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A Comparative Assessment of Industrial Policies under East Asian Economic Integration: Policy Implications for Myanmar

SAI Seng Sai

47-11

名古屋大学大学院国際開発研究科

GRADUATE SCHOOL OF INTERNATIONAL DEVELOPMENT
NAGOYA UNIVERSITY

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SAI Seng Sai*

Abstract

This study assesses the possible policy initiatives for Myanmar in promoting its industries under regional economic integration through East Asia Free Trade Area (EAFTA), using the Global Trade Analysis Project (GTAP) model for general-equilibrium policy simulations. A comparative study of industrial policies selected from the Association of Southeast Asian Nations (ASEAN) is conducted to draw implications for designing initiatives of industrial promotion with Myanmar's economy in mind. In designing general-equilibrium policy simulations in the GTAP framework, the GTAP 9 database and policy environment and initiatives based on the most recent Myanmar data collected by the author's field survey are utilized. Impacts of hypothesized policy initiatives on welfare levels, macroeconomics, sectoral outputs, and changes in export and import bundles are scrutinized in order to select suitable policies for Myanmar. The results show that i) Myanmar's welfare level can be easily undermined due to adverse trade diversion effects, if it seeks narrow regional Free Trade Area (FTA) only with ASEAN members; ii) Myanmar tends to secure positive welfare gains if the ASEAN Free Trade Area (AFTA) expands to include China, Japan, or South Korea; iii) capital and technology augmentation through regional Foreign Direct Investment (FDI) is essential for Myanmar to achieve industrialization; and iv) productivity improvement in key industries will produce a large advancement in its industrial transformation, leading to sizable welfare gains.

Keywords: Industrial Policy, FDI, Technology Transfer, GTAP, FTA, Myanmar

1. Introduction

From the early 1950s, East Asian countries such as South Korea, Malaysia, and Thailand adopted import substitution strategies and achieved successful industrial development through the 1960s (Amakawa 2010: 4). The development of East Asian economies in the 1980s was interdependent among countries, as they proceeded with export-oriented industrialization. An advanced country like Japan brought the transfer of industrial development to the East Asian latecomers, called "the flying wild-geese pattern," in this period (Kojima 2000: 2-3). Through these processes, the trade pattern between countries was changed. The transfer of industry was led by Multi-National Enterprises (MNEs) through Foreign Direct Investment (FDI). The host country absorbed the catch-up effort from the advanced countries. The advanced countries enjoyed the lower costs of land and labor while the

* Ph.D. Candidate, Graduate School of International Development, Nagoya University, Japan. I would like to express my deepest gratitude to Professor Shigeru OTSUBO, and two anonymous referees for their valuable comments.

host country offered the advanced country incentives through foreign investment promotion policy. As capital and technologies entered the local firms of the latecomers, they also enjoyed an efficient use of these benefits.

The objective of the study is to draw an industrial policy for Myanmar under regional economic integration. In order to implement Myanmar's initiatives for industrial promotion, lessons from the industrial policies adopted by selected ASEAN members are surveyed in a comparative manner. The study focuses on the strategies selected from ASEAN members using trade liberalization and FDI as their major sources for industrial development. Firstly, Myanmar's effort to implement its industrialization process under regional trade agreements will be reviewed. Then, the lessons drawn from the area's comparative studies and the current policy initiatives of Myanmar are then combined into a set of policy packages. Finally, these policy scenarios are simulated using the general-equilibrium framework of the Global Trade Analysis Project (GTAP) model.

The current study looks at Malaysia as representative of the leading members of ASEAN, while treating Vietnam, Cambodia, and Myanmar as latecomers to industrial development in the region. This paper is organized as follows. Section 2 reviews the development of industrial promotion policy under Regional Trade Agreements (RTAs). Section 3 discusses a comparative study of industrial policies among Cambodia, Vietnam, Malaysia, and Myanmar. Section 4 shows the GTAP model framework and policy simulations. Section 5 discusses the results, and Section 6 concludes the study and formulates policy implications for Myanmar.

2. Industrial Promotion Policies under Regional Trade Agreements (RTAs)

In the 1960s, the process of trade liberalization generated many regional agreements all over the world. Bhagwati (1996: 22–51) asserted there were two waves of the creation of regional trade agreements. One took place in Europe during the 1960s and 1970s, and the other in the United States (US) in the 1980s. A regional trading arrangement also emerged in Southeast Asia in the 1980s. The World Bank (2005: 27–31) described that, since the establishment of the World Trade Organization (WTO) in 1995, many countries had created regional trading arrangements to promote their industrial policies. The main regional trading arrangements are the North American Free Trade Area (NAFTA), the Asia-Pacific Economic Cooperation (APEC), the European Union (EU), and the Association of Southeast Asian Nations (ASEAN).

The objective of a country's industrial promotion is to achieve economic growth and structural change. It also involves producing goods with new technologies and then transforming from a traditional economy to a modern one. Urata and Kawai (2000: 50) describe the former technology transfer by MNEs in the 1990s was characterized by transferring technology of the home country to foreign affiliates. A later approach was transferring from an overseas affiliate of MNEs to local firms

in host countries. The former type is called technology transfer while the latter is widely known as technical spillover. Hence, FDI accompanied by technology is critical for a country's development.

There are various viewpoints on industrial policies. UNCTAD (1998: 14) defines industrial policy as the effort of government to promote specific industries or sectors through policy initiatives. Therefore, industrial policy is a government's effort to choose the target industrial structure to promote productivity and efficiency. Industrial policy can affect agriculture, manufacturing, and services as well. In most developing countries, industrial policy is primarily focused on labor-intensive industries. The success of East Asian economies was mainly caused by their proactive policies in key industries. Japan, South Korea, Taiwan, and most recently China are examples.

Industrial policy debate has also been growing. Lin (2010), a former chief economist at the World Bank, argues that developing countries should pay attention to the development of new competitive industries to support the labor-and resource-intensive products in which they currently have a comparative advantage. Additionally, reinvestment in more productive industries can be continued over time. Altenburg (2011: 35) also avers that lower income countries can successfully implement proactive industrial strategies. However, the former successful industrial policies in East Asia may not be applicable in current developing countries because of their different institutions and the structures of their economies. Khan (2013: 1) asserts that in developing countries, a lack of organization and technological capability are often seen. Developing countries can grow by absorbing technology from advanced countries. However, they may have some difficulties absorbing such technologies in the early stage. The appropriate level of training and skills may often be wanting at that moment.

A successful country can depend on the effectiveness of industrial policy and think about to whom and at what it is directed. Hence, the success of an industrial policy depends on how it is designed and implemented. At the moment, many developing countries like ASEAN latecomers still have challenges in formulating their industrial policies in light of the competitiveness of economic integration. Following the worldwide developments in policy implications, advanced ASEAN members have been pursuing industrial promotion and economic development in the context of regional economic integration. Strategies for industrial promotion in Myanmar should also be assessed in this context. In the ASEAN region, Myanmar is a latecomer, along with Cambodia, Laos, and Vietnam in the 1990s. Therefore, the author selects Cambodia, Myanmar, and Vietnam to make a comparative study of their developments. Since Malaysia is one of the leading ASEAN members because of adopting FDI policy in the 1970s, the author selects the Malaysian economy to observe its policy choices and then draws policy simulations for Myanmar using the GTAP model.

To summarize, industrial policies can be defined in the traditional narrow sense; that is, selecting/promoting key industries with favors and protective measures. In the recent discussions of industrial policies, however, many researchers often examine them in a broader sense, including general investment-conducive macro policies and institutional changes. Regarding broader policies, trade and

FDI strategies under a strategic usage of regional trading frameworks are commonly discussed. In this study, the author wishes to design Myanmar's initiatives for industrial promotion as a member of the AFTA and the ASEAN. With this intension, the author summarizes those steps taken by Malaysia, the country that Myanmar policy makers often treat as a textbook case, and by the other latecomers in the ASEAN as important background, and then concentrates more on the sectoral (decomposition) impact of the trade, FDI policies, and technology transfer in Section 3. Those are both areas of keen concern for policy makers in Myanmar today.

3. A Comparative Study of Industrial Policies among Cambodia, Vietnam, Malaysia, and Myanmar

The following section discusses a comparative study of industrial policies among Cambodia, Vietnam, Malaysia, and Myanmar to formulate policy implications for Myanmar.

3.1. The Myanmar Experience

In 1962, Myanmar's economy was closed to international trade and practiced an import substitution policy called the Burmese Way to Socialism. As a result, the economy stagnated for over three decades and the country was classified as one of the Least Development Countries (LDC) (Thein 2004: 51–84). In 1988, under the State Peace and Development Council (SPDC) regime, several reforms were set up to promote a market-based economic system. The FDI law was introduced in November 1988. A strategy was set for the development of agriculture as the base from which the development of the rest of the economy would be built. As a result, Myanmar achieved annual growth during the reform period. Growth was driven by the strong performance of the agriculture sector, rapid growth in the private sector, FDI inflows (including in oil, gas, and mining), and vibrant exports due to liberalization and the development of tourism and construction (Thein 2004: 121–171). The following table shows Myanmar's industrial share of GDP from 1995 to 2014.

In Table 1 the industrial share of manufacturing in GDP was stagnant and declined from 9.9 percent in 1995 to 9.7 percent in 2000, and then slightly rose to 17.5 percent in 2005. Myanmar's industrial share of manufacturing in GDP only rose from 9.9 percent to 17.5 percent from 1995 to 2005, insignificant compared to Vietnam (23 to 40 percent) and Cambodia (11 to 28 percent), as shown in the ADB database (Findlay, Park, and Verbiest 2015: 32). This shows that Myanmar's industrial share was the lowest among ASEAN nations. Therefore, Myanmar needs to upgrade its industrial share of manufacturing in its GDP.

Since President Thein Sein took office in 2011, the government started to implement a development vision through political, economic, and social reforms. The first step was political change, followed by economic and social reform (NLM 2011). In 2015, the government established the National Export

Table 1 Myanmar Industry's Share of GDP (1995–2014)

(Share in %)

Sectors	1995	2000	2005	2010	2011	2012	2013	2014
Agriculture	60.0	57.3	46.7	36.8	32.5	30.6	29.5	27.9
Industry	9.9	9.7	17.5	26.5	31.3	32.4	32.4	34.4
Services	30.1	33	35.8	36.7	36.2	37	38.1	37.7

Source: Central Statistics Organization (CSO), Ministry of Planning and Finance, Myanmar

Strategy (NES) to promote industries. In the strategy, the NES is to promote export development and the competitiveness of Myanmar's products in the global markets (MOC 2015).

The government started a strategic plan in the Framework for Economic and Social Reforms (FESR) in January 2013. In the reform process, it identifies a number of short-term and a long-term development plan. In the framework, it lays out reform priorities for long-term goals (2011–2031). Since Myanmar's export items are mainly primary resources, the NES will largely focus on diversified products because its export items and destinations are very limited. Currently, over 40 percent of Myanmar's exports are still going to a single market. As Myanmar is abundant in agricultural resources, the priority sectors will be mainly in agro-based and some labor-intensive manufacturing. Myanmar has also established a Special Economic Zone (SEZ) and an Export Processing Zone (EPZ) to promote industrial development (MNPED 2015).

Under the SPDC regime, economic reform was attempted through the promotion of FDI, encouraging private economic activities, and implementing fiscal and monetary policies. Under the Thein Sein regime, the reform goal is to establish a developed nation. The industrial policy is targeted to specific ownership, like the Myanmar Industrial Development Committee (MIDC), which is mostly dominated by military holding companies. The MIDC took monopoly power in strategic and key industries like gas, gems, and power production (Global Witness 2015). The industrial policy provides a favorable environment for this group while neglecting the development of the domestic private industry. As a result, the country has not fully reached an international level compared to other ASEAN members. Myanmar's economy is still as weak as an underdeveloped state's at the close of the twentieth century.

To sum up, many factors are undermining Myanmar's economy, such as a lack of macroeconomic policy, financial sources, poor infrastructure, cronyism, corruption, and political instability. In order for Myanmar to transform its industrial structure, policy adjustments like proactive industrial policy are necessary. Currently, Myanmar faces many challenges to implementing its industrialization process.

3.2. The Cambodian Experience

Cambodia experienced civil war in the 1960s. After achieving peace, Cambodia initiated its market-based economy in 1985. After that, the state monopoly of trade was abolished in 1987 (Chhair and

Luyna 2014: 6–10). In 1988, a further attempt was made by strengthening the role of the private sector through liberalization. Foreign direct investment and financial programs for state enterprises were introduced in the mid-1980s. After the general election in 1993, Cambodia implemented a political and economic reform process under the Royal Government of Cambodia (Amakawa 2010: 9).

Moreover, Cambodia enjoyed textile exports to the US free of quotas. In 1999, Cambodia received duty- and quota-free access to the EU market for textile products (Bargawi 2005: 13). Following this development, FDI went into the garment industry. After that, the garment industry became the leading export sector, accounting for 80 percent of export earnings. Almost all the garment exports went to the US market under the Multi-Fiber Agreement (MFA). Although Cambodia achieved target growth during its industrialization process in the 1990s, most of the growth was dependent on a single industry operated by FDI through MNEs (Amakawa 2010: 10).

In 2005, the Cambodian government established a special economic zone. The objective was to promote the economy, attract FDI, and create job opportunities. As Cambodia's MFA was phased out in 2005, the country's advantage in garment exports began shrinking. However, Cambodia maintained its competitiveness in the market. Furthermore, from 2008 to 2012, Cambodia's exports in labor-intensive manufacturing diversified. Footwear became the major export item. Recently Cambodia established a special economic zone on the Cambodian-Thai border (Hill and Menon 2013: 13).

To sum up industrialization in Cambodia, foreign capital played a leading role in the economy, especially in the garment industry. Establishing the economic zone for promoting exports and job opportunities will be a potential source of growth for a latecomer like Cambodia.

3.3. The Vietnamese Experience

After a long civil war, Vietnam reunited in April 1975. During the reunification, Vietnam adopted the economic policy of price control, state subsidies, and rationing through a centrally planned economic system. In the restructuring period, it took many years for Vietnam to adopt an economic policy. By the early 1980s, Vietnam started to support the idea of market incentives. Finally, in 1986, Vietnam implemented a market mechanism called the *Doi Moi* (Renovation) policy (Ohno 2014: 240–241).

Soon after adopting the *Doi Moi* policy, economic growth was rapid, with the average rate of 7.4 percent during the period 1991–2010. During two decades, the industrial structure changed from agriculture to manufacturing and services. In 1990, although Vietnam was among the poorest countries in terms of GDP per capita, its status was changed to a lower-middle-income country by the World Bank classification. The Vietnamese growth was driven not only by the *Doi Moi* policy, but also state-owned enterprises, foreign firms, and private sector engagements (McCaig and Pavcnik 2013: 2–4).

To sum up, this growth was mainly attributed to the large inflow of FDI. In 2008, the flow of FDI

was increased. FDI, ODA¹, private remittances, and portfolio investment were the main engines of Vietnam's growth (Ohno 2014: 246).

3.4. The Malaysian Experience

In 1957, Malaysia transformed its economy from resource-based industry to a manufacturing-based one. During this period, growth was driven by FDI through MNEs. The manufacturing share of GDP increased, and Malaysia became one of the world's largest exporters of consumer and industrial electrical products in the global market (Ling 2006: 287). In the 1970s, Malaysia changed its economic policy from import substitution (IS) to an export-oriented strategy to attract FDI in the assembly and processing industries. Furthermore, the National Economic Policy (NEP) was adopted in 1969 for the five-year plan 1971–1975 (Ohno 2014: 220).

In the 1980s, under Prime Minister Mahathir's regime, Malaysia's industrial policies changed from a State-led to FDI-led strategies. A heavy industrialization program was implemented to promote export processing. The First Industrial Master Plan (IMP1) was launched for the period 1986–1995. In 1991, Mahathir launched Vision 2020 to become a fully-developed nation. In this vision, Malay people would become the key to supporting industries. Hence, the second Industrial Master Plan (IMP2) 1996–2005 was launched under the ideas of cluster-based industrial development and the Manufacturing⁺⁺ (manufacturing-plus-plus) program. The Third Industrial Master Plan (IMP3) 2006–2020 aims to develop services, especially high-value services and industry-supporting services. The emphasis is to create value-added technology, knowledge, and human resources. The IMP3 is a long-term vision for 15 years to develop key industries (Felker 2001: 134–136).

To summarize, the Malaysian government has implemented an industrial master plan, Small and Medium-sized Enterprise (SME) promotion, and the FDI attraction as its strategy. In the 2000s, the Malaysian government is focusing on the Information Technology (IT) and the knowledge economy to achieve its national development.

3.5. Summary of a Comparative Study of Industrial Policies

As shown in Table 2 the Cambodia, Myanmar, and Vietnam (CMV) started market economy initiatives at the same time, around the mid-1980s. Only Malaysia switched from import substitution to an export-oriented strategy in the early 1970s. There are many similarities in industrial policies in CMV in the 1960s. Myanmar adopted an import substitution strategy until the mid-1980s. In the meantime, Cambodia and Vietnam also adopted an import substitution strategy. Cambodia, Myanmar, and Vietnam started to adopt a market economy around the mid-1980s. However, the development of these countries is different. Among CMV, Vietnam's rate of industrialization was high due to export diversifications. In the 1990s, while Vietnam improved its exports, Cambodia and Myanmar depended on single export items. Malaysia's industrial policy is currently focusing on heavy industrial policy (the

Table 2 Summary of Industrial Policies among Cambodia, Vietnam, Malaysia, and Myanmar

Country	1960s	1970s–1980s	Mid–1980s	1990s	2000s	Summary of Industrial Policies
Myanmar	Socialism IS Strategy	Isolationism IS Strategy	Market-oriented Strategy Primary-based Industry	Agro-based Industry Labor-intensive Industry	Resource-based Industry Labor-intensive Industry SEZ & EPZ	1. Open economy in the 1980s 2. FTA in the 1990s 3. A resource-based Industry
Vietnam	Civil War IS Strategy	Socialism IS Strategy	<i>Doi Moi</i> (Renovation Policy)	Upgrading Manufacturing	Diversified Export Items	1. Open economy in the 1980s 2. FTA in the 1990s 3. Export-oriented Strategy
Cambodia	Civil War IS Strategy	Socialism Export Promotion	Market-based Economy	Privatization (SOEs)	Labor-intensive in Manufacturing SEZ & EPZ	1. Open economy in the 1980s 2. FTA in the 1990s 3. A Single Industry
Malaysia	Laissez-faire IS Strategy	Market-based & Export Orientation	Market Economy Heavy Industry	Global Trade Industrial Masterplan Heavy Industry	IT Revolution New Economic Model SMEs Masterplan	1. Export-oriented Strategy in the 1970s 2. FTA in the 1990s 3. IT, New Economic Model

Note: Import Substitution (IS), State-owned Enterprises (SOE), Small and Medium-sized Enterprise (SME), Special Economic Zone (SEZ), Export Processing Zone (EPZ), and Information Technology (IT)

Source: Compiled by author

automobile and IT industries), so it is different from CMV and ahead of those countries.

To sum up a comparative study of industrial policies selected from ASEAN members, Cambodia's economic growth was due to the boom in garment exports to the EU and US markets, and most garment exports were led by FDI and foreign firms. Although CMV adopted their market-oriented economies at the same time, Myanmar lags behind its fellow ASEAN members. The reason is due to political issues, a lack of macroeconomic policy, and poor infrastructure. Among CMV, Vietnam's rate of industrialization is very close to that of the original ASEAN members.

4. Research Methodology and Framework

In this study, the general-equilibrium multi-country multi-sector model developed by Hertel (1997) is used as a tool for examining the impact of trade liberalization under regional trade agreements. By using Hertel's GTAP model, the study incorporates tariff reduction under the RTA. In the GTAP analysis, it will first examine the macroeconomic and welfare effects on Myanmar. Moreover, the sectoral output, change in export and import bundles, and Myanmar's trade direction will be further examined under the RTAs such as the AFTA, EAFTA, and ASEAN Plus China, Japan, and Korea. Afterward, the strategic plan for Myanmar's key industries is examined through the simulation of improving capital and technology in the industrial output of these industries. Finally, in order to support and elaborate on Myanmar's National Economic Plan, industrial promotion in Myanmar's key industries is chosen as a policy tool for simulations in the GTAP model. The key industries are agriculture, fishery, forestry, mining, textiles, and food and beverages. The standard GTAP model, parameters and closures in the GTAP 9 version by Hertel are used as the benchmark for policy simulation in the study.

4.1. Global Trade Analysis Project (GTAP) Version 9 Database

The Computable General Equilibrium (CGE) model is used widely in the analysis of regional trade agreements and trade policy, particularly for welfare impact analysis of member countries. The GTAP model² is a multi-sector, multi-country computable general equilibrium (CGE) (Hertel 1997). The latest version, GTAP 9, has 140 regions and 57 sectors. In the current analysis, 140 regions are aggregated into 16 regions, and 57 sectors are mapped into ten sectors. The individual ASEAN members are singled out, while the remaining Southeast Asian countries (Myanmar and Timor-Leste) are designated as Myanmar³ (Holst and Ni 2008). Other East Asian countries are Japan, China, and Korea, with whom Myanmar has a potential for FTAs and other prospective FTA members. The remaining countries and regions are included in the Rest of World region. The scenarios are modeled based on tariff reductions which will be fully implemented in 2015 for AFTA and 2020 for EAFTA respectively.

Table 3 Aggregated Region in The GTAP Model

New Region	Comprising Regions
1. Cambodia	Cambodia
2. Laos	Laos
3. Myanmar	Myanmar with Timor-Leste
4. Vietnam	Vietnam
5. Brunei	Brunei
6. Indonesia	Indonesia
7. Malaysia	Malaysia
8. Philippine	Philippine
9. Singapore	Singapore
10. Thailand	Thailand
11. China	China
12. South Korea	South Korea
13. Japan	Japan
14. USA	USA
15. EU	EU-25
16. ROW	Rest of the World

Source: GTAP 9 Database

Table 4 Sector Aggregation

Sr. No	Sector	Code	Coverage of Commodities
1	Agriculture	AGR	Paddy rice, wheat, grains, non-grain crops, wool, and livestock
2	Forestry	FOR	Forestry
3	Fishery	FHS	Fishery
4	Mining	MIN	Oil, gas, coal, minerals
5	Foods & Beverages	PFD	Meat products, milk products, processed rice, other food products, beverages and tobacco
6	Textiles	TEXT	Textiles and clothing
7	Manufacturing	MANU	Wood products, paper products, petroleum, coal products, chemical, rubber, plastic products, mineral products, ferrous metals, metal products, transport equipment, machinery and other equipment, other manufacturing
8	Construction	CNS	Construction
9	Trade	TRD	Trade
10	Services	SVCS	Transport, other services (private and government)

Source: GTAP 9 Database

In the latest version of the database, as Myanmar is composite data in the rest of Southeast Asia with Timor-Leste, the rest of Southeast Asia (XSE) is assigned as Myanmar in the analysis. Hence, XSE is designated as Myanmar in the GTAP 9 2011 database. Since the Timor-Leste economy is small, its economy is ignored in the simulation. The rest of the Southeast Asian economy is assumed for analyzing the economy of Myanmar. The study uses Myanmar to stand for the rest of Southeast Asia in drawing implications for policy simulations (a comparison of the economies of Myanmar and Timor-Leste is provided in Appendix A).

4.2. Basic Structure of the Model and Assumptions

There are three basic structures in the GTAP model: industrial sectors, households, and governments. The primary factors of production in the model are land, labor, and capital. In this model simulation, labor is assumed to move across industries but not countries, while capital is assumed to be mobile across industries and countries. Land is assumed to be used only in agricultural sectors. The economic agents are each country/region, producers, private households, and government. In the GTAP model, private households and government are economic agents as regional households. Regional expenditures are the sum of private households and government. By supplying the factors of production (land, labor, and capital) to producers, regional households obtain factor incomes from producers (Hertel and Tsigas 1997: 27).

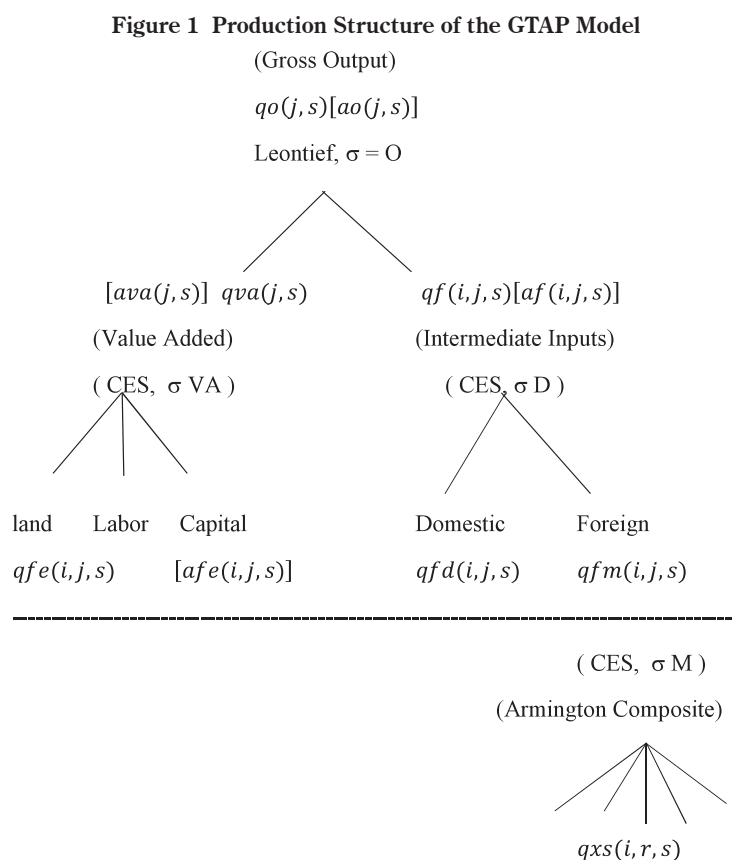
The gross production function in the GTAP model has the structure shown in Figure 1. It is also known as the technology tree. On the production of value-added nest, firms use primary inputs (land, labor, and capital). This quantity is denoted in percentage change form, (qfe). Firms also purchase intermediate inputs which are produced domestically, (qfd), and which are imported, (qfm). Therefore, firms import the intermediate inputs from exporters, $qxs (i, r, s)$. This sourcing occurs at the border, the dashed line between the firms' production tree and the constant elasticity of substitution (CES) nest combining bilateral imports. These intermediate inputs flow from the variety of region (qxs) in the Armington assumption (Hertel and Tsigas 1997: 10–73).

The tariff structure is shown in the following equation.

$$pms(i, r, s) = tm(i, s) + tms(i, r, s) + pcif(i, r, s) \quad (1)$$

Equation (1) shows that changing the import tariff will affect the domestic market price for tradable commodity i in regions r . Change in the border price of the product, $pcif(i, r, s)$, or two type of border interventions will affect that product as well. Both are ad valorem import tariffs. The first, $tm (i, s)$, intends to establish some domestic price changes while the second, $tms (i, r, s)$, is bilateral in nature. A reduction of the bilateral tariff imports of i from r into s , $tms(i, r, s)$, will create the lowers $pms(i, r, s)$ via a price linkage equation (1).

In order to conduct the FDI simulation exercise, the author follows a paper by Otsubo (2005)



Source: Adapted from Hertel (1997)

on the computational analysis of the economic impacts of Japan’s FDI in Asia. The author selected the following set-up for FDI simulations: exogenous saving rate, free international capital flows (RORDELTA=1), and no reflection of investment changes on the shocked/adjusted capital stock endowments (EXPAND=1 or inoperative). Parameters/variables operated in the simulation are: qo (capital) for designated sectors, and ao (technology) in production representing a Hick neutral technology improvement (Otsubo 2005: 12–13). By changing capital and technology variables, it will move to a new equilibrium situation in output function by equation (2).

The output function is shown in the following equation:

$$QO_{jr} = e^{ao_{jr}t} \min(QVA_{jr}e^{ava_{jr}t}, QF_{ijr}e^{af_{jr}t}) \quad (2)$$

where

QO_{jr} = industry output of commodity j in region r ,

QVA_{jr} = value-added in industry j in region r ,

QF_{ijr} = demand for intermediate input commodity i for use in industry j in region r ,

ao_{jr} , ava_{jr} , and af_{ijr} = the parameters of technical change.

In the general equilibrium model by Hertel, changing tariff rate, parameters, and closure will affect the production and consumption pattern, and move toward a new equilibrium level.

In this study, a policy shock on trade is conducted by using a tariff to examine the static equilibrium. In order to understand capital improvement and technology effect, external shock through movements in qo (capital) and technology transfers are further examined. In the GTAP model, three types of technical change can be used for policy simulation: ao (output augmenting technical change), av (value added technical change), and afe (intermediate input augmenting technical change). As the study intends to analyze capital augmentation with a technical change in the simulation of FDI, capital (qo) is augmented in this study. For technology transfer, output augmenting technical change (ao_{jr}) is conducted in this study.

4.3. Policy Simulation Scenarios

The simulation design in this study has three policy packages: regional trade agreements, a preferential treatment and the industrial policy promotion for Myanmar, and combined trade and FDI policies.

4.3.1. Simulating the Impact of Regional Trade Agreements

In the first set of simulations, the following question will be answered: Is there any welfare gain for Myanmar by joining regional trade agreements?

The first simulation examines Myanmar's import tariff reduction under AFTA. The rate of tariff reduction is simulated by the commitments of Myanmar under the AFTA scheme. Therefore, the target tariff rate of Myanmar's liberalization of 0 percent is employed in the simulation with the AFTA, the EAFTA, and ASEAN Plus One. This result shows the situation of Myanmar's economy with the FTA scheme complete in 2015 for AFTA and 2020 for EAFTA.

From the first simulation, the study estimates whether Myanmar enjoys welfare gains from the AFTA or not. If not, a latecomer like Myanmar may ask a preferential treatment for protection of some infant industries in the ASEAN context. Although protectionism and trade barriers are not allowed in regional integration and under WTO rules, latecomers will ask for protection of infant domestic industries. Therefore, in this section, policy simulations are conducted under the RTAs S0 through S7.

4.3.2. Simulating Impacts of Preferential Treatments, Capital Stocks, and Technology Transfers to Myanmar

In the second set of simulation exercises in 4.3.2, the following question will be answered: Is membership in the AFTA beneficial for Myanmar?

The second simulation group focuses on a particular favored circumstance for Myanmar in the protection of some infant industries. Moreover, further simulations will be conducted on the role of capital accumulation and technology transfers into the Myanmar industries. The economic development gap between original ASEAN members and latecomers is very high, hence, latecomers need to adjust their level to compete under regional trade agreements. The author assumes the production and output of latecomers should be upgraded in the regional context. Therefore, in this simulation (S8), Myanmar asks for protection of some infant industries.

Furthermore, due to domestic/regional policy changes for FDI, qo (capital) moves from China, Japan, Korea, and Thailand into Myanmar by the amount equivalent to 1 percent of Myanmar's original capital endowment in the simulation 9. Afterward, technology transfers are assumed to increase by 1 percent in Myanmar's industries (agriculture, fishery, forestry, mining, foods and beverages, and textiles) in the simulation 10. The author assumes the parameter (ao_{jt}) output augmenting technical change by 1 percent in these industries. Therefore, in order to know how the transfer of technology has effects in this study, the technical change parameter (ao_{jt}) is augmented in these industries. The selected industries are a part of the strategic industrial policy of Myanmar's National Comprehensive Development Plan (NCDP) in the period 2011–2031. Therefore, the author assumes these parameters increase in output by 1 percent in the GTAP simulation.

Experiments on a favored treatment, FDI, and technology transfers are conducted under S8 through S11 in the following key industries:

1. Keeping protections in Myanmar's four industries (agriculture, fishery, textiles, and foods & beverages) with ASEAN members while ASEAN–6 liberalizes import tariffs for all sectors for Myanmar
2. Due to domestic policy change in FDI, qo (capital) moves from China, Japan, Korea, and Thailand into Myanmar by the amount equivalent to 1 percent of Myanmar's original capital endowment
3. In the simulation of technology transfer, the rate of technology parameter⁴ (ao_{jt}) in the gross output function (equation 2) is conducted for technology transfer in Myanmar's industries (agriculture, fishery, forestry, mining, foods and beverages, and textiles). Therefore, the author assumes technology transfers into Myanmar's key industries at 1 percent.

From the result of the second set of simulations, we can identify whether technology transfers are essential for latecomers like Myanmar. Therefore, the author proceeds in the next simulation design for the industries under the simulation exercise in 4.3.3. Based on a comparative study selected from ASEAN members, the author proceeds an industrial policy as combined trade and FDI policies (East Asian Growth Model). Therefore, the following simulation design will be conducted for industrial policy simulations in S12 and S13.

4.3.3. Simulating the Impact of Combined Trade and FDI Policies (East Asian Growth Model)

Finally, the issue will be addressed by the following question: Which policy will make Myanmar achieve its industrialization?

Lastly, the author observes industrial policies selected from ASEAN members' experiences in achieving industrialization. Malaysia attracting FDI to some key industries can be a policy guideline for Myanmar in these simulations. In the early stage of industrialization, Malaysia attracted FDI to catch up to East Asian nations, while Cambodia attracting FDI in the garment sector and Vietnam attracting FDI in export-led industries will be observed. Therefore, the author chooses an appropriate policy from these countries' experiences to apply to Myanmar's industries by the simulation of Myanmar's industrial policy in S12 and S13. Simulations will be conducted in the following areas:

1. FDI induction and full unilateral trade liberalization (all sectors, to global economy) by Myanmar.
2. FDI induction by Myanmar and East Asian economic integration (EAFTA).

To sum up the policy scenarios, the author simulates static trade liberalization by reduction of import tariffs in the standard GTAP model. To examine a static replication of more dynamic impacts of capital accumulation and technology transfers, the author applies the transfer of capital and technology to the Myanmar industries.

Table 5 shows the summary of the simulation design in the study.

Table 5 Simulation Design for Myanmar under the RTAs and Industrial Promotion Policies

Code	Name of Simulation	Details of Simulations
1. Simulation Design for Regional Trade Agreements		
S0	UL-Global	Unilateral liberalization by Myanmar to the global economy
S1	UL-ASEAN6	Unilateral liberalization by Myanmar against ASEAN-6
S2	ASEAN6-UL	Unilateral liberalization by ASEAN-6 against Myanmar
S3	AFTA	Myanmar and ASEAN Free Trade Area
S4	EAFTA	Myanmar and East Asia Free Trade Area (ASEAN+3)
S5	ASEAN-China	Myanmar and ASEAN Plus China Free Trade Agreement
S6	ASEAN-Japan	Myanmar and ASEAN Plus Japan Free Trade Agreement
S7	ASEAN-Korea	Myanmar and ASEAN Plus Korea Free Trade Agreement
2. Simulation Design for Preferential Treatments and Industrial Promotion for Myanmar		
S8	Preferential Trade Policy	Keeping protections by Myanmar in four industries (agriculture, fishery, textiles, and foods & beverages) against ASEAN members while the ASEAN-6 liberalizes import tariff for all sectors for Myanmar

S9	Transfer of Capital Stock	Due to domestic/regional policy changes for FDI, <i>qo</i> (capital) moves from China, Japan, Korea, and Thailand into Myanmar by the amount equivalent to 1 % of Myanmar's original capital endowment
S10	Technology Transfer	Due to technology transfer to Myanmar's industries (agriculture, fishery, forestry, mining, foods & beverages, and textile), productivity (<i>ao</i>) improves by 1 % in these industries
S11	Transfer of Capital stock and Technology (FDI)	Combination of cross-border transfer of capital and technology (composite FDI impact) to Myanmar (S9+S10)
3. Simulation Design for Combined Trade and FDI Policies (East Asian Growth Model)		
S12	FDI Induction and Full UL	FDI induction and full unilateral trade liberalization (all sectors, to global economy) by Myanmar (S11 + S0)
S13	EAFTA FDI and Trade Integration	FDI induction by Myanmar and East Asian economic integration (EAFTA) (S11 + S4)

5. Results and Findings

In this study, the author examines import tariff reduction under regional trade agreements. The rate of tariff reduction is simulated by the commitments of Myanmar under the AFTA scheme. Then the study posits a preferential treatment for Myanmar through protection in some infant industries. Finally, a comparative study of industrial policies selected from ASEAN members is conducted to draw policy implications for Myanmar's industrial promotions.

Under the simulation exercises, the author shows the proper initiatives in broader policies such as unilateral liberalization, AFTA, EAFTA, ASEAN Plus One, with China, Japan, and Korea, and which policies should be avoided. The simulations conducted in this study are; i) unilateral liberalization in a narrow group and wider group; ii) liberalization with and without reciprocation; and iii) the validity of an old industrial policy of protecting target industries. Among the results, a clear negative answer is found under the old industrial policy of protecting target industries. Furthermore, the relative impacts of trade and FDI integrations are also tested, reflecting the fact that current economic integration is mostly propelled by FDI networks. The importance of technology absorption is also clearly tested and proven.

To summarize, the original and key findings in this study are i) attracting FDI into the Myanmar industries with technology transfers, and ii) trade protection should be avoided, and the economy's endogenous reaction should be preserved. Therefore, these original findings are produced by conducting policy simulations in a well-designed sequential manner under regional trade agreements (S0–S7), a preferential treatment and industrial promotion (S8-S11), and combined trade and FDI policies (East Asian Growth Model) under S12 and S13. Detailed results and findings are presented in

Table 6 Welfare Implication for Myanmar under Regional Trade Agreements (RTAs) (In Millions of US dollar)

	S0	S1	S2	S3	S4	S5	S6	S7
Cambodia	− 0.33	− 0.86	0.01	− 0.90	− 0.46	− 0.59	− 0.80	− 0.88
Lao	− 0.13	− 0.58	− 0.01	− 0.56	− 0.13	− 0.25	− 0.48	− 0.52
Myanmar	15.10	− 36.10	18.90	− 16.60	158.00	54.00	25.10	45.90
Viet Nam	− 4.56	− 2.54	− 0.44	1.79	− 8.00	− 3.52	0.63	− 1.54
Brunei	− 0.18	− 0.12	0.00	− 0.12	− 0.27	− 0.12	− 0.18	− 0.21
Indonesia	− 7.36	− 0.33	− 0.27	− 0.68	− 8.21	− 4.10	− 3.04	− 2.44
Malaysia	− 8.04	− 1.74	− 0.46	− 2.26	− 6.75	− 5.14	− 3.77	− 2.34
Philippines	− 0.91	− 0.42	0.50	0.03	− 1.36	− 0.29	− 0.38	− 0.62
Singapore	7.97	16.00	− 0.13	15.90	8.29	10.90	13.60	15.50
Thailand	18.60	83.60	1.62	84.80	33.00	47.40	72.20	83.10
China	23.00	− 27.20	− 3.81	− 32.30	2.81	80.90	− 73.50	− 69.10
Japan	54.20	− 4.84	− 0.35	− 5.60	44.90	− 21.20	61.60	− 6.75
Korea	12.50	− 2.50	− 0.44	− 3.10	36.80	− 19.40	− 9.87	59.80
USA	− 7.31	0.37	− 1.12	− 1.65	− 22.80	− 18.50	− 1.89	− 5.67
EU	7.84	− 0.62	− 1.04	− 2.39	− 14.80	− 11.50	− 2.88	− 5.18
ROW	− 62.80	− 17.10	− 7.69	− 25.80	− 155.00	− 82.00	− 59.80	− 64.60
Total	47.50	5.03	5.28	10.50	66.40	26.50	16.50	44.50

Source: Author's calculation based on the policy simulations using the GTAP 9 Database

the following sections.

5.1. Welfare Implications for Myanmar under Regional Trade Agreements (RTAs)

The results of trade liberalization under regional trade agreements are discussed in this section. In the GTAP model, welfare impacts are measured as Equivalent Variation (EV).⁵ The changes in EV associated with trade liberalization under regional trade agreements are summarized in the table for an understanding of the impact of RTAs on Myanmar's economy.

Table 6 shows that under regional trade agreements Myanmar loses welfare under unilateral liberalization by Myanmar to ASEAN (S1) and AFTA (S3). Under these two simulations, Myanmar experiences a welfare loss of 36.10 million US dollars under S1 and 16.60 million US dollars under S3.

In trade theory, trade liberalization increases welfare for member countries against welfare loss of non-members under the formation of a customs union. Here the case of Myanmar is exceptional. The reason is, as the RTAs are happening, Myanmar is forced to import goods from ASEAN members rather than from non-ASEAN members. This creates a higher price for imports and distortion in

Myanmar's terms of trade and increased welfare loss. A similar preliminary simulation for Lao PDR conducted by the author also showed the same result as Myanmar in welfare loss. According to Viner (1950), only the larger areas of a customs union will experience positive effects for members.

Hence, this study confirms that small economies like Cambodia, Laos, and Myanmar (CLM) with limited markets and diversified exports face welfare loss under regional trade agreements. Welfare gain in other simulations implies that as Myanmar opens its trade to more members and extends to the EAFTA and international groups (the global market), it enjoys more welfare than under the AFTA. The welfare gain is high in the case of EAFTA. Under this simulation (S4), Myanmar's welfare increases by 158 million US dollars. Welfare gain also improves when extending regional trade agreements with China, Japan, and Korea respectively.

5.2. Myanmar's Trade Volume under Regional Trade Agreements (RTAs)

The effect of trade creation and trade diversion on Myanmar is discussed in the following section. Table 7 shows Myanmar's bilateral trade volume under regional trade agreements. The following section observes Myanmar trade partners and trade volume.

In Table 7, Myanmar's export volume increases with countries such as Thailand (39.1 million US dollars), China (35.9 million US dollars), Japan (96 million US dollars), Korea (57.1 million US dollars), and the EU (56 million US dollars) under S0. As Myanmar undertakes unilateral liberalization, import volume substantially increases more than export volume with nations such as Singapore (37.8 million US dollars), Thailand (55.9 million US dollars), China (260 million US dollars), and Japan (248 million US dollars). Under S0, Myanmar's export direction is mainly to Japan, Korea, the EU, Thailand, and China.

Under S1, Myanmar's unilateral liberalization to ASEAN, Myanmar imports mainly from Thailand (377 million US dollars), followed by Singapore (90 million US dollars), Indonesia (14 million US dollars), and Malaysia (4.9 million US dollars). The trade relationship between Cambodia, Laos, Vietnam, Brunei, and the Philippines does not develop yet. Myanmar's export direction is mainly to Japan, China, Thailand, Korea, the US, and the EU. Under S2, unilateral liberalization of ASEAN to Myanmar, trade volume is very limited between them. Myanmar's exports only go to Thailand (52.8 million US dollars).

Under S3, AFTA, due to trade creation and diversion effect, Myanmar imports more from its fellow members, making import prices higher, and imports large volume from ASEAN members. The trade relation with China shrinks by 206 million US dollars, while Myanmar imports more from Thailand (380 million US dollars). It creates negative terms of trade and causes Myanmar welfare loss. Myanmar is forced to import higher priced imports from its ASEAN partners, and Myanmar loss in welfare as a result.

Under S4, EAFTA, Myanmar's exports expand to Japan, China, Korea, and the EU. Myanmar

Table 7 Myanmar's Trade Volume with East Asian Members and Prospective Future Members (In Millions of US dollars)

	Trade	KHA	LAO	VNM	BRN	IDN	MYS	PHL	SGP	THA	CHN	JPN	KOR	USA	EU
S0	Export	0.0	0.0	-0.3	0.0	-0.8	4.0	-0.3	1.2	39.1	35.9	96.0	57.1	2.7	56.0
	Import	0.0	0.0	-2.1	0.0	-20.0	-34.4	-0.7	37.8	55.9	260.0	248.0	9.6	7.6	2.3
S1	Export	0.0	0.0	1.4	0.0	1.7	5.7	0.7	1.6	11.2	34.8	19.2	9.5	2.5	12.9
	Import	0.0	0.0	-3.7	0.0	14.0	4.9	1.0	90.0	377.0	-204.0	-25.4	-27.9	-6.6	-13.9
S2	Export	0.0	0.0	-0.8	0.1	0.5	1.6	4.1	-0.7	52.8	-12.5	-5.8	-2.6	-0.9	-4.0
	Import	0.0	0.0	0.1	0.0	1.1	2.2	0.0	0.8	5.2	4.0	0.5	0.6	0.9	1.4
S3	Export	0.1	0.1	4.0	0.1	2.2	7.1	4.8	0.9	64.0	21.9	13.4	6.9	1.6	8.9
	Import	0.0	0.1	11.1	0.0	14.9	6.9	1.0	90.5	380.0	-206.0	-25.5	-28.2	-5.8	-12.7
S4	Export	0.0	0.1	-2.6	0.0	-6.2	-10.5	1.6	-4.0	69.6	50.9	74.2	217.0	-5.1	18.7
	Import	0.0	0.0	0.5	0.0	-5.1	-8.4	-0.3	52.3	145.0	412.0	267.0	33.6	-8.7	-30.4
S5	Export	0.1	0.1	1.0	0.0	-1.4	-0.4	3.4	-1.2	66.7	101.0	49.4	31.6	-1.3	25.8
	Import	0.0	0.0	3.5	0.0	-2.9	-10.6	0.1	63.1	203.0	602.0	-84.3	-110.0	-9.6	-28.0
S6	Export	0.1	0.1	3.1	0.1	0.8	4.8	4.3	0.2	69.8	14.0	44.4	7.5	0.9	8.2
	Import	0.0	0.0	8.5	0.0	11.0	3.6	0.6	79.2	322.0	-358.0	329.0	-49.9	-7.6	-18.8
S7	Export	0.1	0.1	1.4	0.0	-1.2	-0.7	3.5	-1.3	61.1	-20.4	7.3	192.0	-1.5	2.6
	Import	0.0	0.1	10.6	0.0	16.6	12.3	1.0	90.9	379.0	-243.0	-29.5	137.0	-3.0	-9.1

Note: Cambodia (KHA), Lao (LAO), Vietnam (VNM), Brunei (BRN), Indonesia (IND), Malaysia (MYS), Philippine (PHL), Singapore (SGP), Thailand (THA), China (CHN), Japan (JPN), Korea (KOR), The US (USA), and The EU (EU)

Source: Author's calculation based on the policy simulations using the GTAP 9 Database

mainly imports from China (412 million US dollars), Japan (267 million US dollars), Thailand (145 million US dollars), Singapore (52.3 million US dollars), and Korea (33.6 million US dollars) respectively. Under the simulation of ASEAN Plus One (S5, S6, and S7), welfare gain for Myanmar is high and the trade relationship is extended to its fellow ASEAN members.

Under the RTAs, when observing trade relationships between the Cambodia, Laos, and Vietnam (CLV) and Myanmar, it seems very limited between them, as Myanmar and ASEAN latecomers do not trade with each other yet. Since Myanmar's trade relationships are very close to Thailand, Singapore, Japan, China, and Korea, the impacts of trade liberalization also affect these countries under the RTAs.

5.3. Macroeconomic Impacts on Myanmar

In this section, the RTAs, a preferential treatment and industrial promotions for Myanmar, and combined trade and FDI policies will be analyzed through macroeconomic impacts.

Table 8 shows the macroeconomic impact on Myanmar. The policy simulation for Myanmar is shown in the table. The source of welfare impacts is also observed for Myanmar. In the GTAP model, there are three determining factors of equivalent variation: allocation efficiency, terms of trade effects, and investment-saving effects.

As trade liberalizes, Myanmar's GDP shows progress. In terms of trade, it has a negative impact on Myanmar under unilateral liberalization to the global market (S0), ASEAN (S1), AFTA (S3), and

Table 8 Macroeconomic Impact of Myanmar

	GDP Quantity Index	Terms of Trade	Equivalent Variation (EV) Welfare	EV due to Allocation Efficiency	EV due to Terms of Trade
1. Simulation Design for Regional Trade Agreements					
S0	66.90	− 0.41	15.10	66.90	− 37.40
S1	6.62	− 0.27	− 36.10	6.62	− 24.90
S2	0.82	0.12	18.90	0.82	11.00
S3	7.37	− 0.15	− 16.60	7.37	− 13.60
S4	76.09	0.49	158.00	76.10	44.80
S5	38.37	0.07	54.00	38.40	6.29
S6	34.33	− 0.05	25.10	34.30	− 4.85
S7	18.13	0.18	45.90	18.10	16.20
2. Simulation Design for Preferential Treatments and Industrial Promotion for Myanmar					
S8	− 0.79	0.09	11.00	− 0.79	7.95
S9	210.61	− 0.01	51.14	14.37	− 49.25
S10	636.01	0.01	749.17	27.93	66.57
S11	846.63	0.00	800.44	42.30	17.43
3. Simulation Design for Combined Trade and FDI Policies (East Asian Growth Model)					
S12	913.54	0.00	815.49	109.21	− 19.95
S13	922.71	0.01	958.45	118.38	62.16

Note: Welfare decomposition is shown in millions of US \$

Source: Author's calculation based on the policy simulations using the GTAP 9 Database

ASEAN Plus Japan (S6). Regarding allocation efficiency, it improves and makes welfare increase. Myanmar maximizes welfare gain under the EAFTA (S4), better than under the AFTA (S3). This situation may motivate Myanmar to move from an ASEAN-based smaller regional trade agreement to the wider EAFTA-based agreement. That gives Myanmar a better position in EAFTA, as Myanmar's welfare gain is higher in EAFTA than AFTA.

Under the protection of some infant industries in Myanmar (S8), it causes Myanmar to misallocate resources. Although Myanmar enjoys welfare gain by 11 million US dollars and favorable terms of trade by 7.95 million US dollars, the allocation efficiency shows a negative sign (−0.79). It seems Myanmar moves its efficient resources from the textile industry to other disadvantage industries. (Detailed impacts are shown in the industrial output section).

Under the transfer of capital stock into Myanmar (S9) welfare gains of 51.14 million US dollars are observed. EV change due to allocation efficiency also increases by 14.37 million US dollars. However,

terms of trade will show a negative sign due to capital improvement and more FDI. As the transferring of capital by foreign firms, terms of trade will show negative as more intermediate inputs such as capital goods are imported. Myanmar imports more capital goods with higher prices, and this causes terms of trade to show a negative sign. It shows negative terms of trade of 49.25 million US dollars. Under the technology transfer (S10), the impact of welfare (749.17 million US dollars) is higher than the transfer of the capital stock. Under the simulation 11, in order to examine how technology effects are critical in Myanmar's industries, the author applies the combination of cross-border transfer of capital and technology (composite FDI impact) to Myanmar. This simulation shows a favorable situation for Myanmar in promoting FDI with technology transfers. The result shows 800.44 million US dollars under this policy simulation.

Under the combined trade and FDI policies (East Asian Growth Model) welfare gain here are the highest figure among policy simulations. Welfare gain is 815.49 million US dollars under S12 and 958.45 million US dollars under S13. With the combined trade and FDI policies, EV change due to terms of trade and allocation efficiency is significant. All have positive signs for terms of trade and allocation efficiency.

The results confirm how technology is essential for Myanmar to improve terms of trade in the assessment of welfare gain. To compete with ASEAN members, Myanmar needs to upgrade the current condition of its industries to be more sophisticated in regional trade agreements.

5.4. Impact on Myanmar's Industrial Output

Table 9 shows the impact on Myanmar's industrial output volume change through regional trade agreements, preferential treatments and the industrial promotions, and combined trade and FDI policies.

In Table 9, under S0, Myanmar's unilateral liberalization to the global economy, Myanmar enjoys expanded outputs to the world in mining and textiles. Under S1, unilateral liberalization to ASEAN, Myanmar's output expands in forestry, mining, and textiles. However, the textile market contracts from 9.77 under S0 to 1.79 under S1. With ASEAN's unilateral liberalization to Myanmar (S2), only agriculture and fishery slightly expand, and textiles shrink (-0.47). Under the AFTA (S3), forestry, mining, and textiles expand. Under the EAFTA (S4), Myanmar's textiles (12.23) expands significantly. Under ASEAN Plus One, fishery, mining, and textiles improve, while agriculture, forestry, and other manufacturing shrink under ASEAN Plus China. With ASEAN Plus Japan, Myanmar's output expands in agriculture, fishery, mining, and textiles, while output shrinks in forestry, food and beverage, and other manufacturing. With ASEAN Plus Korea, agriculture, mining, and textiles expand, while the remaining industries shrink.

With protection in four industries, under S8, Myanmar's output shrinks in the industrial sectors such as textiles, and food and beverages. Only agriculture, fishery, and mining expand. The reason

Table 9 Impact on the Industrial Output of Myanmar under RTAs, Preferential Treatments, and Combined Trade and FDI Policies (Change in %)

Sector	Share in GDP (%)	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
Agriculture	23.69	-0.06	-0.03	0.03	0.00	0.01	-0.05	0.02	0.05	0.04	0.10	0.81	0.91	0.85	0.93
Fishery	5.26	-0.03	-0.18	0.07	-0.10	0.18	0.05	0.01	-0.08	0.11	-0.01	0.99	0.98	0.96	1.16
Forestry	1.90	-0.62	0.46	-0.21	0.24	-2.62	-1.18	-0.18	-0.79	-0.25	1.82	-1.84	-0.02	-0.64	-2.64
Mining	3.86	0.74	0.30	-0.05	0.25	0.22	0.33	0.33	0.07	0.15	0.39	0.68	1.07	1.81	1.29
Food & Beverages	24.49	-0.62	-0.39	-0.02	-0.41	-0.50	-0.57	-0.32	-0.44	-0.03	0.20	1.41	1.61	0.99	1.11
Textiles	1.69	9.77	1.79	-0.47	1.35	12.23	5.19	1.34	8.41	-0.43	3.68	-1.30	2.39	12.16	14.62
Other Manufacturing	5.63	-2.64	0.51	-0.11	0.38	-3.88	-0.97	-0.72	-1.44	-0.67	3.43	-5.74	-2.32	-4.96	-6.19
Construction	6.43	2.04	0.37	-0.03	0.34	2.48	1.86	0.64	0.67	0.20	-1.04	3.48	2.44	4.48	4.92
Trading	6.63	0.33	0.08	-0.01	0.06	0.39	0.31	0.11	0.09	0.02	0.30	0.94	1.24	1.57	1.63
Services	20.42	0.02	-0.01	0.02	0.01	0.07	0.02	0.07	0.01	0.04	0.45	0.59	1.04	1.06	1.11

Source: Author's calculation based on the policy simulations using the GTAP 9 Database

might be the misallocation of resources from textiles to other industries and policy adoption in protection, which makes Myanmar lose its textile output (-0.43), forestry (-0.25), food and beverages (-0.03), and manufacturing (-0.67). Only agriculture, fishery, and mining develop.

Under the simulations of capital augmentation (S9), Myanmar's output expands in all sectors. Under S11, the combination of FDI and technology transfers, almost all output expands significantly. All output expands proportionately under S11. Under combined trade and FDI policies (S12 and S13), not only is welfare gain high but the industrial outputs of Myanmar also expand significantly. Textiles increase extremely under these simulations.

To summarize, under the static effect of trade scenario, only agriculture, fishery, mining, and textiles improve. This result is due to the comparative advantage of Myanmar under regional trade agreements. This study confirms that capital accumulation (FDI) and improving productivity in output (technology) will help Myanmar to compete with ASEAN members in the future. Upgrading technology shows a substantial increase in almost all key industrial outputs. It is shown that the traditional strategies of protecting target industries would fail. Myanmar should opt for more open, broader policies as an integral part of its industrial promotion. With the more open scheme, and utilizing regional trade agreements, Myanmar should attract FDI into target industries with technological absorption. It also should let the intersectoral flow of productive resources freely happen while exposing sectors to trade competition. This should benefit the future discussion of industrial policies with freer movement of economic resources in the ASEAN and East Asian economies.

6. Conclusion and Policy Implications

In this study, the author analyzed the possible industrial policy for Myanmar to promote its industries under regional trade agreements, using the GTAP model for general-equilibrium policy simulations. The proposition of the study is to implement policy implications for Myanmar by using a comparative study of industrial policies selected from ASEAN members in the GTAP model.

The results show that Myanmar's welfare can be easily undermined due to adverse trade diversion effects if it seeks narrow RTAs only with ASEAN members. Moreover, Myanmar tends to secure positive welfare gains if the AFTA expand to include China, Japan, or Korea. Additionally, a protection policy does not lead Myanmar to enhance its trade volume and welfare. It creates the misallocation of resources among industries. Finally, capital and technology augmentation through regional FDIs, especially from the advanced East Asian countries such as Japan, Korea, and China, is essential for Myanmar to achieve its industrialization. Improving technology in output (technology and technical spillover) in key industries will produce a large advancement in its industrial transformation, leading to sizable welfare gains.

Finally, this study provides practical policy implications, as follows. First, if Myanmar wishes to

re-start its path to industrialization and economic development, it needs to use the frame of regional trade agreements like EAFTA and ASEAN Plus Japan, Korea, or China rather than the AFTA. EAFTA gives Myanmar better welfare gains than the AFTA. Second, given the role of capital stock (FDI) and technology transfers, improving technology in output will create more welfare gain for Myanmar. A proactive industrial promotion policy is essential for Myanmar to achieve its industrialization. Industrial promotion policies in a comparatively advantaged sector (such as agriculture) should be promoted by more capital-intensive industry, meaning that agro-based industry is essential. Food and beverage also need to be upgraded, as Myanmar is rich in these resources. Textiles (garments) are in the most favorable condition to upgrade, not only for competitiveness but also for job opportunities in the take-off period. Special economic zones and export processing zones can be the main objective for Myanmar in the long run. Lastly, a protection policy does not work under regional trade agreements, as it creates resource misallocation from the advantaged industries to the disadvantaged industries.

This study concludes and confirms that small economies like Cambodia, Laos, and Myanmar, with limited markets and diversified exports, will face welfare loss under regional trade agreements. It means ASEAN latecomers need to prepare well for their industrial policies under regional trade agreements. It confirms for Myanmar that without a capital stock (FDI), technology transfers, and a favorable and proactive policy, it will lose its welfare by joining the RTA. However, Myanmar's welfare gain is better in the EAFTA than the AFTA. Welfare gain is also high for all East Asian members.

Notes

- 1 Official Development Assistance
- 2 See Hertel (1997) for the project, its research network and modeling structure at the webpage <https://www.gtap.agecon.purdue.edu/models>.
- 3 See Myanmar database at the webpage <https://www.gtap.agecon.purdue.edu/resources/res>
- 4 See Equation (2)
- 5 In this model, Equivalent Variation (EV) measures the welfare impact in the model $EV = Y_{EV} - \bar{Y}$, where Y_{EV} is the expenditure required to obtain a new level of utility, whereas \bar{Y} is the initial expenditure. See Hanslow (2000), Hertel and Tsigas (1997) for more detail.

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Appendix A

A Comparison in the Economies of Myanmar and Timor-Leste

Key Indicator for Myanmar and Timor-Leste in 2014 database	Myanmar	Timor-Leste
Total population million; as of 1 October	51.5	1.2
GDP, At Constant Prices, million US dollars	53,132.3	4,154.0
Structure of Output percent of GDP		
Agriculture	27.9	4.3
Industry	34.4	76.3
Services	37.7	19.4
Exports, fob	12,524	92.0
Imports, cif	16,633	985.0
Trade Balance	– 4,110	– 893.0
Trade million US dollars		
Exports, total	22,488.6	524.3
Imports, total	24,158.4	114.1

Source: Asian Development Bank (ADB)