Va/L
	(1)	(2)	(3)	(4)	(5)	(6)
Tariff	-0.357***	-0.630***	0.071	-0.205**	-0.371***	0.259**
	(0.067)	(0.065)	(0.090)	(0.083)	(0.077)	(0.104)
Tariff*lab	0.061***	0.112***	-0.026	0.036**	0.068***	-0.048**
	(0.012)	(0.011)	(0.017)	(0.015)	(0.014)	(0.019)
SPS	-0.250	-0.517**	-0.124	-0.260	-0.381	0.103
	(0.234)	(0.260)	(0.381)	(0.297)	(0.278)	(0.372)
SPS*lab	0.026	0.076*	-0.008	0.043	0.062	-0.029
	(0.042)	(0.046)	(0.067)	(0.051)	(0.048)	(0.064)
TBT	0.213	0.194	0.486	0.124	0.074	0.462
	(0.483)	(0.419)	(0.408)	(0.330)	(0.310)	(0.415)
TBT*lab	0.014	0.012	-0.019	0.011	0.013	-0.051
	(0.083)	(0.072)	(0.067)	(0.058)	(0.055)	(0.073)
Pre-inspection	0.418	0.749	-0.005	-0.115	0.160	-0.637
	(0.531)	(0.558)	(0.758)	(0.520)	(0.488)	(0.652)
Pre-inspection*lab	-0.058	-0.116	0.051	0.010	-0.043	0.100
	(0.094)	(0.098)	(0.134)	(0.093)	(0.087)	(0.117)
Licensing	-0.650**	-1.444***	0.640*	-0.451	-0.896***	1.477***
	(0.266)	(0.263)	(0.371)	(0.311)	(0.292)	(0.390)
Licensing*lab	0.107**	0.258***	-0.119*	0.065	0.147***	-0.295***
	(0.047)	(0.046)	(0.064)	(0.056)	(0.052)	(0.070)
Price control	-8,559***	-12,147***	-29,052***	-7,559	-10,221	-25,902
	(3,235)	(2,984)	(4,029)	(41,100)	(38,558)	(51,565)
Price control*lab	1,383***	1,985***	4,717.740***	1,214.495	1,665.753	4,154
	(514)	(474)	(640)	(6,533)	(6,129)	(8,197)
Competition	-1.155	-0.693	-2.269*	-2.027	-2.204*	-4.609***
	(1.152)	(1.095)	(1.194)	(1.277)	(1.198)	(1.602)
Competition*lab	0.228	0.129	0.434**	0.393*	0.413**	0.834***
	(0.216)	(0.210)	(0.213)	(0.220)	(0.206)	(0.276)
Export-related	-0.341	-0.475	0.343	-0.096	-0.291	0.480
	(0.357)	(0.385)	(0.679)	(0.476)	(0.446)	(0.597)
Export-related*lab	0.066	0.095	-0.049	0.036	0.075	-0.073

	(0.062)	(0.066)	(0.125)	(0.083)	(0.078)	(0.104)
Dummy FDI	0.157***	0.152***	0.156**	0.066	0.061	-0.022
	(0.059)	(0.052)	(0.073)	(0.066)	(0.062)	(0.083)
Foreign ownership	0.039***	0.040***	0.045***	0.023	0.024*	0.025
	(0.013)	(0.012)	(0.016)	(0.015)	(0.014)	(0.019)
Constant	6.354***	8.751***	11.259***	6.501***	8.904***	11.452***
	(0.040)	(0.040)	(0.052)	(0.178)	(0.167)	(0.224)
Fixed effects	no	no	no	no	yes	yes
Observations	4,971	4,971	8,936	4,971	4,971	4,971
R-squared				0.029	0.041	0.070
No. of firms	1,512	1,512	2,173	1,512	1,512	1,512

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

4.6.3. The impact of trade policies on employment

The results from labour value added is puzzling. One possible explanation is that firms decided to reduce the number of workers to cope with loss of productivity. If the number decreased higher than the decrease of total value added, firms will show having a higher value added per labour.

To check for this phenomenon, I constructed a new dependent variable that measures the growth of labour:

$$\Delta lab_t = \log(LAB_t) - \log(LAB_{t-1})$$

and used it to replace TFP measurements in equation (4.12). The results of this regression are presented in Table 4.10. Size interaction is presented in columns (3) and (4) while even column receive fixed effect treatments. The consequence of this regression is losing year-2008 observations.

The result is similar to the impact of trade policies on TFP1 and TFP2. That is, higher tariffs are associated with lower growth of labour. With fixed effects applied, a doubling tariff is responsible for a loss of jobs, by 136.8%. The impact is smaller for bigger firms. The same is true for implementing SPS, non-automatic licensing, and some competition measures.

When imports are halted by tariffs and NTMs, firms have limited access to important inputs. Suppose that these inputs are not easily substitutable by domestic inputs or other factor of production – firms will adjust by lowering their production. These findings complement the literature, which already found extensive evidence of the importance of international trade, in particular imported inputs, to manufacturing development (World Bank, 2020).

I complement the literature on the heterogenous effect of trade on firms, especially in Indonesian manufacturing. Bigger firms are able to better manage trade shocks and have less lay-off. This is important to be noted by policy makers, especially since the latest Indonesian manufacturing development plan, Making Indonesia 4.0, places a heavy reliance on attracting investment from big multi-national corporations (A.T. Kearney Incorporated, 2018). Policies for smaller firms are less clear.

Table 4.10. Impact of tariff and NTM on firms' labour input growth

VARIABLES	Δlab	Δlab	Δlab	Δlab
	(1)	(2)	(3)	(4)
tariff	-0.008	-0.028	-0.260***	-1.368***
	(0.009)	(0.021)	(0.047)	(0.063)
SPS	-0.028	-0.120*	-0.176	-1.650***
	(0.020)	(0.066)	(0.153)	(0.230)
TBT	0.034	-0.075	0.064	0.452*
	(0.038)	(0.075)	(0.236)	(0.257)
Pre-inspection	-0.041	0.121	0.066	1.997***
	(0.040)	(0.100)	(0.349)	(0.370)
Licensing	-0.015	-0.042	-0.818***	-4.455***
	(0.033)	(0.073)	(0.190)	(0.237)
Price control	135	1,543	14,832***	6,015
	-88	-1,185	(4,381)	-25,570
Competition	0.072	0.094	-0.999	-2.788***
	(0.289)	(0.387)	(1.563)	(1.006)
Export-related	-0.017	0.097	-0.246	-0.617*
	(0.028)	(0.091)	(0.203)	(0.333)
dummy FDI	0.031	0.147**	0.028	0.091*
	(0.030)	(0.065)	(0.031)	(0.053)
Foreign	-0.008	-0.026*	-0.009	-0.007

ownership	(0.007)	(0.014)	(0.007)	(0.011)
t*l			0.043***	0.251***
			(0.008)	(0.011)
SPS*lab			0.021	0.288***
			(0.027)	(0.041)
TBT*lab			-0.008	-0.095**
			(0.043)	(0.045)
Pre-inspection*lab			-0.008	-0.345***
			(0.061)	(0.066)
Licensing*lab			0.140***	0.809***
			(0.036)	(0.042)
Price control*lab			-2,312.256***	-802.297
			(695.302)	(4,064.466)
Competition*lab			0.207	0.360**
			(0.335)	(0.163)
Export-related*lab			0.042	0.132**
			(0.036)	(0.059)
Constant	0.033**	0.034	0.050***	-0.046
	(0.015)	(0.167)	(0.018)	(0.137)
firm,year,isic FE	no	yes	no	yes
Observations	3,726	3,726	3,726	3,726
R-squared		0.028		0.355
Number of psid	1,268	1,268	1,268	1,268

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The finding on employment is particularly interesting. It has been shown that a lower import tariff contributes to higher wage level and higher employment in industries with high intensity of imported inputs (Kis-Katos and Sparrow 2015, Amiti and Davis, 2012). This study confirms the finding by showing that the increase can be due to higher productivity gain at the firm level.

The heterogenous impact may add to debate on competition. With higher costs of importing inputs, smaller firms suffer more compared to bigger firms[14]. The impact

[14] This statement depends on the import intensity faced by smaller firms. It seems intuitive for smaller firms to rely less on import. However, in the Global Value Chain world, smaller (typically downstream) firms have less capacity to build its own materials, so they often rely on foreign inputs. This is the case in China (Chor, Manuva and Yu 2021).

of a higher trade barrier on intermediate input markets may push smaller firms out of the market to a degree. This may lead to bigger firms having a slight advantage in increasing their mark-up due to worsening competition, which could explain the result from Va/L and decreased wages, from previous studies (Kis-Katos and Sparrow 2015, Amiti and Davis, 2012).

This study also adds to the debate on NTMs, which can be seen as trade inducing and trade reducing. Treating NTM as neutral is certainly welcomed so that researchers can use it in different contexts. This study is among the first to use the TRAINS dataset in a panel setting. The way the NTM is collected, that is, counting the number of regulations in different years (2015 and 2018) without following it, is less than ideal. Even in the 2015 dataset, the lower end-date of any NTM in Indonesia is 2016. It is possible this dataset is missing NTMs that existed but ended during the observation used by this paper.

Measuring NTMs with count data is not ideal. The TRAINS dataset lacks information on how restrictive the NTMs are. For example, TRAINS dataset captures regulation concerning quota restriction on horticulture, but it does not show how much the quota changes over time. It is still important to know if more goods have more regulation covering them. However, studying the impact of NTMs would require more depth (i.e., per sector or per goods studies) compared to studying tariff. These challenges to study NTM will not go anywhere and will remain as one important focus area, especially in the return of inward-oriented industrial policies (Rodrik, 2007).

It is important to acknowledge the role of the policies on the intermediate input market. That is, whether the higher tariff and NTM lead to a stronger domestic growth for firms producing intermediate inputs. Unfortunately, SI does not contain information on the firm's input. Indeed, it is not clear that goods imported by firms as captured by the customs data are actually used for production. As suggested in the previous chapter, the trade data reported by SI is not complete, and those that exist are not always matched perfectly with the customs data.

This study reports another weakness of SI. As noted by SI users before, SI data is highly unbalanced, reported inconsistently and missing variables (e.g., investment,

fixed capital, and energy consumption). In addition, this study found that even among completed data, there are many misleading zeroes. Unlike the missing data, these zeroes are extensive, and accounted for as much as 30% of the total dataset. Fortunately, these zeroes are found to be quite random and hopefully do not bias the results.

The fact that importers in this study consist of only a very minor fraction of the whole sample of SI may limit the context. It is shown already that this importer subset is bigger than the rest of the firms in the survey. Even among these big firms, size matters considerably. Moreover, reported import in SI does not match one-to-one to the customs dataset. SI remains, arguably, the best dataset to study manufacturing firms in Indonesia. Updating SI and its integration with the customs data would certainly improve Indonesian manufacturing studies.

4.6.4. Tariff, NTM and trade

It is compelling to argue that more restrictive trade policies force firms to reduce their foreign input intakes, which are essential to stay competitive. One way to check this is by regressing their actual import against trade policy indicators. I use Poisson-Pseudo Maximum Likelihood (PPML), first introduced by Silva and Tenreyro (2006). PPML is shown to be more consistent than log-log OLS in the presence of zero value data and heteroskedasticity, very common in trade data (Silva & Tenreyro, 2006).

Aside from trade policies, log of TFP is used as a control. Gravity variables are used as well, such as log of GDP of Indonesia (gdpo), log of GDP of source countries (gdps) and log distance between Indonesia and countries (dists). Also controlled are time difference (tdiff), contiguity (contig), donor relationship (Donor), and whether Indonesia and countries have a free trade agreement (fta_wto). I also add cost of doing business in Indonesia (entry_costo) and its partner s (entry_costs) as controls. These controls are sourced from CEPII.

Table 4.11 shows the result of the PPML regression on HS-8-digits import of firms. Three TFPs are used as controls on three different regressions, namely TFP1, TFP2 and Va/L. Columns (4) to (5) have year and ISIC-2-digit fixed effects.

Table 4.11. Correlation between trade policies and import value

Import Value	z=1	z=2	z=3	z=1	z=2	z=3
	(1)	(2)	(3)	(4)	(5)	(6)
tfp_z	0.125***	0.268***	0.319***	0.133***	0.277***	0.213***
	(0.013)	(0.016)	(0.023)	(0.016)	(0.018)	(0.024)
Tariff	-0.299***	-0.299***	-0.291***	-0.273***	-0.271***	-0.269***
	(0.045)	(0.045)	(0.045)	(0.044)	(0.044)	(0.044)
SPS	0.779***	0.811***	0.815***	0.703***	0.729***	0.724***
	(0.066)	(0.066)	(0.064)	(0.069)	(0.069)	(0.068)
TBT	0.030	0.025	0.061	0.130*	0.125*	0.136**
	(0.073)	(0.072)	(0.071)	(0.069)	(0.069)	(0.068)
Pre-inspection	0.818***	0.825***	0.708***	0.531***	0.536***	0.540***
	(0.093)	(0.095)	(0.100)	(0.104)	(0.106)	(0.106)
Licensing	0.061	0.048	-0.014	-0.108	-0.123	-0.114
	(0.100)	(0.101)	(0.102)	(0.092)	(0.093)	(0.092)
Price control	-4.874***	-4.859***	-4.791***	-4.356***	-4.356***	-4.462***
	(0.308)	(0.314)	(0.383)	(0.524)	(0.517)	(0.509)
Competition	1.074***	1.069***	0.955***	0.774***	0.777***	0.749***
	(0.237)	(0.238)	(0.230)	(0.229)	(0.230)	(0.228)
Export-related	-0.485***	-0.512***	-0.529***	-0.421***	-0.441***	-0.442***
	(0.119)	(0.120)	(0.121)	(0.125)	(0.126)	(0.124)
gdp_o	1.070***	1.013***	0.951***			
	(0.208)	(0.208)	(0.201)			
gdp_s	-0.228***	-0.227***	-0.242***	-0.247***	-0.247***	-0.248***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
$dist_s$	0.941***	0.984***	1.009***	1.079***	1.127***	1.063***
	(0.086)	(0.088)	(0.085)	(0.085)	(0.086)	(0.083)
fta_wto	0.155	0.165	0.077	0.039	0.051	0.020
	(0.155)	(0.155)	(0.156)	(0.160)	(0.159)	(0.158)
contig	0.428***	0.454***	0.276***	0.247**	0.246**	0.175*
	(0.107)	(0.107)	(0.103)	(0.104)	(0.105)	(0.104)
tdiff	-0.049*	-0.056**	-0.083***	-0.101***	-0.109***	-0.105***
	(0.029)	(0.029)	(0.028)	(0.029)	(0.029)	(0.029)
Donor	-0.254***	-0.289***	-0.394***	-0.449***	-0.483***	-0.483***

	(0.086)	(0.086)	(0.086)	(0.086)	(0.086)	(0.086)
$entry\_cost_o$	-0.179***	-0.188***	-0.171***	-0.192***	-0.195***	-0.189***
	(0.037)	(0.037)	(0.036)	(0.035)	(0.035)	(0.035)
$entry\_cost_s$	0.492***	0.487***	0.486***	0.332***	0.326***	0.352***
	(0.117)	(0.116)	(0.114)	(0.106)	(0.105)	(0.106)
Constant	-20.298***	-20.768***	-19.987***	9.200***	7.177***	7.329***
	(5.991)	(5.987)	(5.792)	(0.742)	(0.754)	(0.754)
Year, ISIC-2 FE	no	no	no	yes	yes	yes
Observations	192,928	192,928	192,928	192,928	192,928	192,928
R-squared	0.008	0.009	0.010	0.012	0.012	0.013

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TFPs are correlated positively with import on all the TFP measurements, corroborating the literature showing that importing firms have higher productivity. Meanwhile, tariffs contribute to overall lower imports. That is, a doubling tariff rate is responsible for a decrease of roughly over 26% of imports.

NTMs have mixed results. Increased numbers of SPS on imported goods is correlated positively with import. The same is true for competition measures and pre-inspections. On the other hand, price control measures are negatively correlated with import. TBT remains less important for firms' import.

The usual gravity variables do not deviate from the literature on trade. Free trade agreement is not significant, suggesting that Indonesia's FTAs are mostly drafted around tariff reduction, which is rather typical (Baier & Bergstrand, 2007). Indonesia imports more from countries that have small business starting costs, while increased cost of doing business in Indonesia, interestingly, related positively with firms' import. Indonesia also trades relatively less with countries that give aid to it.

Table 4.12 adds interaction between trade policy variables with TFP measurement and controls for heterogenous effect. TFP's positive association with import value remains, even when controlled with fixed effects. The general role of tariff is much stronger compared to Table 4.11, showing more than double negative coefficients.

There is indeed an indication of heterogenous effect. That is, more productive firms tend to import more. The significance is weakened when ISIC-2-digit fixed effect is introduced. It is possible that the significance is absorbed by industries more integrated with the Global Value Chain than others, which typically are more productive.

With heterogenous productivity controlled, NTM effects on firms' import are much stronger. TBT shows a strong negative impact on import as well as pre-inspection. More productive firms are impacted less negatively. However, other NTMs are associated with more imports, and affect less productive firms even more.

The result from NTMs is rather puzzling, especially since they affect TFP somewhat negatively. That is, just by having more import associated with these NTMs does not necessarily lead to higher productivity. It possible that these imports are inflated by increased prices associated with the NTMs, which put pressure on firms' mark-up. Another possible argument is that some NTMs have reverse causality (Pierola et al., 2018); that is, as import increases, the Indonesian Government applies more NTM to lower Current Account Deficit (CAD).

Table 4.12. Correlation between trade policies, TFP and import value

Import Value	z=1	z=2	z=3	z=1	z=2	z=3
	(1)	(2)	(4)	(9)	(10)	(12)
tfp_z	0.113***	0.312***	0.331***	0.136***	0.342***	0.226***
	(0.013)	(0.017)	(0.032)	(0.017)	(0.021)	(0.033)
Tariff	-0.546***	-0.600***	-0.841***	-0.464***	-0.433***	-0.743***
	(0.100)	(0.144)	(0.247)	(0.121)	(0.163)	(0.248)
Tariff*tfp_z	0.035***	0.030**	0.045**	0.027*	0.016	0.038*
	(0.012)	(0.014)	(0.021)	(0.015)	(0.016)	(0.021)
SPS	1.076***	1.577***	2.026***	1.191***	1.632***	1.771***
	(0.277)	(0.280)	(0.324)	(0.299)	(0.309)	(0.331)
TBT	-1.090***	-1.106***	-1.903***	-1.100***	-1.071***	-1.698***
	(0.286)	(0.281)	(0.301)	(0.284)	(0.279)	(0.304)
Pre-inspection	-1.852***	-1.910***	-2.655***	-2.632***	-2.658***	-3.145***

	(0.581)	(0.588)	(0.751)	(0.649)	(0.658)	(0.768)
Licensing	1.211***	2.612***	2.065***	1.359***	2.650***	1.636***
	(0.419)	(0.436)	(0.520)	(0.457)	(0.470)	(0.521)
Price control	25.021***	22.841***	27.486***	33.873***	31.596***	32.040***
	(6.582)	(7.251)	(7.961)	(7.584)	(7.985)	(7.898)
Competition	3.581***	2.027*	4.164***	3.241***	1.892*	3.855***
	(1.159)	(1.140)	(1.264)	(1.080)	(1.080)	(1.163)
Export-related	0.509	0.926*	1.234*	0.815	1.300*	1.347*
	(0.525)	(0.540)	(0.668)	(0.649)	(0.676)	(0.722)
SPS*tfp_z	-0.044	-0.114***	-0.179***	-0.073	-0.135***	-0.155***
	(0.041)	(0.042)	(0.049)	(0.045)	(0.046)	(0.050)
TBT*tfp_z	0.157***	0.159***	0.273***	0.172***	0.167***	0.256***
	(0.038)	(0.037)	(0.040)	(0.038)	(0.036)	(0.041)
Pre-inspection*tfp_z	0.387***	0.395***	0.488***	0.458***	0.461***	0.535***
	(0.082)	(0.083)	(0.108)	(0.092)	(0.092)	(0.110)
Licensing*tfp_z	-0.172***	-0.372***	-0.306***	-0.217***	-0.402***	-0.258***
	(0.056)	(0.058)	(0.072)	(0.062)	(0.064)	(0.073)
Price control*tfp_z	-4.530***	-4.204***	-4.890***	-5.759***	-5.423***	-5.507***
	(0.995)	(1.096)	(1.201)	(1.138)	(1.199)	(1.184)
Competition*tfp_z	-0.372**	-0.161	-0.476***	-0.370**	-0.185	-0.464***
	(0.162)	(0.157)	(0.177)	(0.150)	(0.149)	(0.161)
Export-related*tfp_z	-0.139*	-0.197***	-0.247**	-0.173*	-0.241**	-0.253**
	(0.074)	(0.076)	(0.097)	(0.093)	(0.097)	(0.106)
gdp_o	-0.228***	-0.223***	-0.242***	-0.246***	-0.243***	-0.247***
	(0.028)	(0.029)	(0.029)	(0.028)	(0.028)	(0.028)
gdp_s	1.058***	1.004***	0.946***			
	(0.207)	(0.207)	(0.200)			
$dist_s$	0.933***	0.964***	1.006***	1.074***	1.119***	1.060***
	(0.087)	(0.088)	(0.085)	(0.086)	(0.087)	(0.084)
fta_wto	0.150	0.154	0.030	0.024	0.034	-0.011
	(0.154)	(0.155)	(0.158)	(0.160)	(0.160)	(0.160)
contig	0.438***	0.460***	0.284***	0.258**	0.252**	0.188*
	(0.108)	(0.109)	(0.104)	(0.105)	(0.106)	(0.104)
Tdiff	-0.048*	-0.054*	-0.090***	-0.102***	-0.109***	-0.109***
	(0.029)	(0.029)	(0.029)	(0.030)	(0.030)	(0.030)
donor	-0.243***	-0.286***	-0.401***	-0.442***	-0.487***	-0.483***
	(0.086)	(0.087)	(0.088)	(0.087)	(0.087)	(0.087)

$entry\_cost_o$	-0.178***	-0.186***	-0.172***	-0.189***	-0.191***	-0.187***
	(0.037)	(0.037)	(0.036)	(0.035)	(0.035)	(0.035)
$entry\_cost_s$	0.494***	0.493***	0.497***	0.337***	0.332***	0.363***
	(0.116)	(0.116)	(0.113)	(0.105)	(0.105)	(0.105)
Constant	-19.845***	-20.945***	-19.964***	9.211***	6.516***	7.070***
	(5.955)	(5.953)	(5.792)	(0.749)	(0.770)	(0.839)
Year, ISIC-2 FE	no	no	no	yes	yes	yes
Observations	192,928	192,928	192,928	192,928	192,928	192,928
R-squared	0.009	0.009	0.011	0.012	0.013	0.013

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

With this result, it is hard to conclude that the channel through which NTMs reduce TFP is through lower import. Some NTMs are associated with higher imports while not associated with increased TFP. A more in-depth study aiming at specific industries may be able to capture this channel better.

But the main message from this study is clear. Lowering barriers to trade is very important to increase firms' TFP. With intermediate input consistently accounting for more than 70% of Indonesia's import, an import substitution strategy may be compelling if the government wishes to limit CAD. Since limiting import is not very hard to do, it may be one of the strategies used to force firms to invest in upstream industries.

However, erecting barriers to import these inputs will decrease Indonesia's competitiveness in the short-to-medium run. While Indonesia has a huge market in its own right, not engaging in the world market will certainly limit its growth potential. Without reliable access to foreign import, foreign investors will have a hard time integrating its supply chain. The Indonesian market alone may not be sufficient since most international firms are abusing the GVC to stay competitive in the world market.

With less competitive products, Indonesia, in turn, would have to rely on the domestic market to attract investment. With limited market, firms may need higher mark ups from the Indonesian market, limiting import competition. This may lead, in turn, to erect even more import barriers for the downstream market. We have seen more policies enforced for this purpose, such as Local Content Requirement (LCR) and

SIM-card blocking for illegal smartphones that do not meet LCR policy. Indeed, the Ministry of Industry of Indonesia, which is tasked to do these policies, has an increasing role in drafting NTM policies compared to other agencies (Munadi, 2019).

4.7. Conclusion

While Indonesia has been successful in its reduction of tariff, NTMs are introduced extensively as a substitute. The infant industry argument has been used for some time by the Indonesian Government to justify these measures, but they may have unintended consequences. That is, disrupting trade means disrupting firms' GVC, which may lead to less efficient manufacturing in the end.

I find strong evidence that tariff and NTMs lower Indonesia's TFP. I also complement the literature of the heterogenous effect of globalisation among firms. That is, bigger firms have a better ability to manage competitiveness loss from trade policy shock. Less access to imported input is found to be the main channel from the loss of competitiveness.

This finding suggests that an import substitution strategy may be highly inefficient. Firms will have to deliver less quality and more expensive goods. Moreover, losing access to important inputs may, in the end, limit Indonesian firms to compete in the export market and rely on the mark-up domestic market, which may further invoke import barrier on the output market.

There are limitations in this study. Firstly, count data is known to be a limitation in NTM studies, as it does not differentiate the depth between counted policies. Secondly, observations that can be made are limited by the quality and amounts of data. Data quality is certainly the main limitation in perfection of Indonesia's manufacturing study, which is desperately needed as the country aims to grow faster through manufacturing.

Chapter 5
Conclusion

Economic growth is a crucial issue for the Indonesian Government. Pursuing manufacturing-led growth has been in the government's agenda for a long time. This time, it is not different. However, from the policy perspective, ambiguity arises in the use of policy. By inviting foreign investment and promoting economic transformation toward manufacturing in the agenda, the Indonesian Government instead puts in policies that restrict foreign investment as well as discourage trade openness.

Economic reform is needed to achieve such a target. Indonesia still has a relatively restrictive investment climate. Banks, while relatively prudent, are enjoying mark-up amid low competition. The financial market is shallow as the bond market is dominated only by the government. Economic transformation toward manufacturing, which can be more capital intensive, will be hard without increased access to capital.

Understandably, deepening the financial market by attracting foreign capital brings with it a big risk. Indonesia experienced the AFC and Taper-off episodes before, and CAD was told to be one of the main culprits. Since the end of the commodity boom, Indonesia's CAD is returning. However, without substantial change, the net primary income transfer will put even more pressure on CAD. The fear of CAD right now will not only push for an even higher CAD in the future, but also slow down the progress of economic transition.

This thesis shows why letting CAD persist for some time is essential to Indonesia's long-term economic growth and for ensuring a smooth transition toward a manufacturing-driven economy. As with Indonesia in the 1990s, and other countries in the region at the moment, foreign investment is very important to kickstart manufacturing growth. To ensure a sustainable current account management, these investments must be competitive on the global stage. Strong manufacturing competitiveness will be able to secure a good amount of foreign exchange to ensure a stable currency.

Moreover, this thesis shows why restricting CAD by force could hamper manufacturing's competitiveness and slow down the economic transition toward it.

To be globally competitive, Indonesia must not shy away from using global resources for production. Many intermediate inputs are better sourced from abroad because of their price and quality. Hyper-specialization is important in exploiting know-how and economies of scale. Indeed, research shows that firms able to utilise the so called GVC are more productive, and countries that are able to join the GVC are also more productive.

This thesis provides the case to strengthen financial account openness, especially in the longer-term source of financing like FDI. Measures that reduce the cost of starting businesses, such as the Risk-Based Assessment and 'silence is consent' approach, are welcomed. The government can do more by reducing its investment restrictiveness index. Important measures such as revising the negative investment list are important to open more industries to foreign investors.

More importantly, this thesis highlights the needs to significantly reduce goods trade restrictions. Firstly, using trade policy to fix financial account problems is very detrimental to the economy in general. But more importantly, imports are highly important to source intermediate inputs globally and strengthen Indonesia in the GVC framework. More open trade also makes Indonesia attractive to foreign investors and makes it less likely for other countries to retaliate with their own trade restrictions toward Indonesia.

First and foremost, Indonesia must streamline its NTMs. A relatively unnecessary NTM, such as pre-shipment inspection and quota restriction, can be minimized. The automatic licensing introduced by Neraca Komoditas, if done right, may help with better trade facilitation. Standards, while important, create additional costs unless they are harmonized with Indonesia's main trading partners. Building better trade physical infrastructure is also necessary, which will be more efficient if the government is concerned less over CAD in the near term.

The importance of international investment and goods is well documented. This thesis builds from previous research on both general context as well as Indonesia studies for its argument. To put it bluntly, the results coming from both the simulation and empirical approach are not terribly surprising. However, linking the results to broader policy aspects, like current account management, is the strength of this thesis.

Moreover, this thesis has come at the timing of the Omnibus Law, arguably the most important economic reform since the end of the AFC, which presents an excellent case for policy simulation. The results from this paper serve as a usable benchmark for the government, especially regarding the current account.

There are some limitations in this thesis. Firstly, like any structural simulation, the simulation used in this thesis suffers from often stylized assumptions, such as perfect competition, generally similar movement of labour and capital, and consumption-based and profit-based optimization of representative agents. In addition, most of the parameters used as an input to the simulation are sourced from the GTAP database, the accuracy of which may or may not have important implications for the result. While these assumptions and parameterisation can be argued to fit the balance between realism and practicality, results from the simulation part of this thesis must be tested with empirical evidence.

An additional caveat to the results is the *ceteris paribus* assumption embedded in the model's baseline. Obviously, things change. The emergence of the COVID-19 pandemic accelerated those changes at an unprecedented level, Indonesia included. The pandemic accelerated the protectionist trend that has emerged since the 2010s. Huge stimuli introduced by advanced countries and pushing toward greener energy leads to another spike of commodity prices, which changes the balance of Indonesia's current account as a natural resource exporter and may hinder its incentive to keep pursuing economic transition from natural resource-based exports. One must take these turns of events into account in reading the simulation results of this thesis.

Discussion on environmental sustainability is clearly missing from this thesis. Research has shown how climate change affects economic growth in negative ways in the long run. More importantly, environmental standards have been the main issue hindering full implementation of the Omnibus Law. With the increasing trend of demand of a green economy, making sure that the Omnibus Law does not depart from sustainability will be important to attract foreign investment. Unfortunately, with environmental issues not being at the center of this thesis, models used do not utilise any environmental module.

The empirical part of this thesis is not without its limitations. Empirical results often rely on the quality of data used, and this thesis is no exception. With the existence of a non-trivial amount of missing values from capital stock, investment, and energy consumption, questioning the reliability of the data is not baseless. Various statistical techniques are applied to reduce the margin of error coming from the data, but clearly data quality hinders this thesis from making a general and more heroic conclusion of its results.

This thesis lays groundwork for future policy evaluation as well as future possible research. From the policy perspective, this thesis provides indicators to be followed for comparison with the simulation results. Luckily, most indicators from the simulation result can be easily observed. It is important to follow interest rates, which, according to the simulation, will be converging with the developed world in 2050. The CAD will increase during the investment boom but narrow in the future. Asset ownership and economic transition, measured by manufacturing value added, can also be followed.

Deviation from the results may come from different parameters, but also from ineffective implementation of the reform. That is why it is important to follow the implementation of the Omnibus Law, which can help eliminate inefficiency of the reform's implementation as the reason why the results are different from the real world. It remains to be seen whether Risk-Based Assessment can actually reduce the cost of doing business in Indonesia. SWF, which could be helpful in many cases, can still suffer from the lack of transparency in its portfolio choices. Additionally, the fact that the SWF is backed by the government may introduce a moral hazard, which hinders efficiency in its portfolio choices. Looking at the effectiveness of Neraca Komoditas in reducing the barrier to imports can also be questioned.

The research of the heterogenous impact of trade on firms has been put into the attention of many trade economists since Melitz (2003). This thesis provides yet more evidence of that effect in the Indonesian context. With evidence of heterogenous impact of trade pile-up, economic models with representative agents are quickly losing their fashion. Representative agent models emphasize the importance of an average agent in a normally distributed population. However, not only do exporters

and importers tend to be very small subsets of a population of firms, only the most productive of that subset are able to better manage productivity under trade uncertainties. Moreover, these very small fractions of non-representative firms make decisions that are important in Indonesia's economic transition. Introducing heterogeneity of firms to the model used in this thesis will greatly improve the policy analysis coming from it.

This thesis provides a clear link between the Indonesian Government's effort to accelerate economic transition toward manufacturing with the current account. But the government is not the only actor in affecting the current account. As noted in Chapter 3, the Indonesian central bank is very active in managing exchange rate and Indonesia's financial account by deciding how much foreign reserve it accumulates. Indeed, given how important are imported capital and intermediate goods to the growth of the manufacturing sector, exchange rate plays a significant role in Indonesia's effort to transition its economy toward manufacturing. Because of this, the importance of research in understanding the role of Bank Indonesia's policy in Indonesia's economic transition cannot be understated.

While far from perfection, this thesis serves what it intended: as a policy focus paper which presents a framework and evidence to support opening Indonesia's financial and goods market and integration of its economy further, with the global economy. The search for frameworks and evidence is far from over, however. Hopefully this thesis can be groundwork for various further research studies by students, academics, and professionals.

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