# THE IMPACTS OF ASEAN FREE TRADE AGREEMENT ON VIETNAM'S RICE SECTOR

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# Abstract

This study employs the standard static GTAP general equilibrium (CGE) model and the GTAP V8 database in order to evaluate the impacts of the ASEAN Free Trade Agreement (AFTA) on regional production, consumption, trade, and prices for agricultural and processed foods. Emphasis is placed on the impacts on rice production and trade among ASEAN members. There are four main findings:

- Firstly, AFTA leads to a small increase in Vietnam's rice production and exports when intra-ASEAN rice tariffs are reduced to agreed 2015 levels. However, Vietnam's rice production and exports would increase much more if ASEAN partners would further reduce their rice tariffs to zero (complete trade liberalization).

- Secondly, the results of this research support complete trade liberalization from an economic perspective because it enhances economic welfare gains for the newer ASEAN members, especially Vietnam. Vietnamese and Thai rice farmers' incomes are likely to improve following complete trade liberalization. For the other ASEAN members, especially the Philippines and Malaysia, the major benefits from complete trade liberalization include an increase in rice consumption, with its positive implications for household food security. In addition, complete trade liberalization will result in better resource allocation and increases in production of goods that exhibit comparative advantage in these two countries.

- Thirdly, this study draws further attention to a trade-off between food security in rice and rice self-sufficiency. Complete trade liberalisation leads to decreased prices of rice and some other foods paid by private households, thus enabling them to increase consumption of these goods. However, the decreased rice price and production leads to decreased rice self-sufficiency in the Philippines and Malaysia.

- Lastly, the finding of this study supports the trade creation effects of both AFTA, and complete trade liberalization among ASEAN members, which mainly involve trade in rice, other food and agricultural goods. This trade creation outweighs trade diversion in some manufacturing sectors.

In brief, the key findings of this study suggest that deeper regional trade liberalisation through complete rice trade liberalization would greatly increase Vietnam's gains from AFTA and support previous findings that rice trade liberalization can contribute to improving rice farmers' incomes, thus reducing poverty in Vietnam. The results of this study could also assist policy makers in ASEAN member countries to better evaluate the pros and cons of further opening their rice markets in the future.

# Acknowledgements

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# Acronyms

ASEAN: Association of Southeast Asian Nations

BULOG: Badan Urusan Logistik

CEPT: Common Effective Preferential Tariff Scheme

CU: Custom union members

RTA: Regional trade agreement

STE: State-trading enterprise

TOT: Term of trade

URAA: Uruguay Round Agreement Agenda

# Chapter One INTRODUCTION

## 1.1. Background

Agriculture contributes a significant share to Vietnam's GDP: an average of 20% over the last decade. Rice is an important agricultural crop in Vietnam, due to its key role in food security, poverty reduction, and export earnings. The paddy area comprises 70% of the total annual crop area in the last decade. On average, from 1990 to 2010, rice accounted for 93% of Vietnam's food crop output. The majority of rural households in Vietnam are involved in rice production. Approximately one fifth of Vietnam rice production was exported in the same period, which contributed 20% to the world's rice exports. Rice, coffee and rubber contributed approximately 70% to Vietnam's agricultural exports (General Statistics Office, 2010a) . Due to the significance of rice exports to Vietnam's economy, gaining access to foreign markets for rice is a key concern for Vietnam, during multilateral and bilateral free trade negotiations and implementation.  However, rice is designated as a sensitive product, and therefore it is exempt from trade liberalisation. Only the ASEAN Free Trade Agreement (AFTA) includes tariff reduction for Vietnam's rice. Evaluating AFTA's impact on Vietnam's rice prices, production and trade is important because of the lack of recent research on this topic.

Furthermore, in most of the studies on the impacts of AFTA on Vietnam's welfare gain, there are consistent results that AFTA is likely to bring about economic welfare gains for Vietnam, although Vietnam received modest gains relative to the original members' gain (Fukase & Martin, 2001; Strutt, Hertel, & Stone, 2010; Urata & Kiyota, 2003). Vietnam's agricultural and food processed exports are key drivers of this gain, because agricultural exports accounted for a large share of Vietnam's exports, and ASEAN markets are important markets for some of these goods. It is important to note that most of these studies included rice in regional rice trade liberalisation and assumed that the intra-ASEAN rice tariff could be reduced to 0%. In other words, these studies neglected the fact that

this product is regarded as a sensitive or special product, and therefore, the rice tariff will not be reduced to 0%. From this situation emerges the question: How does Vietnam's welfare gain from AFTA vary with the inclusion/exclusion of rice trade liberalisation in AFTA?

Rice self-sufficiency and price stabilisation are among the most common rationales for ASEAN members' exempting rice from trade liberalisation. Dawe and Timmer (2012) discussed that rice trade protection, together with production and supporting policies, works towards ensuring price stability for rice, which benefits poor consumers, rice producers and also results in micro-economic stability. Clarete (2012) suggested that ASEAN rice trade liberalisation could aid a reduction in price volatility for ASEAN members, which arises from a supply shortage in the world's rice market. In highlighting rice self-sufficiency and household food security, Dawe (2013) found that rice area per capita is a significant factor for rice production and rice self-sufficiency in Indonesia, the Philippines and Malaysia. In order to increase rice self-sufficiency, these countries need to increase their rice area per capita. However, this is counter-productive, because a certain amount of land for higher profit crops has to be replaced by the production of lower profit rice crops. In addition, the use of a rice trade restriction for the purpose of rice self-sufficiency has several disadvantages because a rice trade restriction causes a distortion in agricultural production in Indonesia, the Philippines and Malaysia (Athukorala & Loke, 2009; David, Intal, & Balisacan, 2009; Fane & Warr, 2009). Athukorala and Loke (2009) hypothesised that should rice trade liberalisation occur, a liberalising country could better reallocate resources into the production of crops with higher efficiency and therefore gain from better resource allocation. Sayaka et al. (2007) found that, if Indonesia reduced its rice tariffs to 0% for rice imports from all sources, Indonesia is likely to increase its diversification in agricultural production. However, Sayaka's study covered only four agricultural goods. Apart from this study of Sayaka et al. (2007), there is negligible research that could investigate the impact of ASEAN rice trade liberalisation on resource allocation for ASEAN members. Therefore, in order to shed more light on these issues

above, there is a need for research with two properties: evaluating several possible impacts of regional rice trade liberalisation on ASEAN members' rice industries, in terms of production, consumption, self-sufficiency and economic welfare gain; and taking into account the interaction of rice sectors with the remaining sectors, following trade liberalisation.

Another important analysis of regional trade agreement is the trade creation and diversion affect. This analysis is important because trade creation increases economic welfare gains for AFTA members, as opposed to the converse effect of trade diversion. In regards to the matter of trade creation/diversion of AFTA, there exists contradictory results. Fukase and Martin (2001), Toh Mun and Gayathri (2004) employed an earlier GTAP database and they anticipated that the formation of AFTA had led to trade diversion. However, studies by Elliott and Ikemoto (2004) provided a contrasting finding that AFTA led to trade creation, but the degree of trade creation was lower in the period 1993 – 1997, than in the preceding period 1988 – 1992[1].  Later studies by Korinek and Melatos (2009) examined past trade data, which supported intra-ASEAN trade creation in agriculture. Since the issue of trade creation and trade diversion, when AFTA members complete their tariff commitment by 2015, have not been updated yet, this study therefore attempt to contribute further understanding into this issue.

## 1.2. Structure of the thesis

This thesis comprises seven chapters. Chapter One provides an overview on the world's rice production, consumption and trade of rice. Chapter Two then explores production support and trade policies that ASEAN members, China and India, have employed and the influential factors for these rice trade policies. This chapter also includes discussion on each ASEAN country's rice trade policies. This chapter could help a further understanding of the challenges that could face Vietnam's rice exports to ASEAN partners. Chapter Three presents a literature

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[1] Due to rising competition for market share from China, South American and Eastern Europe.

review that highlights the impacts of global and regional rice trade liberalisation from different perspectives, such as food security, poverty reduction, production and consumption of Vietnam and ASEAN members. One section in this chapter pinpoints the gap in the literature review and highlights the importance of this research, since it can quantify the impacts of ASEAN tariff reforms on ASEAN members' agricultural prices, production, trade, self-sufficiency, and economic welfare, especially in regards to rice. Chapter Five discusses the methodology and data employed for this research. Finally, Chapter Six presents the results and interpretation. This last chapter also presents summary, conclusion and a discussion on the research limitations and ideas for future research.

## 1.3. An overviews on the world's rice production and trade

This section provides an overview of world's rice market, production, consumption, and trade, and also helps to gain further insight into rice production and consumption trends in selected countries where rice is a staple food. This section also assists in explaining the outstanding feature of the world's rice trade which is thin and volatile relative to some other commodities, such as wheat and corn. This explanation then becomes helpful in understanding rice trade policies of ASEAN members.

Although rice is differentiated by types, level of processing, level of quality and level of milling (see Appendix 1), this study is not able to capture this differentiation and therefore considers two rice types: paddy rice and processed rice.

### 1.3.1. World rice production

Asian countries account for the largest share of global rice production (see Figure 1.1). Noticeably, in the South East region, rice accounted for 81% of grain production in 2010, about four times higher than the world's average share, namely 21% (see Table 1.1).
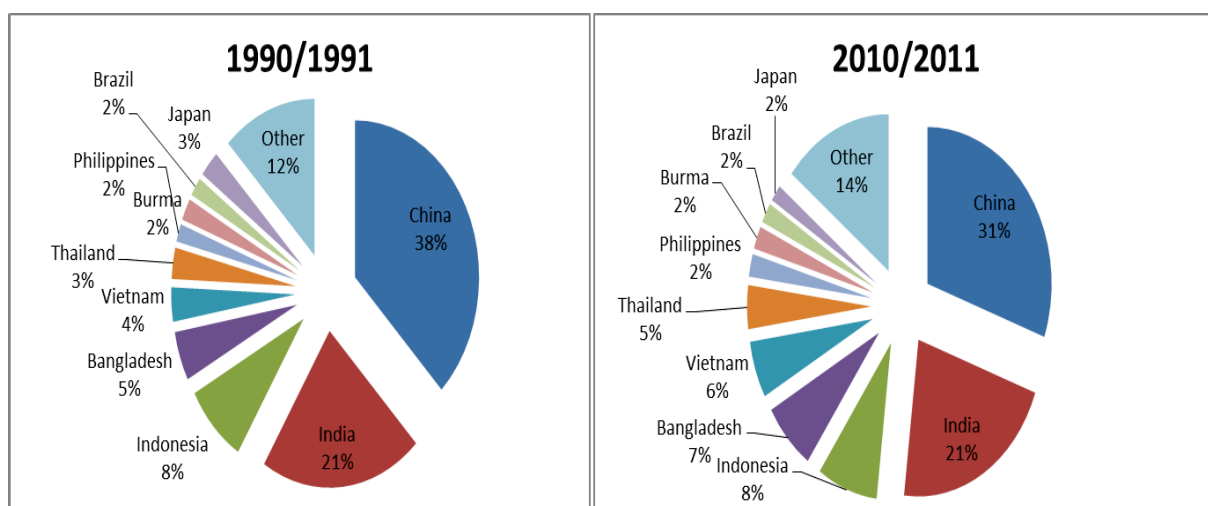
Figure 1.1 Share of the top ten largest rice producers (Source: (USDA, 2013))

Among Asian countries, China, India, Indonesia, Bangladesh and Vietnam together account for 72% of the world rice production (see Figure 1.1). China is the world's largest rice producer, with production amounting to 31% of the world's rice production in 2010, a slight decrease of 7% when compared with 1990. This decrease is explained by the expansion in rice production from Vietnam, Thailand and Bangladesh. Specifically, Vietnam's share of the world's rice production increased from 4% in 1990 to 6% in 2010 while Thailand's share increased from 3% to 5% at the same time. Noticeably, only Indonesia and Bangladesh are the world's largest rice producers as well as rice importers because their domestic production does not fulfil domestic demand. Taken together, due to Asia's dominant share of rice production, it has been the leading rice exporting region, supplying for almost three quarters of total rice exports in 2010.

Table 1.1  Proportion of rice production to grain production* in selected Asian regions (%)

|  | 1990/1991 | 1995/1996 | 2000/2001 | 2005/2006 | 2010/2011 |
|---|---|---|---|---|---|
| **The world on average** | 20 | 22 | 22 | 21 | 20 |
| **East Asia** | 41 | 39 | 41 | 36 | 33 |
| **South Asia** | 49 | 46 | 47 | 49 | 46 |
| **Southeast Asia** | 82 | 84 | 84 | 82 | 81 |

Note: *Grain include rice (milled), oat, barley, wheat, maize, mixed grain, wheat
Source: (USDA, 2013)

## 1.3.2. Rice consumption in selected Asian countries

Food consumption patterns in many East Asian countries exhibit substantial changes. Such changes occurred in three stages (Rae, 1995). Consumption per capita of staple foods, e.g. rice, increased in the first stage, and then non-staple foods (such as wheat) increased in the second stage. At the third stage, consumption shifts toward higher protein and higher value foods, such as meats, vegetables and fruits. Rice consumption per capita reduces with increased income in China, Thailand, India, the Philippines, Indonesia, Malaysia, Vietnam and Bangladesh , but increases in the Philippines (2010). Timmer, Block, and Dawe (2010) predicted that there will be a significant decline in rice consumption per capita in the next four decades due to an increase in national income and labour migration from rural to urban areas during that period. It is important to mention that there is a diversity in rice consumption per capita among regions within a country as well as among different countries. However, further discussion on this diversity is not within the scope of this study.

Figure 1.2 exhibits rice consumption per capita in countries where rice consumption is above 100 kg/person/year; and rice contributes about half of calorie intakes. Vietnamese have the highest per capita consumption, followed by Indonesia. In Vietnam, the survey by GSO (2010b) showed that while rice consumption per capita has declined, and consumption of meat, fish, fruit and food eaten away from home has increased. The survey also showed household expenditure on rice declined by 9.6% and that on meat increased by 1.1%, that on eating out increased by 6.1% from 2002 to 2010. The decreasing household expenditure on rice is coupled with the decreasing share of rice in calorie intakes in Vietnam (see Table 1.2). Unlike Vietnam and Indonesia, the Philippines and Thailand experienced a fast growth in per capita rice consumption. Noticeably, the Philippines is the only country that has experienced both an increase in rice per capita consumption and an increase in rice contribution to calorie intakes. Such increase is due to the continued low level of per capita income and the large difference in food expenditure pattern between the rich and the poor. For low-income families in the Philippines, rice is still the main source of energy (Balisacan, Sombilla, & Dikitanan, 2010)
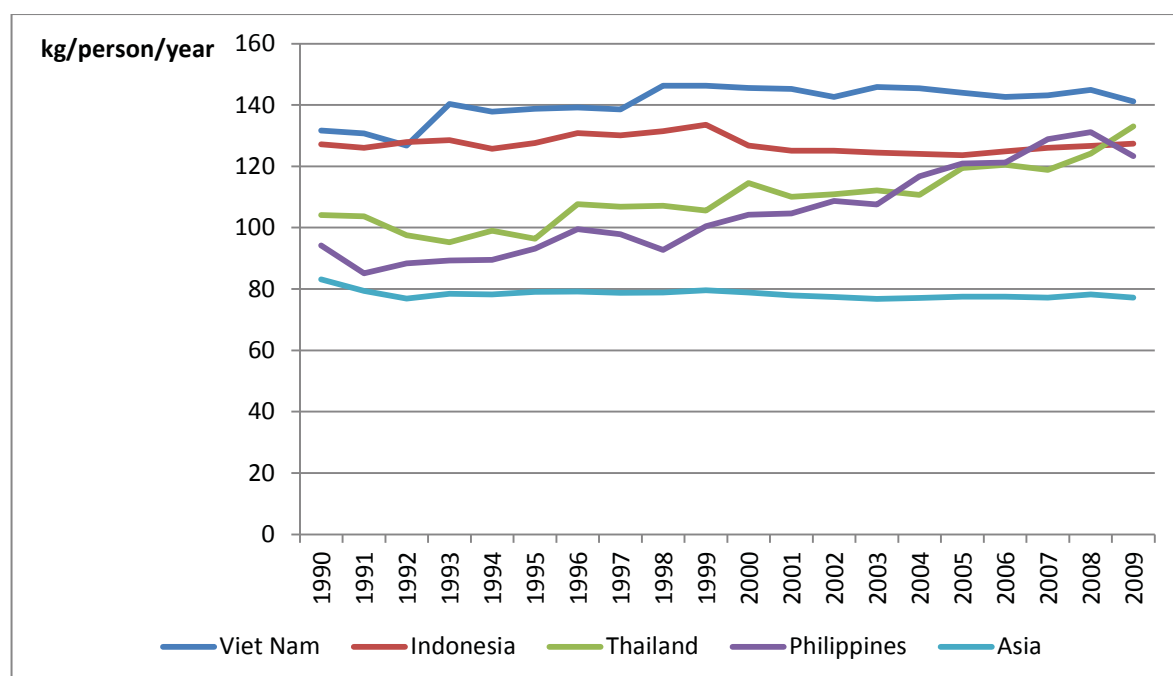


Figure 1.2: Rice consumption per capita in selected Asian countries (Source: (FAOSTAT, 2013))

Table 1.2: The contribution of rice to calorie intakes in key rice producing countries (%)

| Year | 1990 | 1995 | 2000 | 2005 | 2009 |
|---|---|---|---|---|---|
| China | 33 | 29 | 28 | 27 | 26 |
| India | 35 | 32 | 31 | 31 | 29 |
| Indonesia | 55 | 51 | 52 | 49 | 48 |
| Japan | 24 | 23 | 22 | 22 | 21 |
| Malaysia | 31 | 29 | 29 | 26 | 25 |
| Philippines | 40 | 40 | 42 | 48 | 47 |
| Republic of Korea | 36 | 34 | 31 | 27 | 28 |
| Thailand | 50 | 43 | 43 | 42 | 46 |
| Viet Nam | 70 | 67 | 63 | 56 | 52 |

Source: (FAOSTAT, 2013)

Figure 1.3 displays a declining trend in per capita rice consumption in five countries (South Korea, Japan, China, India and Malaysia) where rice per capita consumption is below average amount among Asian countries (80kg/person/year). Such declining trends in rice per capita consumption explain the falling contribution of rice to calorie intakes in all five countries. Income growth and urbanisation have contributed to the changes in food consumption pattern. For example, in Korea, Rae & Bailey (1997) found that the share of household expenditure on cereals which mainly comprise rice has dropped by 36% while that on meals away from home increased by 28% from 1975 to 1995. Increased affluence, increased urbanization, changing lifestyles and the westernization of Korean were among the key drivers of changes in Korean' food consumption pattern (Rae & Bailey, 1997).
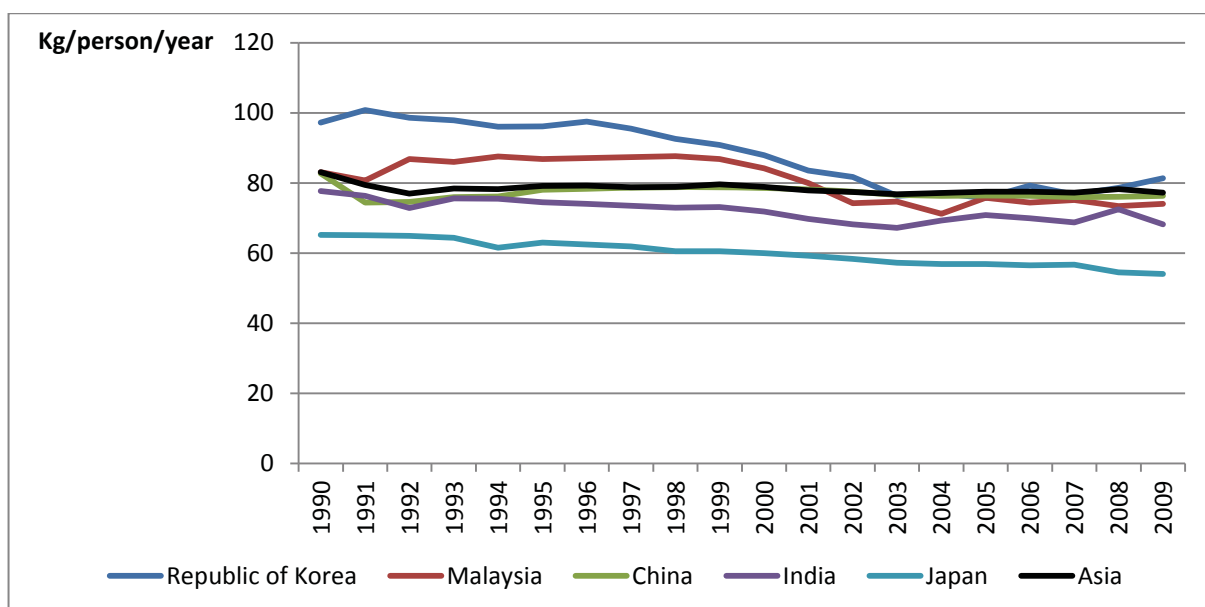
Figure 1.3: Rice consumption per capita in selected Asian countries (Source: (FAOSTAT, 2013))

### 1.3.3. **Major rice exporters**

World rice exports increased nearly threefold during the period from 1990 to 2010. There was a major expansion in rice exports between 1990 and 2000 from Asian region, particularly from the top five exporting countries: Thailand, Vietnam, the US, India, and Pakistan (see Table 1.3). Altogether, the top five rice exporters accounted for 75% of the world market share in the 1990s and 81% in the 2000s. This reflects the high concentration of the world rice supply, suggesting the world rice price is susceptible to these key rice exporters' supply abilities. Unlike China where most rice is consumed domestically, Thailand, Vietnam and India export a significant share of their rice output.  With regard to Vietnam, its exports during the 2000s increased by 41% from 2,968 to 5,006 mm tonnes. This increase helped Vietnam retain its share of the world rice exports. As for India, it was the third largest rice exporter during the 1990s, but it was overtaken by the US during the 2000s.  Regarding other rice exporters, it is noticeable that China and Australia no longer belonged to the top 10 rice exporters in the 2000s. China's decline in rice exports resulted from its pursuit of domestic price stability and food security (China's policies will be further discussed in Chapter Two).

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Table 1.3 Major milled rice exporters from 1991 to 2010

|   | 1990-2000 | | | 1990-2000 | | |
|---|---|---|---|---|---|---|
|   | Countries | Average quantity (1000 tonnes) | Share (%) | Countries | Average quantity (1000 tonnes) | Share (%) |
|   | **Total** | **19,277** | **100.00** | **Total** | **29,461** | **100.00** |
| 1 | Thailand | 5,459 | 28.32 | Thailand | 8,631 | 29.30 |
| 2 | Vietnam | 2,720 | 14.11 | Vietnam | 4,872 | 16.54 |
| 3 | United States | 2,647 | 13.73 | India | 4,009 | 13.61 |
| 4 | India | 2,149 | 11.15 | United States | 3,293 | 11.18 |
| 5 | Pakistan | 1,589 | 8.25 | Pakistan | 2,811 | 9.54 |
| 6 | China | 1,520 | 7.88 | China | 1,213 | 4.12 |
| 7 | Australia | 553 | 2.87 | Uruguay | 767 | 2.60 |
| 8 | Uruguay | 511 | 2.65 | Egypt | 732 | 2.49 |
| 9 | Argentina | 369 | 1.91 | Burma | 530 | 1.80 |
| 10 | EU-15 | 297 | 1.54 | Argentina | 409 | 1.39 |
| 11 | Egypt | 272 | 1.41 | Cambodia | 370 | 1.26 |
| 12 | Burma | 241 | 1.25 | Brazil | 336 | 1.14 |
| 13 | **Rest of the world** | 951 | 4.93 | **Rest of the world** | 1,487 | 5.05 |

Source: (USDA, 2013)

## 1.3.4. **Major rice importers**

The two largest rice importing regions in the 2000s were Sub-Sahara Africa and Southeast Asia. These regions accounted for nearly 80% of the world's rice imports in 2010, with Sub- Sahara Africa occupying the larger share. Nigeria surpassed Indonesia to become the world's largest rice importer with a share of over 6% of global rice imports. It is projected that the Sub Sahara region will remain the largest rice importer in the future (Wailes & Chavez, 2012). There are three main reasons for an increase in Sub Sahara's rice imports. Firstly, in the Sub-Saharan region, rice consumption tends to increase, along with an increase in urbanization. Secondly, consumers prefer imported rice to locally grown rice because the former is of better quality. For example, imported rice was favoured by Nigerian rice consumers in part because of its cleanliness, taste and grain shape (Akpokodje, 2003). Thirdly, poor infrastructures in several Sub Saharan countries hinder trade, thereby causing significant price differences within and among different countries in the region. Imported rice is cheaper than domestic

rice in several countries. In Gambia, for example, in 2001 and 2004 the price of imported rice was lower than local rice by 8% (Ministry of Agriculture, 2007).

Table 1.4 Major milled rice importers from 1991-2010

| | 1990-2000 | | | 2000-2011 | | |
|---|---|---|---|---|---|---|
| | **Countries** | **Average quantity (1000 tonnes)** | **Share (%)** | **Countries** | **Average quantity (1000 tonnes)** | **Share (%)** |
| | **Total** | **17,961** | **100** | **Total** | **27,580** | **100** |
| 1 | Indonesia | 1,787 | 9.95 | Nigeria | 1,809 | 6.56 |
| 2 | Iran | 1,164 | 6.48 | Philippines | 1,682 | 6.10 |
| 3 | Brazil | 812 | 4.52 | Indonesia | 1,481 | 5.37 |
| 4 | Saudi Arabia | 757 | 4.21 | European Union | 1,294 | 4.69 |
| 5 | Bangladesh | 702 | 3.91 | Iran | 1,275 | 4.62 |
| 6 | EU-15 | 628 | 3.50 | Saudi Arabia | 1,117 | 4.05 |
| 7 | Philippines | 619 | 3.45 | Iraq | 984 | 3.57 |
| 8 | Nigeria | 590 | 3.28 | Bangladesh | 860 | 3.12 |
| 9 | Japan | 544 | 3.03 | Senegal | 831 | 3.01 |
| 10 | Iraq | 529 | 2.94 | Cote d'Ivoire | 813 | 2.95 |
| 11 | China | 523 | 2.91 | Malaysia | 805 | 2.92 |
| 12 | Malaysia | 499 | 2.78 | South Africa | 769 | 2.79 |
| 13 | **Rest of the world** | 8,807 | 49.04 | **Rest of the world** | 13,860 | 50.25 |

Source:  (USDA, 2013)

South East Asia is also a key rice importing region. Among South East Asian countries, Philippines, Indonesia and Malaysia are the main rice importers. In the Philippines, its rice imports more than doubled during the1990s due to increased rice consumption per capita; and domestic consumption grew faster than domestic production. Indonesia is the world's third largest rice producer as well as the third largest rice importer. Indonesia has high level rice self -sufficiency as their rice output could meet 99% domestic demand in 2007 due to a large support for the rice industry from the Indonesian Government (Indonesia's policies will be further discussed in Chapter two). Compared to Indonesia, the Philippines and Malaysia's rice self-sufficiency were lower, namely around 70% (GTAP Data Base, Version 8)

Examination of rice consumption trends in selected Southeast Asian countries has implication for Vietnam's rice exports. Southeast Asian is Vietnam key's market to which more than half of Vietnam's exported rice is consigned. In the 1999s, Indonesia was Vietnam's largest rice importing partner. However, the 2000s witnessed the large share of Vietnam's rice exports shifting from Indonesia to the Philippines. Specifically, Vietnam's rice exports to the Philippines increased by more than 60% from 1999 to 2010. Wailes and Chavez (2012) projected that under the this status quo by 2021 the Philippines will take over Nigeria and Indonesia to be the world's largest rice importer, with its share of the world rice imports rising from 5.1% to 9%. On the export side, Vietnam Thailand and India will continue to be the world's leading rice exporters by 2021 (Wailes & Chavez, 2012). In India, although rice consumption per capita trends downward, rapidly growing population requires more food supply. As such, India's share of world rice exports is projected to reduce from 22% to 20% by 2021. Due to India's declined market share, Thailand will expand its world market share from 24% in 2010 to 35%. Meanwhile, Vietnam will maintain its world market share of 22% by 2021. Due to increasing import demand from the Philippines, Vietnam's rice exports are likely to increase if the Philippines liberalized its rice trade. This study will focus on the extent to which the regional trade liberalization affects Vietnam's agricultural production, and trade with a focus on the rice industry. While product differentiation and quality can be other important factors in increasing exports to ASEAN market, it is not within the scope of this study.

# Chapter Two OVERVIEW OF PRODUCTION SUPPORT AND TRADE POLICIES FOR RICE IN SELECTED COUNTRIES

This chapter explores the production support and trade policies for rice that ASEAN members, China and India, have employed. This chapter aims to explore the influential factors of rice trade policies for ASEAN members. In addition, it includes references to previous studies on the impacts of trade policies on each country and the world rice market. This chapter could help with a further understanding of the challenges that could face Vietnam when exporting rice to its ASEAN partners.

## 2.1. Vietnam

### 2.1.1. Domestic support policies

Vietnam has initiated economic reforms since the early 1980s. However, the reforms implemented in later years had the most significant impacts on increasing its agricultural production, including rice.  Figure 2.1 shows that, during the late 1980s, rice production and rice exports in Vietnam increased considerably.  Rice paddy output increased by almost 80% and rice exports grew more than 250% between 1987 and 2000. The annual production growth rate during the 1990s was approximately 5%.  This robust performance can be attributed to several factors. Firstly, in 1988, under Resolution 10, rice farmers were assigned long-term leases on their land[2]. These rice farmers were also allowed to own all their rice output and they were no longer required to sell their

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[2] Prior to 1988, local officials and agricultural officers were entitled to assign production land to farmers. Farmers did not have a long-term right to their assigned land and therefore many farmers lacked the incentive to increase their investment in the assigned land.

output to the state-trading agencies, at prices which were lower than the market price[3]. These farmers could, therefore, decide to market their rice to either private traders or state-trading agencies. Another factor that contributed to the increase in rice production was the government's decentralisation of input supplies. Prior to 1986, the central government determined the crops for each province and allocated inputs, such as fertilisers and seed, to each province. This input allocation was not sufficient to meet requirements and resulted in high competition for input access among production groups. Since the latter half of 1988, constraints on input supplies were relaxed, because provincial authorities were allowed to handle input supplies, including imports of inputs to meet provincial demand for production. However, according to Ordinance Number 193, issued on December 23, 1988, only state trading agencies were allowed to import inputs. Furthermore, the government still strongly controlled the allocation of foreign exchange.

In addition to the above reforms, rice farmers had more incentives for land conservation and improvement, following the passing of the Land Law in 1993 which acknowledged five rights: exchange, transfer inheritance, lease and mortgage. Furthermore, the expansion of rice production was attributed to the government's increasing investment in irrigation and the adoption of new rice varieties. Nguyen and Grote (2004) reported an increase in volume of the Vietnamese government's total input subsidies from 1987 to 2002. Irrigation

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[3] Prior to 1988, under the contract system, farmers were obliged to sell contracted amounts of rice to the government and only retain the excess. This contract system was displaced after 1988.

subsidies accounted for the main support, while other subsidies, such as fertilisers and power, were provided occasionally.
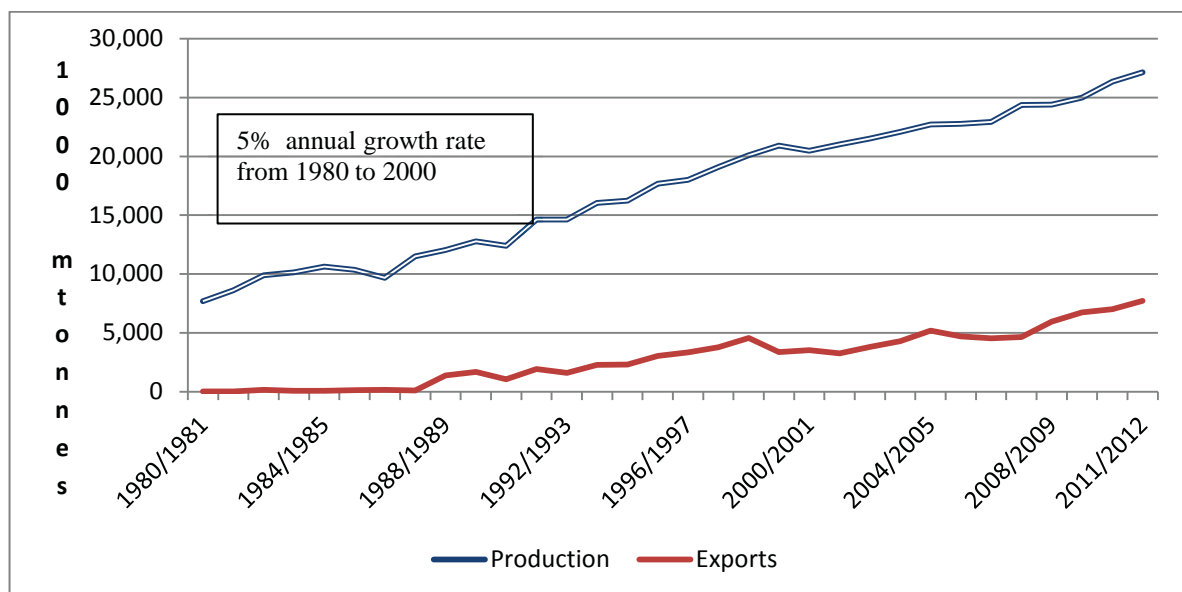


Figure 2.1: Vietnam's rice production and exports since 1980 (Source: (USDA, 2013)

Following the reforms of the late 1980s, further reforms on domestic trade and border trade were implemented in the early 2000s, which had significant impacts on increasing Vietnam's rice production and exports[4]. Although rice was mainly exported by state-trading enterprises, the removal of both export quotas and intra-trade restriction, after 2001, created incentives for both producers and private exporting companies (Minot, 2000). Minot (2000) anticipated that domestic paddy price would rise by 20% and exports by 51%, following the removal of an export quota. In line with Minot's finding, Nguyen and Grote (2004) reported that those reforms, from 1986 to 2001,contributed to raising rice farmers' incomes in Vietnam.

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[4] Prior to 2001, a quota on rice exports was applied. In addition, there were restrictions on internal rice trade, in part to control the smuggling of rice into China. Although Vietnam has had a sizable surplus in rice since 1987, the government still controlled rice exports, due to its concern over the impacts of external price shocks on low income consumers. Without any control, external price shocks were likely to cause surging domestic prices. Given that rice accounted for a large share of food expenditure at that time, an increase in the price of rice would have negatively affected the low income population. Furthermore, without export quotas, food exporting companies could sell rice freely and this situation made it difficult for the government to ensure sufficient rice supplies for regions which suffered a rice shortage

Regarding the role of state trading enterprises (STEs) in supporting rice farmers' income, two STEs, the Vietnam Food Company 1 (VFA1) and Vietnam Food Company 2 (VFA2), directed their members to purchase rice from farmers at least at the minimum price set by the government. This operation was aimed at preventing the farm gate price from dropping at peak harvest time. However, only a small number of farmers can sell their paddy rice directly to the food companies. Most rice farmers sell rice to small traders/collectors because they do not have any means of transportation (Loc & Khoi, 2011). Therefore, the farmers selling directly to the food company receive a higher price than those farmers who have to sell to traders/collectors (Loc & Khoi, 2011).

State-trading enterprises also played a key role in assisting the government to administer rice exports. Two state-owned trading companies, Vinafood 1 and Vinafood 2, (both members of VFA), were entitled to negotiate contracts with large rice importers and then allocate these contracts to other VFA members. These two companies became involved in all 'government to government' sales, which accounted for a large share of total rice exports, namely 66.4% in 2007, 49.2% in 2008 and 42.7% in 2009, respectively (Loc & Khoi, 2011).

Such operations are used to ensure a reliable and continuous rice supply in large quantities to key importers, which then protects Vietnam's reputation. Vinafood and other STEs hold an advantage over private trading companies, due to their ability to gain access to preferential finance, in addition to having a larger storage capacity and qualified human resources. Therefore, they are in a good position to negotiate large transactions (Morrison & Sarris, 2007). However, there exists criticism on the dominant roles of those two STEs in regards to the marketing of rice. One reason for the criticism is that it makes several private food exporting companies reliant on their allocation of rice exports, thereby only slowly improving competitiveness in the marketing of rice.

## 2.1.2. **Trade policy**

Vietnam's rice trade is managed by five government authorities. These include the Prime Minister's Office, the Ministry of Industry and Trade (MOIT), the Ministry of Agriculture and Rural Development (MARD), the Vietnam Food Association (VFA) and the State Bank of Vietnam (Pham, 2010). Those authorities undertook to set rice export quantities and rice trade policies. Rice exports were no longer controlled through quotas. Instead, export companies have to send their export contracts to VFA[5] for approval. This administration enables the authorities to control rice exports, when necessary (Tsukada, 2011). The current measures to administrate rice exports have an advantage over export quotas, because they may enhance export companies' competitiveness in finding a market for their rice exports. However, those companies are likely to face risks when the VFA ceases to approve export contracts. This could occur when the total rice export target is reached prior to the latter quarters of a year.


The target for rice exports is set and announced annually by the Prime Minister. However priority is given to food security and rice farmers' welfare by the Vietnamese Government [6] and therefore, national food security and rice price stability has a great influence on the government's rice trade management (Tsukada, 2011). Because rice accounts for a significant share of poor household's expenditure and calorie intake, a sudden spike in domestic rice price as a result of an increase in the world's price could reduce the poor households' food security. For these reasons, in response to the impacts of the food crisis on domestic prices in 2007/2008, a ban on exports , together with an export tax, export quota and minimum price for exports were adopted between 2007 and 2008 (see Figure 2.2). At that time, the VFA was instructed by the government not to approve any new rice export contracts until the restriction on exports was

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[5] VFA's roles are to stand for the interests of VFA rice exporting members and provide its members with market information. VFA also assists government to implement rice export policy (Tsukada, 2011)

[6] The Vietnamese governments' persistence on enhancing food security is stated in Resolution No. 63/NQ-CP dated 13/12/2009. This resolution focuses on ensuring food supply sources and also people's access to food. For further details on the resolution see (Hai, 2012).

lifted. After 2008, those restriction measures were removed, but a minimum export price has still been applied up to the present time.

Figure 2.2: Vietnam paddy rice price from 2006 -2009



Source: (Clarete, 2012; USDA, 2013)

(MEP: minimum export price)
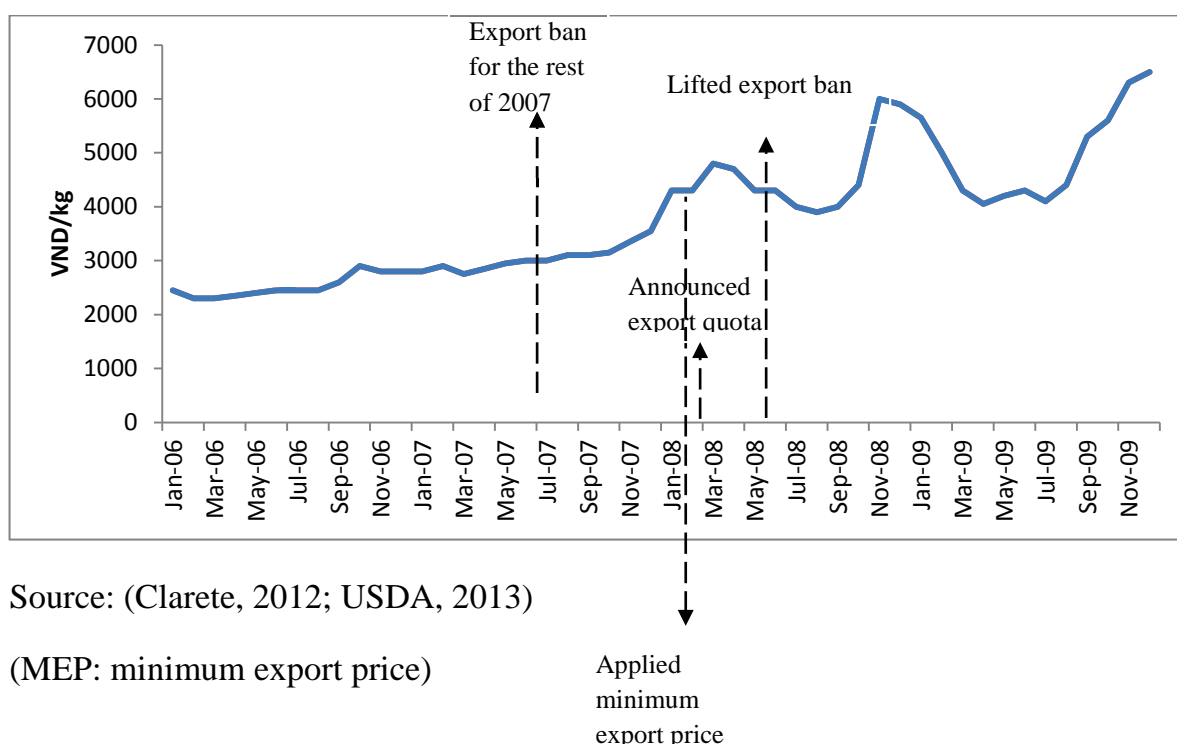
## 2.2. Thailand

### 2.2.1. Domestic support policies

The highlight of Thailand's domestic support policy is its pledging programme. This programme was started in 1981/1982, in order to financially support rice farmers to store their harvested rice. Under the pledging programme, participating farmers receive a low interest loan from the Bank for Agriculture and Agricultural Cooperatives (BAAC), if they pledge their stocks as collateral for the loan[7]. The borrowers have to repay the loan at the pledging price plus

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[7] Farmers who do not have warehouse can bring their stock to a central warehouse under the deposit slip/paddy pledging schemes. The Public Warehouse (PWO) and the Farmer Central Market Organization (FCMO) are in charge of the warehouse deposit slip/paddy pledging schemes. Farmers who have their own warehouse can keep their stock in their own facility (named barn-house pledging). Before the loan due date, farmers can decide to forfeit or redeem their pledged stock. This decision is made on the

interest, if market prices are above the pledging price. In the reverse case, the borrowers are exempt from paying the loan interest. This pledging price is to help farmers avoid loss when a large fall in market price could reduce largely rice farmers' incomes. It also enables the farmers to gain access to low interest finance for their rice storage. The cost of this programme, including the loss incurred to BAAC, is covered by the government's budget.

Table 2.1: Comparison between average farm gate price and pledging price of white rice paddy in Thailand[*] (main crop)

| Year | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/2007 | 2007/08 | 2008/09 | 2011/12 |
|---|---|---|---|---|---|---|---|---|
| Pledging price (Baht/ton) | 4760-5330 | 4760-5330 | 6200-6600 | 6700-7100 | 5900-6500 | 6100-6700 | 10800-12000 | 13800-15000 |
| Average farm gate price (Baht/ton) | 5048 | 5222 | 6495 | 6672 | 6442 | 8676 | 9816 | 10063 |

Note: [*] is processed into Thai white rice 5% broken. Data for 2009-2011 is not included because pledging programme was suspended during this period and an insurance programme was adopted instead.
Source: Wade & Prasertsri (2012, p. 11)

Since the 2001/2002 crop, the objective of the programme was changed towards price support and farmer income support (Poapongsakorn, 2010). In particular, the Thai government has set their pledging price higher than the market price since 2008/2009 (see Table 2.1). The proportion of pledged rice was estimated at 31.5 percent of the 2011/12 main-crop production (21-22 million tons of paddies).

The pledging programme has been criticised for at least two reasons. Firstly, Poapongsakorn (2010) argued that the high pledging price was motivated by some Thai politicians' interest in increasing rents for some groups of beneficiaries, and also to help those politicians win re-election. Secondly, the programme requires a high cost, but it generates unfair benefit distribution. In fact, in 2008, only 4.5% of the programme benefits accrued to the poorest rice

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difference between the market price and the pledging price, which is set by the government. If farmers decide to forfeit their crop, the government pays BAAC the interest. Otherwise, farmers pay BAAC 3% and the government pays the remainder of the relevant costs.

farm households. In contrast, more than a third of the programme benefits were distributed to 20% of the richest rice households. Furthermore, high pledging prices have significant impacts on the domestic farm gate price and export price. Due to high purchase prices, Thai rice exporters have to sell their rice at high prices on the international market. This makes Thai rice price less competitive, in comparison with India and Vietnam's equivalent rice types. Thailand's market share declined in 2001/2012, and Vietnam and India could make use of this opportunity to increase their export shares.

## 2.2.2. Trade policy

To protect rice farmers, in addition to the policies as mentioned above, Thailand restricts the amount of rice imports with a tariff rate quota. The in- quota tariff is 30% and the out quota tariff is 50% for all WTO members. However, for specific ASEAN member partners, the duty rate is 5% under the Common Effective Preferential Tariff (CEPT). This quota is managed by the Department of Foreign Trade (DFT). Thai importers are required to hold import licenses  for rice imports (WTO, 2010c). Given Thailand is the world' largest rice exporter, according to Warr (2008), the import restriction are due to two reasons. Rice trade liberalization could reduce incomes of the rice producer due to a fall in producer price. Rice imports, especially from Vietnam could highly substitute with some Thai rice because rice is in fact highly differentiated by types, and Thai rice producers have high efficiency in some types of rice production, but not all.  This substitution effect, in turn, could have negative impacts on the Thai rice producers, thus leading to political consequences.

In regards to export subsidies, Thailand did not make a commitment on export subsidies in URAA. Thailand has not subsidized its rice exporters.

## 2.3. Indonesia

### 2.3.1. Production and income support policies

In order to increase rice self-sufficiency, the Indonesian government provides several supports for rice producers. These supports include the provision of a fertilizer subsidy and free high quality seeds to eligible farmers[8]. In addition, its Food Logistics Agency, *Badan Urusan Logistik* (BULOG) procures the rice surplus from domestic rice producers for no lower than the minimum procurement price, thus ensuring that the domestic price does not drop too low during peak harvest time.

In order to reduce the effect of high prices of rice on poor consumers, the government introduced the RASKIN programme with the purpose of providing rice to poor households at subsidised prices. In 2013, the Indonesia Ministry of Social Affairs is in charge of the programme's budget and BULOG is in charge of distributing rice to targeted households. Each eligible household receives 15kg of rice/month at Rp 1,600/kg in 2011/2012[9] (Voboril & Meylinah, 2013).

### 2.3.2. Trade policy

Rice is among a few commodities which are highly protected in Indonesia. Indonesia employs quantitative restrictions and a state-owned trading enterprise for its rice imports. BULOG used to be granted a monopoly over international trade in rice. According to WTO (2013b, p. 64), however, this monopoly has recently been removed. However, rice is still primarily imported by BULOG. Indonesia's private enterprises are allowed to import rice, but they are required to have a license. Therefore, only approximately 1% of domestic rice consumption

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[8]Farmers who want to receive high quality seed must meet certain criteria set by the government. Local government selects eligible farmers through proposals from farmer associations. The local government is also responsible for ensuring seed effectively reaches those farmers. The seed is supplied by PT Sang Hyang Seri and PT Pertani and distributed to the farmers' paddy fields (Saifullah, 2010)

[9] Further information on this programme can be found on the BULOG website: (http://www.bulog.co.id/eng/glance_v2.php)

is imported by private companies (2010). In regards to the tariff rate on rice imports, Indonesia charges the same tariff rate, i.e. Rp450/kg, on rice imports from all sources.

There are several explanations for Indonesia's restrictive trade policy on rice. Firstly, together with producer support, their rice trade policy assists in enhancing rice self-sufficiency in Indonesia.  Figure 2.3 shows that the gap production and consumption narrowed between 2004 and 2008. Rice production fell between 2007and 2008, but recovered in 2010. Indonesia used to be the world's largest rice importer until the early 2000s. Due to an increase in rice production, Indonesia has increased its self-sufficiency and it has not been the world's largest rice importer since the mid-2000s.

The second explanation could be the government's control on rice trade in support of its price stabilisation objectives. Dawe & Timmer (2012) discuss that rice is procured from farmers at the incentive price and is resold to targeted consumers at a subsidised price. This practice entails a fiscal cost burden. Despite this cost, Dawe and Timmer (2012) believe that the benefits of price rice stabilisation for poor consumers, producers and macroeconomics could exceed the cost. In the case of consumer benefits from rice price stabilisation, these authors use an example of a study by Steven et al. (2004) that, in response to an increase in rice prices in the late 1990s in rural Central Java, Indonesia, mothers in poor families reduced their caloric intake to better feed their young children. Based on this result, these authors believe that a reduction in calorie intakes as a result of an increase in rice price, even if it occurs only temporarily, could have a permanent impact on pregnant woman and children. In regards to the role of rice price stabilisation in relation to macroeconomic stability, Dawe and Timmer (2012) present three supporting arguments, one of which is that, given the demand for rice is inelastic, in response to an increase in rice price (as a consequence of bad harvest ), households did not reduce their budget for rice, but instead they reduced their budget for some other goods. This situation could cause prices and quantities in the affected industries to fall, due to a fall in

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household demand for these goods. However, this argument seems to contradict the author's previous study in 2008, in which Dawe (2008) stated that the role of rice price stabilization, in relation to macroeconomics, is less significant today than it was in the 1970s. There are two reasons for these changes. Firstly, due to a substantial increase in export earnings, Indonesia nowadays can afford to import a large quantity of rice in the event of domestic shortfalls. Indonesia can also afford to purchase a large share of its domestic rice consumption from the world market. Secondly, rice used to account for a large share of household expenditure. However, this share has declined as Indonesian household incomes improved.
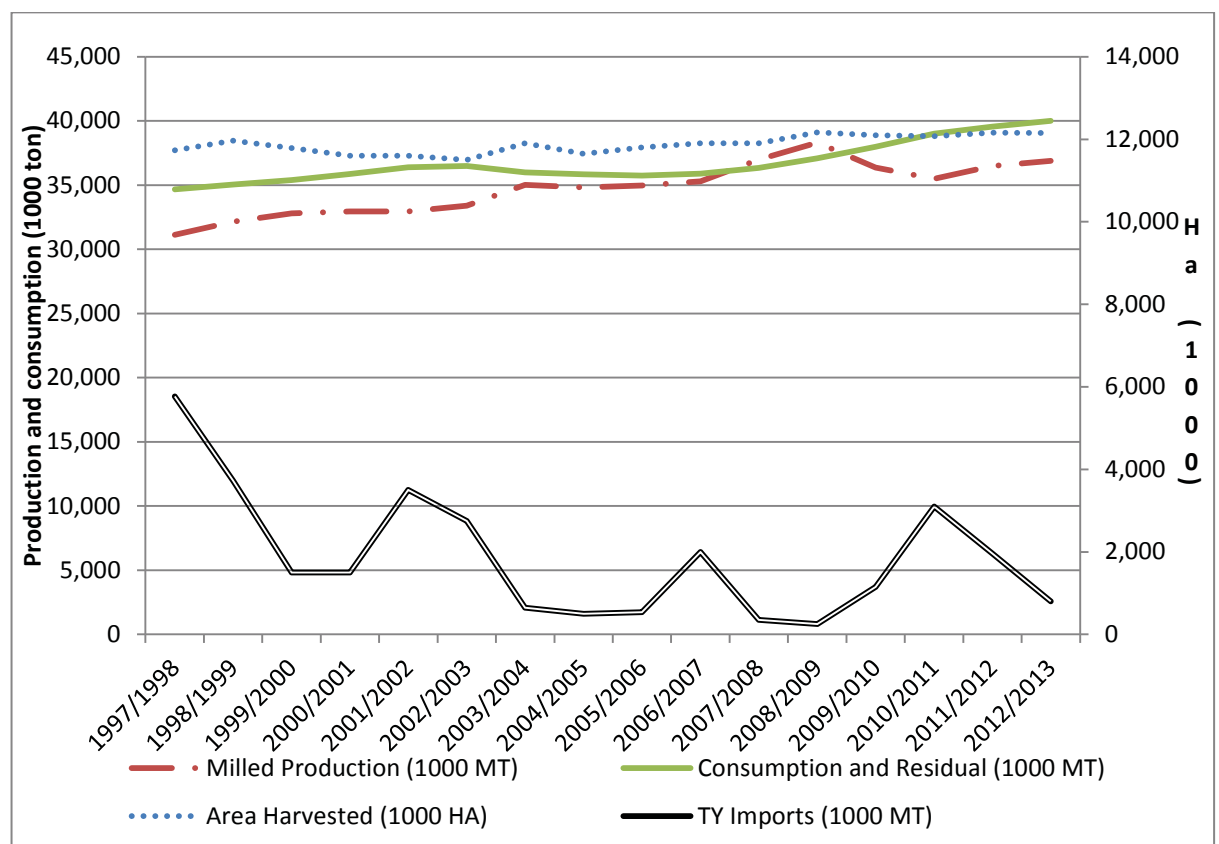


Figure 2.3: Indonesia's rice producti on, consumption and area. Source:(USDA, 2013)

In a study on the impacts of rice trade policy on poverty reduction, Warr (2005) found that the government's restriction on rice imports had adverse impacts on poor consumers, because it raised the domestic price and limited their access to a cheaper supply of rice. Therefore, the removal of import restrictions was likely to reduce poverty in Indonesia. Similarly, a recent study by Sayaka, Sumaryanto,

Croppenstedt and DiGiuseppe (2007), also found that the removal of rice tariffs reduces the price of rice paid by Indonesian consumers and it also increased crop diversification. Despite the potential benefits of rice trade liberalisation, future rice trade liberalisation has hardly occurred, because rice is a highly sensitive political commodity. Fane and Warr (2009, p. 194) explained that the rice millers have considerable political influence on policy makers in Indonesia. Protection for the rice farmers has been increased due to this political power and "the economic nationalism that dominates among members of parliament".

## 2.4. The Philippines

Rice is the key agricultural crop in the Philippines because it significantly contributes to the income of millions of Filipino farmers (Cororaton & Cockburn, 2006). Moreover, rice is important because it accounts for a large share of household food expenditure (Cororaton, 2006) and it also supplies more than half the calorie intake for a significant share of the Filipino population (discussed in Chapter I). Therefore, food security in the Philippines is closely associated with rice self-sufficiency.

### 2.4.1. Domestic support policies

In order to encourage domestic rice production, the National Food Authority (NFA) runs several income supporting programmes. One of NFA's key programmes is to procure paddy rice from small-scale farmers at a subsidised price. NFA also runs several indirect market intervention programmes, such as the Farmers' Incentive Rice (FAIR) Purchase Program, in order to encourage farmers to sell rice to NFA. Under FAIR, farmers are allowed to buy back rice that is already sold to NFA within six months from the date of sale. This buyback is allowed when the market price is higher than the price that NFA previously paid to purchase rice from the farmers. This operation occurs in order to help maximise farmers' profit.

In addition to supporting rice farmers, NFA is also in charge of distributing rice, at an affordable price, to consumers in strategic locations under the Targeted Rice Distribution Programme (TRDP). It is clear that, in order to support both farmers and rice consumers, NFA requires a high budget for its mission. However, budget constraints and a lack of financial resources have hindered NFA from expanding its programmes in recent years (Balisacan et al., 2010)

In response to the food crisis in 2007/2008, the government launched its programme, FIELDS, in 2008, which aimed to achieve higher food self-sufficiency by 2013. Under this programme, additional funds are provided for a fertiliser and micronutrient subsidy; investment in irrigation; infrastructure and education; agricultural credit; and a seed subsidy. However, Balisacan et al (2010) point out that the programme faces several challenges, such as deficient coordination among the agencies involved in the programme, and a lack of control on seed quality.

## 2.4.2. Trade policy

The Philippines was granted special treatment under the Uruguay Round Agreement on Agriculture. Following this special treatment, the Philippines have employed a tariff rate quota for rice. The minimum access quota was reported at 350,000 tonnes in 2006. This quota has been maintained until June 2012. Rice imports from ASEAN members have been subject to a tariff of 40%. In addition to a high rice tariff, The Philippines impose strict restriction on the importation of rice. According to WTO, "The NFA has control over imports of rice: it has the authority to import rice itself or to allocate import quotas to licensed importers (i.e. Filipino farmers, cooperatives, or private grains businesses). All out-of-quota rice is imported by the NFA directly" (WTO, 2012, p. 68)

The Philippines has experienced rice insufficiency which has become worse since the early 2000s, because demand for rice has grown greater than the supply of rice. Rice consumption rose by 5%, in comparison to a 3% increase in rice production (compound annual growth rate) in the 2000s (see Figure 2.4).

Government control of rice imports is for the purpose of enhancing rice self-sufficiency and price stability (Kajisa & Akiyama, 2005) . However, such policies are confronted by several critics for a number of reasons [10], since it results in a high consumer price and therefore reduces the welfare of rice consumers (Kajisa & Akiyama, 2005) . Consistently, in a study on the impacts of the import quota, Cororaton and Cockburn (2006) reported that the removal of the import quota would result in a decline in the consumer price. The benefit from quota elimination outweighs the negative impacts of a surge in rice imports. These authors also find that the removal of an import quota on rice also helps to reduce poverty in the Philippines. In a discussion on an improvement in food security, Kajisa and Akiyama (2005) also suggest that rice trade liberalisation could be a potential approach to achieve food security in the Philippines. However, despite the potential benefits from rice trade liberalization. David et al. (2009) states that rice trade liberalisation is unlikely to occur in the Philippines. The Filipino Government persistently pursue to increase rice self-sufficiency strategy and reduce its reliance on international markets, following its experience in the food crisis in 2007.
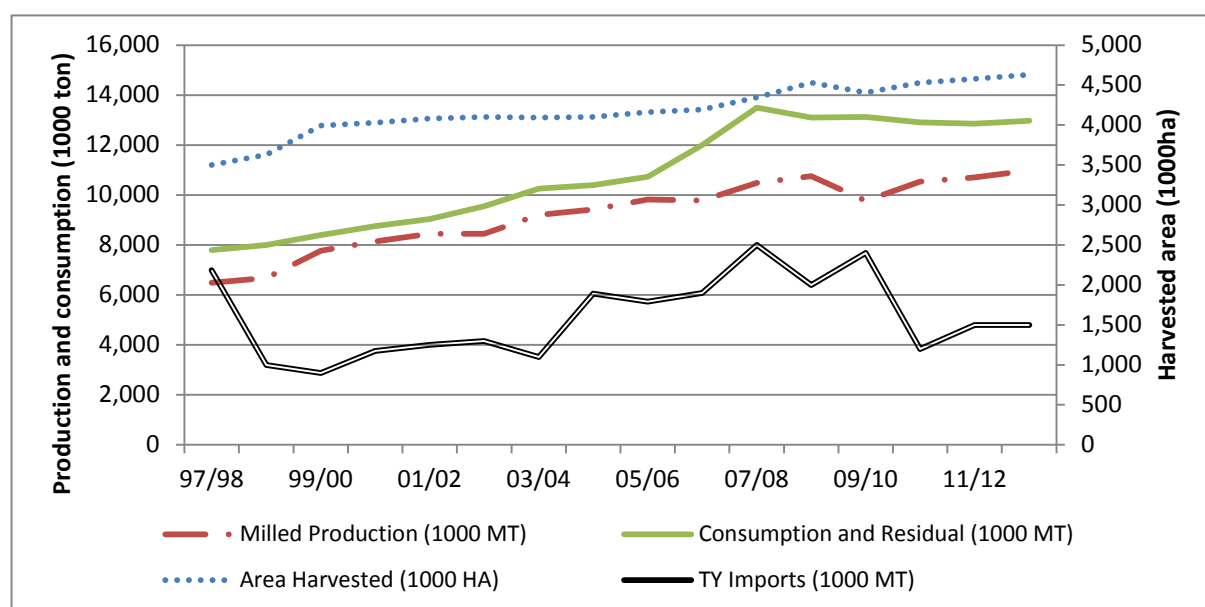


Figure 2.4: The Philippine's rice production, consumption and area (Source:(USDA, 2013))

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[10] Kajisa & Akiyama (2005) point out that NFA was assigned to rice price stabilisation in the Philippines. However, its operation in this matter is inefficient and unsatisfactory, due to an unstable rice prices in the Philippines.

## 2.5. Malaysia [11]

### 2.5.1. Production support and income support policies

In pursuit of higher rice self-sufficiency, the government strongly supports rice farmers and provides them with a wide range of incentives to maintain rice production. The key policy to support rice farmers is a guaranteed minimum price (GMP). If the market price falls below GMP, a new public limited Company, Padiberas Nasional Berhad (BERNAS), is in charge of purchasing rice from farmers at no less than GMP price. Paddy rice farmers are also supported through a fixed payment. This payment is based on the amount of paddy rice farmers sell to registered rice mills. In 2010, the payment was approximately RM 24.81 per 100 kg (WTO, 2010a). In order to reduce the impact of a high domestic price for rice on low income consumers, the government controls the price of low quality rice. For example, the price of ST15 is kept at RM 1.65/kg for Peninsular Malaysia and RM 1.80/kg for Sabah and Sarawak.

### 2.5.2. Trade policy

Rice is exclusively imported into Malaysia by BERNAS. BERNAS operates a transparent purchasing system with an open tendering procedure. However, by holding a monopoly on rice imports, BERNAS has an advantage when negotiating a rice price with its suppliers, since it is the only rice importer (WTO, 2010a). The tariff on rice imports from ASEAN member is currently at 20%.

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[11] This section is mainly based on a WTO trade policy review report provided by WTO (2010a)

Rice accounted for a much smaller share of private household consumption in Malaysia than in Indonesia, the Philippines and Vietnam, namely 0.9%, 3.8%, 4% and 5%, respectively (GTAP Database, Version 8)). However, rice remains protected in Malaysia. In a study evaluating the distortions in Malaysian agriculture, Athukorala and Loke (2009) found that rice shows a major distortion, in regards to agricultural incentives in the country. This situation occurs because rice is a highly sensitive 'political' crop. Athukorala and Loke (2009, p. 203) explain that "Rice farming, nearly all wet paddy farming, is the major source of income for rural households in the states of the north and east in Peninsular Malaysia and parts of East Malaysia. At independence, about three-quarters of the native peasant producers (predominantly rice growers and fishermen) were Malays; about 90% of the rice growers were Malays; and about one-third of the economically active Malay male population represented the peasant sector". Given that rice is the major cause of agricultural distortion in Malaysia, these authors hypothesise that this distortion could result in a welfare loss for Malaysian consumers; and also constrain resources from being employed in more efficient and dynamic production, such as processed foods. As such, these authors question whether Malaysia's rice trade liberalisation could result in better resource allocation?

# 2.6. China[12]

## 2.6.1. Domestic support policies

The Chinese government places a strong emphasis on grain self-sufficiency, as a result of the food crisis in 2007/2008, world food price volatility, and China's growing demand for food to feed its huge population. A summary of China's spending on support programmes for grain is given in Table 2.2.

Table 2.2: Chinese government spending on subsidy programmes for grains* from 2005 – 2006 (US$Million)

| Years | Direct payment | Seed Subsidy | Machinery Subsidy | Fuel/Fertilizer Subsidy | Others | Total |
|---|---|---|---|---|---|---|
| **2009** | 2,221 | Na | 1,471 | 10,529 | 3,426 | 17,647 |
| **2008** | 2,221 | 1,775 | 588 | 9,382 | 1,160 | 15,126 |
| **2007** | 2,221 | 979 | 294 | 4,059 | - | 7,553 |
| **2006** | 2,088 | 603 | 88 | 1,838 | 1 | 4,618 |
| **2005** | 1,941 | 574 | 44 | - | - | 2,559 |

Source:  Sanchez and Junyang (2009, p. 10)
Note: * Grains include rice, wheat and maize
      The 2007, 2008 seed subsidy covers soy bean, rice, wheat, corn, rapeseed and cotton. Exchange rate 1USD = 6.7RMB

As shown in Table 6, total spending on direct payment and input subsidies increased by approximately seven times, between 2005 and 2009. Fuel and fertiliser subsidies account for the largest share of total subsidies. The budget for these subsidies in 2009 is almost double that in 2007. Direct payment is another important support, which was started in 2002 in Anhui, Henan and Jilin provinces. This support has been provided nationwide since 2004 (Fang, 2010). Direct payments did not increase as fast as fuel and fertiliser subsidies. Overall, these subsidies contributed approximately 22 percent of net profit margins for grain farmers in regards to the 2008/2009 crop (Sanchez & Junyang, 2009).

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[12] It is helpful to include China and India's policies in this chapter, because these countries are the world's largest rice producing and consuming countries,: and India is a key rice exporter. As such, changes in their policies have a significant impact on the world rice market.

In addition to the subsidies discussed above, China introduced a minimum procurement price scheme for rice in 2004. This scheme was notified to the WTO as an Amber Box measure that could boost production and cause trade distortion. Under the scheme, the government purchases grain from farmers in 13 major grain-producing provinces and regions, when the market price falls below the minimum price (Xinhua, 2013). Recently, there has been a significant increase in the minimum price set by government (Sanchez & Junyang, 2009)). In 2013, the Chinese government announced that the minimum price would be set at 2,640 yuan ($420) (Xinhua, 2013), a 10% increase relative to the 2012 relevant price. In addition to these support policies, the Chinese government lays emphasis on improving productivity in grains. For details on these measures, see Beckman (2010). Overall, these policies are contributing to China's grain self-sufficiency[13] (Sanchez & Junyang, 2009). Rice production has recovered from its decline at the beginning of the 2000s and it has risen steadily over the last few years (see Figure 2.5)
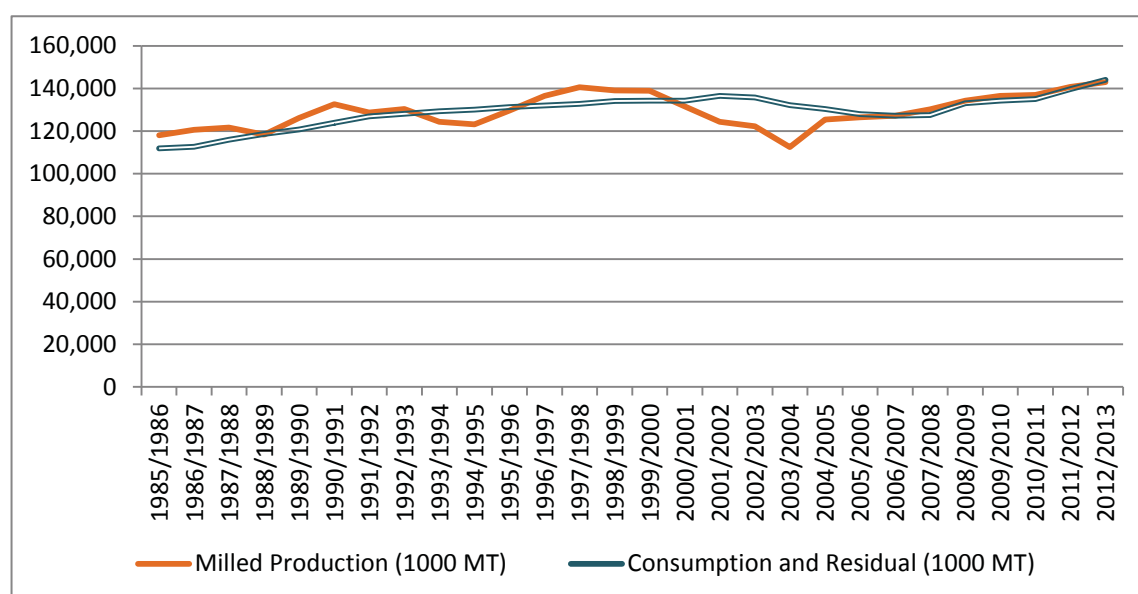


Figure 2.5: China's rice consumption and production from 1985 to 2013 (Source: (USDA, 2013))

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[13] The target is 95%

## 2.6.2. **Trade policy**

### 2.6.2.1. **Importation of rice**

China has adopted a tariff rate quota on rice imports since its accession to the WTO. This quota was set at 2.66mmt in 2001 and then increased to 5.32 mmt in 2004. This quota has not been changed since 2004. However, actual imports were far below the quota. The in-quota tariff is 1%, while the out-quota tariff is is 65%. The imported quota of 5.32mmt is equally allocated to state trading enterprise and private enterprise (Riedel, Lagos, & Junyang, 2013).

### 2.6.2.2. **Exportation of grain** [14]

The Chinese government also imposes export quotas on rice, wheat and maize. Exports of rice, maize and soybeans are controlled through state-trading enterprises. In addition, the export of grains has been subject to export license management since 2008. The government also removed VAT rebates on cereal exports[15]. As a result of strict regulation on exports, China exhibits a declining trend in rice exports (see Figure 2.6).
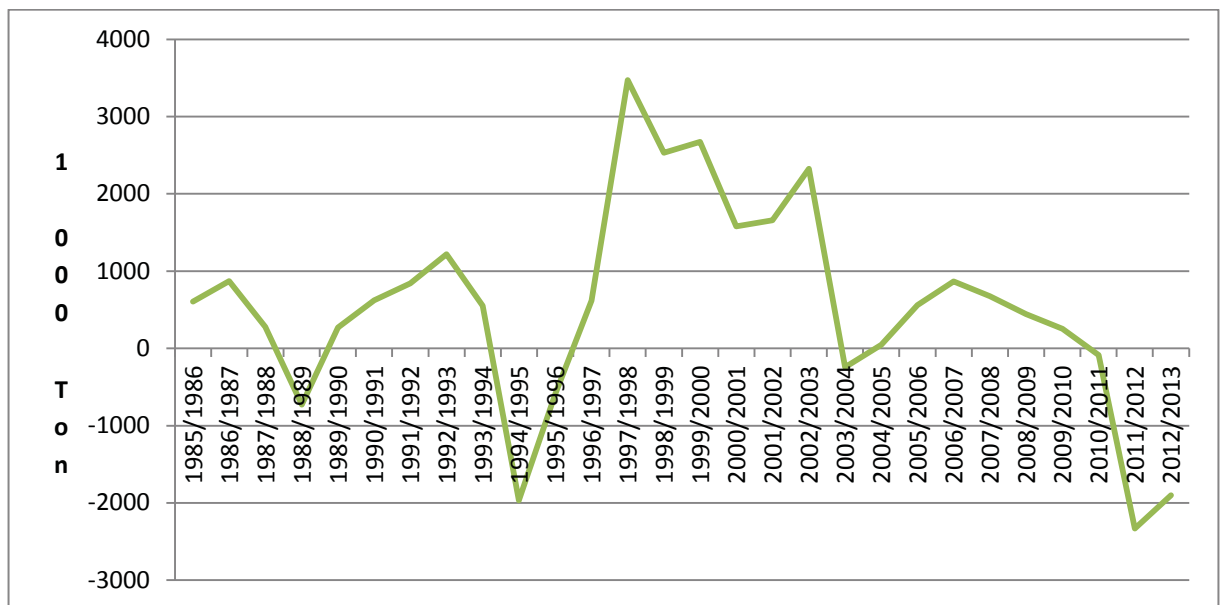


Figure 2.6: China's net rice trade[*] from 1985 to 2012 (Source: (USDA, 2013))
Note: [*]Net trade = exports - imports

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[14] Based on (Fang, 2010)
[15] Exports of grain were entitled to a 13% rebate of their declared export value at the port, before 20 December 2007 (Fang, 2010)

## 2.7. India

Rice is a strategic sector in India and it accounted for up to 42% of total food grain production in 2007-2008 (Gulati & Dutta, 2010). Indian rice production is rising faster than its domestic demand and therefore, this enables India to export rice occasionally (see Figure 2.7). This increase in rice production can be attributed partly to large subsidies from the Indian government.
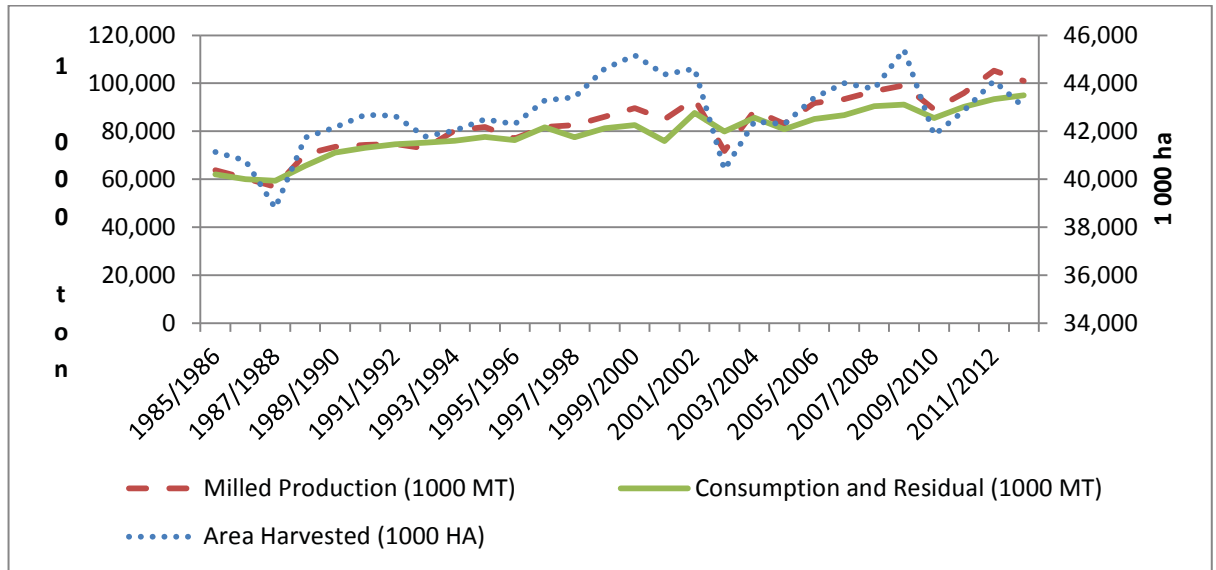


Figure 2.7: India's rice production and consumption since 1985 (Source: (USDA, 2013))

### 2.7.1. Farmer and consumer support policies

In order to support rice farmers, the Indian government has implemented several policy measures that include both input and output support. The most common form of input support is fertiliser and electricity subsidies. Fertiliser accounted for the largest share of total input subsidies (40%), followed by electricity (26%) and irrigation (21%) in 2007. Gulati and Gupta (2007) found that the rice industry received the highest share (37%) of total subsidies for fertiliser and electricity in India, followed by the wheat industry (35%).

In addition to input supports, the Indian government supports grain farmers' incomes through output price support. Paddy rice is purchased from farmers at the minimum support price (MSP). Rice procurement is organised by the

government through public and cooperative agencies. The Food Corporation of India (FCI) is responsible for food grain procurement, distribution and storage. The proportion of rice procured by FCI rose from 25.5% in 2003/2004 crop, to 41% in 2005/2006 crop. Rice can also be procured and distributed by the state governments under a decentralised procurement scheme. This scheme aims to benefit more farmers, in disadvantaged rural areas, from the minimum support price. Overall, these measures contribute to enhanced rice production, and it has enabled India to have a high level of rice surplus since 2008.

FCI plays a central role in enabling the Indian government to support rice farmers and to assist the targeting of poor consumers. Government policies to maintain a high domestic price of rice could benefit rice farmers at the expense of the consumers, especially those with low incomes. In order to mitigate the impacts of high rice prices on India's poor consumers, some of the rice procured by FCI is sold to low income Indian consumers at a subsidised price, under a public distribution system (PDS). In addition, the rice procured by FCI is used to support the targeted poor population through the Targeted Public Distribution System (TPDS)[16]. FCI is also responsible for maintaining a sufficient buffer stock[17] which is used in emergency cases, such as crop failures, drought, or flood. FCI is also granted with special privileges to control the rice trade in India. FCI's role to control the rice trade is discussed in the following section.

## 2.7.2. Trade policy

Restrictive marketing and trade policies are applied to rice and wheat in India (Daws, Block, Gulati, Huang, & Ito, 2010). In the case of domestic trade policies, intra-state and inter-state trade of paddy rice is restricted, thus enabling government agencies to purchase sufficient rice for its procurement scheme. Rice millers have to sell a certain proportion of their milled rice to government

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[16] The programme focuses on helping the most vulnerable people in India to obtain food grains at a low price below market price.
[17] which is used to support domestic consumers in case of crop failures, drought, or flood

agencies. FCI relies on these millers to purchase approximately half of their targeted rice procurement (Gulati & Dutta, 2010). The obligation of the rice millers to sell milled rice to FCI is set by the government and it varies from state to state.

Rice is considered to be a sensitive good in India, due to its important role in food security. Therefore, exports of rice have been subject to restrictions and quotas which are notified yearly. However, restrictions on rice exports could be changed abruptly, in order to ensure food security. Licenses for rice exports and a minimum export price are also applied in order to administrate prices and rice availability. Rice imports have been subject to a tariff rate of 80% (HS 1006.40), except for rice imports from Sri Lanka. This high tariff makes imported rice very expensive and India's imports of rice are managed via state-trading. Due to these measures on rice imports, there has not been any rice imported into India since the early 1990s (see Figure 2.8).

The unpredictability in India's rice exporting policy was observed to transmit instability into the world rice price during the global food crisis in 2007/2008. India introduced a ban on rice exports from October 2007 until September 2011 (Clarete, 2012), in spite of an increase in rice production at that time. This export ban was explained by the concern that an increase in the world rice price could have an adverse impact on India's food security. This export ban in turn was responsible for a surge in the world price of rice. Derek (2011) estimated that key rice exporters, including India and Vietnam, contributed 60.9% to the surge in the world price during the rice crisis in 2007/2008.
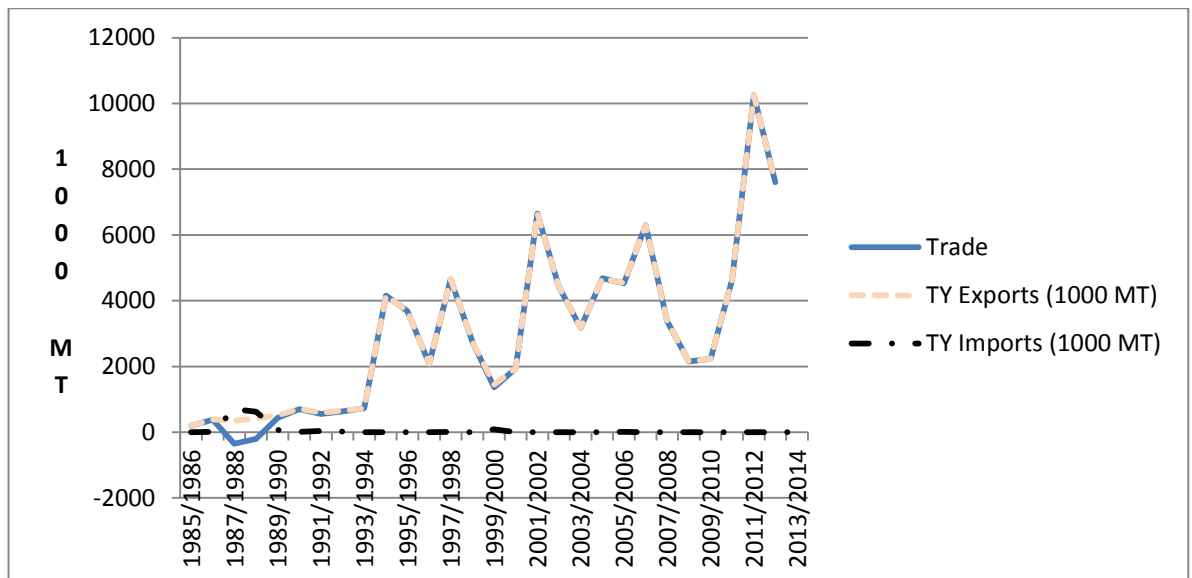
Figure 2.8: India's net rice trade since 1985 (Source: (USDA, 2013)

## 2.8. Conclusion

The above sections present a brief discussion on the rice trade policies of ASEAN members, China and India. In order to compare the level of support in these countries and to further understand supporting trends over a period of time, this study employed a 'nominal rate of assistance' ratio (NRA), which is an outcome of a global research on agricultural distortions led by Anderson and Martin (2009). This ratio is defined as "the percentage by which government policies have raised (or lowered if the NRA is less than 0) the gross returns to producers above (or below) the gross returns they would have received without government intervention" (2009, p. 17)

Table 2.3 presents the nominal rate of assistance for selected Asian countries. Rice farmers in Japan and Korea receive a higher level of income support from their governments' policies, than their counterparts. The support level in these two developed countries far exceeds the remaining countries. In the 1990s, policies in Japan, Korea and Malaysia were aimed at increasing their rice farmers' incomes, while the reverse was seen in Vietnam and some Asian countries. However, the 2000s witnessed a reverse trend, when Japan, Korea and Malaysia reduced their support and Thailand, China, Vietnam, Indonesia and India increased their support. As a result, NRA in these three latter countries has risen

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since 2000. Among ASEAN members, Thailand differs from the remaining members in that its NRA shows decreasing negative value, suggesting that rice production has been taxed but that taxation has reduced over the period from 1990 to 2007 (Anderson & Martin, 2009; Warr, 2008)

Table 2.3: Nominal rate of assistance for selected Asian countries

| Country/Region | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Japan | 518 | 758 | 597 | 597 | 624 | 629 | 588 | 521 | 318 | 249 |
| Korea | 276 | 340 | 390 | 374 | 422 | 395 | 350 | 226 | 205 | 210 |
| Malaysia | 123 | 117 | 54 | 89 | 82 | 65 | 65 | | | |
| Vietnam | -37 | -8 | 19 | 35 | 4 | 34 | 22 | 9 | | |
| India | -18 | -9 | 15 | 18 | 29 | 19 | 22 | | | |
| Philippines | 16 | 55 | 73 | 69 | 54 | 41 | 17 | | | |
| Indonesia | -10 | -12 | 15 | 21 | 23 | 25 | 9 | | | |
| China | -36 | -2 | -8 | -6 | -15 | 0 | -2 | -12 | | |
| Thailand | -14 | -10 | -13 | -9 | -6 | -3 | -6 | | | |

Source: Anderson & Martin (2009)

Further examination of Vietnam's NRA shows that, in the 1990s, the price of rice was kept lower, relative to the border price, as a result of administered prices and the government's restriction on rice exports. Following the economic reforms since 1986, the government relaxed its control and allowed the market to decide the price. Nevertheless, an export quota was employed until 2001. Then, in 2001, the export quota was removed along with the gradual reduction of the state-trading monopoly on rice trade. These changes contributed to a rise in the domestic market price. At the same time, policies put in place to curb high inflation and eliminate the dual exchange rate became effective. Taken together, these policies contributed to a rise in NRA. Despite an improvement (reduction) in NRA lately, the level of support that Vietnamese rice farmers receive is very modest compared to that in some other countries, such as Malaysia.

# Chapter Three  LITERATURE REVIEW

## 3.1. Regional trade agreements

### 3.1.1. Theory of preferential trade agreements

The difference between trade liberalisation and preferential free trade theory is that the latter might cause trade diversion or trade creation. Trade creation and trade diversion were first introduced by Viner (1950)[18]. Trade diversion refers to a shift of imports from efficient suppliers to less efficient suppliers. This shift is due to the cheaper price of imports, as a result of tariff removal among custom union members (CU). Trade creation refers to increased imports from efficient suppliers, in addition to CU members. A CU member can have a welfare gain/loss, if a trade creation/trade diversion outweighs a trade diversion/trade creation. Viner's conceptual framework for preferential free trade theory has been acknowledged. However, trade creation and trade diversion are insufficient to explain the change in a CU welfare.

Bhagwati (1971),  Lipse (1957) and Meade (1955) found that a CU could have a welfare gain, although it experienced trade diversion. If the new price faced by union consumers became cheaper than the pre-union price, it could lead to increased imports and the generation of a consumer surplus. The consumer benefit would be greater than the loss of tariff revenue, thus resulting in a welfare improvement for the trade-diverting CU.

Furthermore, a welfare change would result not only from a trade volume change but also from a price change. In the case of a large CU, Mundell (1964) stated that a CU's joint welfare could be positive, due to the improved terms of trade, even though the CU formation entailed trade diversion. However, the gain would be unequally distributed between the CU members. In the case of a small CU of

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[18] Viner illustrates trade diversion and trade creation through a model in which there are only three countries in the world. Two countries form a custom union and the third country represents for the remainder of the world.

two members, Panagariya (2000) demonstrated that a CU could cause a loss of tariff revenue for the member who diverted its imports from the rest of the world to its CU partner. Therefore, Panagariya (2000, p. 301) stated that "The more the country imports from the partner and the greater the magnitude of tariff preference, the more it loses". This assertion is based on two assumptions. Firstly, the country with the higher tariff continues to import goods from the rest of the world. Such goods were initially imported from the world. Secondly, the import price was determined by the rest of the world. If these assumptions were altered, the CU member could gain (Panagariya, 2000). If the CU partner were assumed to be the sole supplier of the imported commodity, the other CU member could gain, because it paid a lower imported price relative to the pre-CU price. Even if trade diversion occurs after CU formation, the smaller the gap between the world price and the new CU price: the lesser loss experienced by the CU member.

Panagariya's inconclusive assertion is challenged by many questions. A survey conducted by Robinson and Thierfelder (2002) shows that the welfare of most RTA members was improved and that trade creation outweighed trade diversion in most empirical studies. This survey included several studies on the static impact of North American Free Trade Agreements (NAFTA), the EU and MERCOSUR on RTA members.

## 3.1.2. Empirical studies on the impacts of AFTA on Vietnam

In an earlier study of Vietnam's accession into ASEAN, Fukase and Martin (2001) used the above mentioned theoretical framework and earlier data, and found AFTA had small economic impacts on Vietnam for two reasons. Firstly, Vietnam's access into the ASEAN market would not be improved remarkably, because Singapore accounted for a significant share of Vietnam's exports to ASEAN. However, Singapore already applied a very low tariff. Secondly, AFTA would create trade among members, but the trade creation was outweighed by the

trade diversion. This study did not give attention to the impacts of AFTA on Vietnam's rice trade with AFTA members.

Abbott, Bentzen and Tarp (2010) presented a different view on the impacts of AFTA on Vietnam's trade with ASEAN members. Through their review of trade statistics from 1986 to 2004, Abbott, Bentzen, and Tarp (2009) point out that Vietnam's exports to some ASEAN countries surged remarkably, two years after Vietnam's accession into ASEAN. Similarly, Toh Mun and Gayathri (2004) expressed positive views on the economic impacts of AFTA on Vietnam. These authors employed a GTAP model in order to study the economic impacts of AFTA on Vietnam. They provided positive results: Vietnam's total exports and imports increased by 4.5% and 7%, respectively; and Vietnam's welfare increased as a result of Vietnam's accession into AFTA. This gain came solely from the improved terms of trade.

### 3.1.3. Trade creation/diversion of AFTA

Trade creation and trade diversion are widely considered to be a key aspect of RTA analysis. In regards to AFTA, there exists an inconclusive debate on its trade creation and diversion. Employing an earlier GTAP database, Fukase and Martin (2001), Toh Mun and Gayathri (2004) anticipated that the formation of AFTA led to trade diversion. However, a study by Elliott and Ikemoto (2004) provided evidence in support of AFTA leading to trade creation, but the degree of trade creation was lower during the period 1993 to 1997, than in the preceding period 1988 to 1992[19]. Similarly, later studies by Korinek and Melatos (2009) supported intra-ASEAN trade creation in agriculture. One possible explanation for the differences among these studies is that trade flows among ASEAN members have increased and the trade patterns of ASEAN members, as a group, have changed from 1997 through to 2007 (Abbott et al., 2009). Table 3.1 presents further details of the studies on the impacts of regional trade agreements on ASEAN members. Apart from three studies mentioned above,

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[19] Due to rising competition for market share from China, South American and Eastern Europe.

either analysis of trade creation/diversion or Vietnam's participation into AFTA were not included in most of the other studies.

Table 3.1: Selected studies on the static analysis of AFTA on ASEAN members

| Authors | Model, data, results and discussion |
|---------|-------------------------------------|
| (Strutt et al., 2010) | **Research aim**:  To study the economic impact of RTAs on poverty reduction in ASEAN new members, i.e. Vietnam, Lao, Myanmar and Cambodia.<br><br>**Model**:  GTAP (modified closure)<br><br>**Data**: GTAP Database version 7 + household survey data from four countries of interest**.**<br><br>**Scenario**:  ASEAN members eliminate all intra-ASEAN tariffs.<br><br>**Results:**<br><br>- Tariff elimination would make a contribution to poverty reduction and bring about significant gains for new ASEAN members.<br><br>- Tariff removal would have minimal impacts on Vietnam's crop output and processed food.  The output of crop and processed food would increase by 0.7% and 0.3%, respectively. |

| | |
|---|---|
| (Korinek & Melatos, 2009) | **Research aim**: The impacts of AFTA on ASEAN's agricultural trade<br><br>**Model**: GRAVITY model. Dependent variable: bilateral trade flows. Explanatory variables: incomes, distance, culture and dummy variables (which represent past trade flow).<br><br>**Data**: A panel dataset comprised of annual bilateral data for 55 (3-digit SITC) products, including all agricultural products for the period 1981 to 2006.<br><br>**Scenario:** Six ASEAN members fully complete CEPT commitments from 2002 – 2004, while four new members partially complete their commitments.<br><br>**Results:** AFTA has contributed to agricultural trade among its members<br><br>Trade creation is significantly positive for AFTA members. |
| (Siah, Choong, & Yusop, 2009) | **Research aim**: Examine the contribution of AFTA on enhancing intra-trade among five ASEAN members, Thailand, Singapore, Indonesia, the Philippines and Malaysia.<br><br>**Model**: A modified gravity model is estimated within an autoregressive distributed lag (ARDL) framework.<br><br>**Data**: 1970 -2001<br><br>**Results:** The formation of AFTA is found to play an important and prevalent role in increasing intra-trade among five ASEAN members. However, such an increase in intra-trade might not benefit these five countries as a group, due to the occurrence of trade deflection. |

| | |
|---|---|
| (T. D. Nguyen & Ezaki, 2005) | **Research aim**: The impacts of regional economic integration on Vietnam's growth, poverty and income distribution. <br> **Model**:  GTAP (modified closure) <br> **Data**: GTAP DATABASE Version 6 <br> **Scenario**: Five ASEAN countries, i.e. Vietnam, Thailand, Malaysia, Indonesia and the Philippines, eliminate merchandise tariffs for each other. <br> **Results:** <br> - AFTA would bring about a positive welfare change for Vietnam. <br> - AFTA would contribute to an increase in household income and reduce poverty in Vietnam. <br> - AFTA would result in trade diversions because Vietnam's imports from ASEAN increases, while imports from non-ASEAN members declines. <br> - Vietnam's total imports and exports would increase by 3.15% and 1.73%, respectively. |
| (Elliott & Ikemoto, 2004) | **Research aim**:  Investigate the effect of AFTA and the 'anticipation' effect of AFTA on intra- and extra-regional trade flows for ASEAN (Indonesia, Thailand, Philippines, Malaysia and Singapore) <br><br> **Model**:  A Modified Gravity Model <br> **Data**:  **1982-1999** <br> **Results:** <br> - The formation of AFTA in 1993 did not immediately lead to a significant increase in intra-regional trade flows, at first. <br> - Although the trade flows were small at the beginning, they increased gradually. <br> - Trade creation was lower during the period 1993 to 1999, than the preceding period (1988–1992). One explanation for this lower trade creation is the rising competition for market share from China, South American and Western Europe. |

| (Urata & Kiyota, 2003) | **Research aim**: impact of an East Asia FTA on trade patterns in East Asia countries (including Japan, South Korea, China, and ASEAN countries)<br><br>**Model**: standard GTAP model<br><br>**Data**: GTAP database Version 5<br><br>**Scenario:** Remove trade barriers<br><br>**Results:**<br><br>- East Asia FTA brings about welfare gains for all members.<br>- There could be minor changes in comparative advantages for FTA members following FTA.<br>- Sectors in which members have comparative advantage are projected to expand. |
| --- | --- |

## 3.1.4. Impacts of regional rice trade liberalisation on ASEAN members

When it comes to the effect of regional rice trade liberalisation, recent attention has been focussed on the effects of rice trade liberalisation among ASEAN members on their rice price instability, especially following the food crisis in 2007/2008. This is partially because the use of trade controls to stabilise the domestic rice price has been responsible for price volatility on the world's rice market. The world price of rice in 2007/8 shows a higher volatility relative to that of wheat and corn, because share of the global rice trade volume in global rice production was rather small, namely 6%, compared to 23% (wheat) and 14% (corn) in 2002 (Cornish & Fernandez, 2005). This narrow feature of the world rice market is a result of several countries pursuing food self-sufficiency. In such a narrow market, Martin and Anderson (2012, p. 426) point out that  an increase in the world's rice price between 2006 and 2008 was partially due to changes in rice trade policies[20] of India and Vietnam. Specifically, these changes contributed 45% of the increase in the world rice price at that time. In order mitigate the impact of price volatility in the future, Martin and Anderson (2012, p. 426) call for a collective agreement among rice importers and exporters, on the extent to which a price-insulating policy will be employed.

In order to reduce rice price volatility, as a consequence of a shortfall in the world supply in the future, Clarete (2012) suggested an option in which ASEAN members remove intra-ASEAN tariffs on rice imports. The author supports his/her idea by simulating situations when India and China's output of rice is reduced by 10%. The results show that India or China's decline in rice output has negative impacts on Indonesia, Malaysia and the Philippines. Indonesia's market price for imports increases by 9.3% and the retail price increases by 0.9%, as a result of a 10% decrease in China's rice production. However, in the second scenario, in which Indonesia eliminates rice tariffs and India's rice production

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[20] Refer to the export restriction on rice that India and Vietnam put into place during the food crisis in 2007/2008

declines by 10%, the results show that the adverse impacts of a 10% output decline would be far offset by increased imports from Vietnam and Thailand. Beyond the effect of rice trade liberalisation on price stability, there is a lack of updated studies on the effects of AFTA on members' rice production and trade, rice self-sufficiency, and economic welfare.

## 3.2. ASEAN members' commitment to Uruguay Round Agreement

As mentioned in Chapter 2, selected countries' domestic support and trade policies for rice are contingent on their commitments to the Uruguay Round Agenda. Thus, an insight into these countries' URAA commitments can assist in further understanding the variation in these countries' policies for rice and their future rice trade policies. For this purpose, the remaining sections of this chapter review the selected countries' commitments to URAA agreements, with a focus on domestic support, market access and export subsidies. These countries' notifications to WTO are also briefly reviewed, followed by a brief summary of the Doha Agenda. In section 3.4, there is a review of the predicted impacts of global rice trade liberalisation on ASEAN member's rice trade and production. This section assists in comparing the results of global and regional rice trade, which is discussed later in the discussion chapter.

### 3.2.1. Domestic support polices

Domestic support policies are classified into three categories in an increasing order of trade distortion: Green Box, Blue Box and Amber Box. Green Box policies refer to the measures that have no or minimal trade distorting impacts, such as investment in agricultural services and direct payments, which are not linked to current production. Green Box measures also include income insurance, natural disaster relief, or environmental protection. WTO members are not required to reduce their expenditure on these measures. Similarly to Green Box measures, Blue Box measures refer to support that is not linked with price

support, including direct payments that are based on fixed hectares or yield. Blue Box direct payments differs from Green Box direct payments, where the former requires the recipients to maintain production.

Compared to Blue Box and Green Box measures, Amber Box measures are more likely to cause trade distortion. These measures include price support, government procurement and input subsidies. WTO member countries have to limit their Amber Box support to below the de minimus level. This level refers to 5% of domestic production value for developed countries and 10% of domestic production for developing countries, in the base year period from 1989-1998. Those countries that exceeded this level committed to reducing their total aggregate measures of support[21] (AMS). The reduction in government outlay for Amber Box measures varied according to each country's level of economic development. Developed countries were committed to reducing 20% of AMS within six years, while developing countries were committed to reducing 13% of AMS within 10 years.

According to Thailand's latest notification to the WTO, a majority of its government outlay on Amber Box support was allocated to rice. Expenditure on "other crops" declined, while support for rice remained rather stable (WTO, 2010c). India, the Philippines and Indonesia had AMSs lower than the de minimus level and thus, they could retain AMS (WTO, 2013a).

Most selected countries in this study notified the WTO that their outlay for Amber Box support was lower than the de minimus level. The situation in the Philippines, for example, was due to the government's rice procurement[22] accounting for a small percentage of production, namely 4% at that time. On accession to WTO in 2001, China agreed that the value of its trade-distorting Amber Box support for agriculture would not exceed 8.5 per cent of its total

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[21] Includes both specific product and non-specific product support and excludes the de minius level.
[22] A factor which was used to calculate AMS

value of agricultural output in the base year (2001), which was equivalent to $US 14 billion (Fang et al, 2002). In 2005 and 2006, according to China's notification to the WTO, Amber Box support for rice was negative because the minimum procurement price was lower than the reference price, which was based on the base period 1996-1998. Information about Vietnam's commitments is not publicly available.

While government expenditure on Amber Box support declined, that on Green Box measures tended to rise in several countries (see Table 3.2). Five out of six countries have a two digit annual growth rate in Green Box support. Indonesia has the highest annual growth rate, followed by South Korea, the Philippines and Thailand. China's data was not available at that time, because China entered the WTO after 2001. However, according to China's latest notification to the WTO, China shows an increasing trend in Green Box support, with an average annual growth rate of 24%, from 2005 to 2008 (WTO, 2011).

Table 3.2: Notification to WTO concerning Green Box supports by selected countries

| Countries | Currency | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Average annual growth rate (%) |
|---|---|---|---|---|---|---|---|---|---|
| Korea | W billion | 1,748 | 3,990 | 5,183 | 5,796 | 5,365 | 5,456 | | 48 |
| Indonesia | Rp billion | 853 | 401 | 450 | 618 | 1,310 | 1,613 | 8,875 | 4 |
| Japan | ¥ billion | 2,205 | 3,169 | 2,818 | 2,652 | 3,002 | 2,686 | | 4 |
| Malaysia | RM million | 870 | 611 | 754 | 665 | 495 | | | -13 |
| Thailand | Baht million | 25,258 | 33,716 | 41,145 | 47,596 | 42,827 | | | 11 |
| Philippines | Pesos million | - | 3,504 | 7,398 | 15,179 | 7,625 | | | 17 |

Source: (WTO, n.d)

## 3.2.2. Market access

Market access under URAA was intended to reduce tariffs and enhance market entry opportunities for agricultural products. In regards to tariff reduction, developed countries were committed to reducing their tariff by 36%, on average, with a minimum reduction of 15% per tariff line over six years. Developing countries committed to reducing their tariffs by 24%, on average, with a minimum reduction per tariff line of 10% over ten years. The least developed countries are exempt from tariff reductions. In order to ensure transparent and predictable trade policies, non-tariff trade barriers had to be converted into equivalent tariffs. However, if the conversion could lead to extremely high tariffs, then countries could adapt tariffication. Following tariffication, countries should comply with the following: an opening domestic market for a specific product to 5% of domestic consumption of that product by 2000 or 2004 (developing country members); the application of a tariff rate quota; or agreement not to introduce any new non-tariff trade barriers.

China, Thailand, Indonesia, the Philippines, South Korea, Japan, and Malaysia have applied for a tariff rate quota for rice. This quota can be managed in several ways. The most common observed in several Asian countries, such as Indonesia, China, Korea and the Philippines, is through state-trading enterprises for rice imports and exports.

Table 3.3: Summary of commitment to reduce AMS and management of rice import quota in selected countries

| Countries | AMS | Market access | | | | Export subsidies |
|---|---|---|---|---|---|---|
| | | Tariff rate quota | Special treatment | Special safeguard provision * | Intervention of state-trading enterprises in trade | |
| China | Value of its trade-distorting Amber Box support for agriculture would not exceed 8.5 per cent of its total value of agricultural output in the base year (2001) (China's de minimis exemption) | Applied quota = 5,320 mm tonnes

In quota tariff : 60%, Out quota tariff : 65% | Not applied | Applied | Export: COFCO is sole rice exporter

Imports: control 50% of import quota | No commitments |
| India | Subject to de minimus level | Not applied | Not applied | Not applied | Food Cooperation of India (FCI) solely import and export rice | |
| Thailand | Commit to reduce AMS by 13% by 2004 | Applied | Not Applied | | Public Warehouse Organization (PWO) does not manage rice exports but gets involved in rice exports in two forms: government to government contracts and direct negotiation | No commitments on export subsidies |

| The Philippines | Subject to de minimus level | Applied<br><br>Quota: 350,000 tonnes<br><br>In quota tariff: 40%<br><br>Out quota tariff 50% | Applied | | National Food Authority (NFA)<br><br>NFA has exclusive control on rice exports<br><br>Allocates in-quota imports to licenced importers. | Commitment not to subsidise exports |
|---|---|---|---|---|---|---|
| Malaysia | Subject to de minimus level | Not applied | Not applied | Not applied | Padiberas Nasional Berhad (BERNAS) has control on rice imports | |
| Vietnam | Not a WTO member until 1997 | | | | | |

*If a product is designated to be subjected to SSP, countries are allowed to take some temporary measures to mitigate the negative impacts of an import surge on domestic producers. Those measures and circumstances are defined by the WTO.

** Allows eligible countries to adopt tariff rate quota for rice, but they have to gradually increase market access for rice imports.

## 3.3. Doha Round Agenda

Following the URAA, a new round of negotiations on agricultural trade was launched in March 2000. Objectives and timetables for negotiations in agriculture and services were introduced in November 2001, as a part of a declaration of the WTO Fourth Ministerial Conference in Doha, Qatar. Next, in 2004, WTO members made further progress in launching a 'Framework' which was designed to focus the negotiations and raise them to a new level. However, despite several consequent WTO meetings, the deadline to conclude these negotiations was missed. Accordingly, minimal progress on rice trade polices has been made since 2001. However, it is noteworthy to mention that The Doha Round negotiations[23] made further steps in introducing sensitive products,

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[23] Special treatment provision and special safeguard provision Under URAA allows for several countries to exempt a number of sensitive products from their general tariff cut formula, due to the important role

special product and new special safeguard mechanisms. Rice is one of the products that is likely to be designated as a sensitive product, if the Doha negotiations are to be concluded.

## 3.4. Global rice trade liberalisation

While there are few studies on the effects of intra-ASEAN rice trade liberalisation on ASEAN members' rice prices, production, consumption and economic welfare, there are several studies on the impacts of multilateral trade liberalisation (i.e. the removal of all tariffs, export subsidies and domestic supports) on Vietnam and its ASEAN partners. These studies have predicted that, together, these policy reforms would result in increased global rice trade. This increase in rice trade volume would vary from 29% to 15% (Wailes & Carter, 2004). Future trade liberalisation would also raise the world trade-weighted export price by 10.6% (Food and Agricultural Policy Research Institute, 2002), 6% (Rosegrant & Meijer, 2007), or 5.52% (Dimaranan, Hertel, & Martin, 2007). If only tariffs were removed, the study by Food and Agricultural Policy Research Institute (FAPRI) (2002) found that global trade would increase by 27% and the world price of rice would increase by 10.3%. The study by FAPRI (2002) also showed that the results of a tariff removal scenario were approximately similar to the results of the scenarios of simultaneous removal of all tariffs, domestic support and export subsidies. Therefore, FAPRI (2002) concluded that tariff elimination would make a major contribution to an increase in global rice trade and export prices. This finding is consistent with the results of Wailes and Morat (2011). These authors showed that, if all countries removed their rice tariffs, global rice trade and the world exports would increase by 19.8% and 5.4%, respectively, while import prices would decrease by 19.2%.

When highlighting rice trade by type, according to Wailes and Morat (2011), the world export of medium grain rice would increase approximately twice that of

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of these products in food security and rural development. However, the criteria for sensitive products and treatment provision for sensitive products was not established in the URAA.

long grain rice. The world export price of medium grain rice would increase substantially by 61%, while that of long grain rice would increase modestly by 1.3%. The trade-weighted import price of medium long grain rice would fall by 62.1%, while that of long grain rice would fall by 15%. Such significant differences were mainly due to Japan and South Korea, the two key importers of medium rice, who eliminated their extremely high tariffs on imported rice.

As far as the impact of global rice trade liberalisation on Vietnam in concerned, a study by FAPRI (2002) found that, if all countries removed their rice tariffs, Vietnam's rice exports would increase by 26%, production would increase by 2% and consumption would decline by 2%. A recent study by Wailes and Morat (2011) predicted that, if all countries eliminated rice tariffs, the Vietnamese producer's price would increase by approximately 14%; the consumer's price would increase by approximately 11%; and the export price would increase by 11%. Vietnam's rice export quantity would increase by approximately 25% and most of this increased export would be destined to go to developing countries.

The above studies, which address the impact of trade liberalisation on the world and Vietnam's rice trade, show different results, in relation to the magnitude of these impacts on trade liberalisation, due to different models, data and disaggregation approaches being used (see Table 3.4). Some studies adopted CGE models with multi-regions and multi-commodities, such as the GTAP used by Dimaranan et al. (2007) and AGRM used by FAPRI (2002), whereas the study by Wailes and Carter (2004) and Wailes and Morat (2011) employed a partial equilibrium model, RICEFLOW. Compared to CGE models, which treat rice as a homogeneous commodity, the RICEFLOW model has an advantage in differentiating rice by types (short, medium and long grain) and processing levels (paddy, brown and milled). However, RICEFLOW features only rice and therefore, it fails to take into account the linkages between rice and other sectors, when trade liberalisation is simulated.

Table 3.4: Summary of selected studies on the impacts of future global trade liberalisation on global and Vietnam's rice trade

| Authors | Methodology, data and results |
|---------|-------------------------------|
| (Wailes & Morat, 2011) | **Model:** RICEFLOW<br>**Base year:** 2008<br>**Projection year:** 2008<br>**Scenario:** Remove rice tariffs worldwide.<br>**Effects on world rice trade:**<br>- Global exports of medium grain rice would increase by 46%, while that of long grain would increase about 23%.<br>- Trade-weighted export price of long grain would increase by 6.3%, while that of medium rice would increase by 1.3%.<br>- Trade-weighted import price of medium rice would fall by 62.1%, while that of long grain rice would decrease by 15%.<br>**Effects on Vietnam's rice trade**<br>- Production increase less than 1%.<br>- Consumption decline by 2.3-2.4%.<br>- Export increase approx.25% mostly to developing countries.<br>- Producer's price increase approx. 14%.<br>- Consumer's price increase approx.11%.<br>- Export price increase approx.11%. |
| (Anderson & Martin, 2005) | **Model:** LINKAGE<br>**Base year:** 2001<br>**Projection year:** 2015<br>**Scenario:** Potential outcome of Doha Round.<br>**Effects on world trade:**<br>- Trade volume**:** Export increase approx.28%, Import increase by 35%.<br>- Price: World export price would increase approx.?8.5%, Import price would increase approximately by13%.<br>**Effects on Vietnam:**<br>- **Trade volume** Export increase approximately by 18%, Import increase approx.?12%,<br>- **Price** Vietnam's export price decrease approximately by 1%. |

| | |
|---|---|
| (Rosegrant & Meijer, 2007) | **Model:** IMPACT<br>**Base year:** 2001<br>**Projection year:** 2015<br>**Scenario:** Full liberalisation (no price difference between domestic price and world price).<br>**Effects on the world's trade:** Export price would increase by 6%.<br>**Effects on Vietnam:** Not mentioned |
| (Wailes & Carter, 2004) | **Model:** AGRM[24]<br>**Base year:** 2002<br>**Projection year:** 2011<br>**Scenario:** Full liberalisation (removal of all domestic support and trade barriers).<br>**Effects on the world trade:**<br>- Trade volume would increase by 29%.<br>- Price would increase by 10.3%.<br>**Effects on Vietnam:**<br>- Exports would increase by 25%.<br>- Production would increase by 2%.<br>- Consumption would decline by 2%.<br><br>**Scenario:** Remove trade barriers only.<br>**Effects on world trade:**<br>- Trade volume would increase by 27%.<br>- Price would increase by 10.6%.<br>**Effects on Vietnam:**<br>- Exports would increase by 26%.<br>- Production would increase by 2%.<br>- Consumption would decline by 2%. |

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[24] This model comprises only temperate crops, many livestock products, poultry and dairy products, for more than 25 countries. Other sectors, such as textiles and food processing sectors are not included in this model.

| (Wailes & Carter, 2004) | **Model:** RICEFLOW  (Partial equilibrium model) <br> **Base year:**  2000 <br> **Scenario:**  Remove all border protection. <br> **Effects on  world trade:** <br> - Composite trade volume would increase by 15%. <br> - Export prices would increase 32.8 %. <br> - Import prices would decrease by 13.5%. <br> **Trade volume and prices by types:** <br> **Medium/short grain rice:** <br> - Trade volume would increase by 73%, while long grain rice would increase by 7 %. <br> - Export prices would increase by 91%. Import prices would reduce by 27%. <br> **Long grain rice** <br> - Export prices would rise marginally by 1.8 %. |
|---|---|
| (Wailes & Carter, 2004) | **Model:**  AGRM non-spatial dynamic econometric model <br> **Base year:**  2005 <br> **Projection year:**  2012 <br> **Scenario:**  Remove domestic support, tariffs and export subsidies. <br> **Effects on world trade:** <br> - World rice trade increase by 15%. Impact on prices resulting from removal of import tariffs. <br> - Changes in prices would mainly result from tariff removals. <br> - Long grain rice export prices would increase from 18% to 22%. |
| (Dimaranan et al., 2007) | **Model:**  GTAP <br> **Base year:**  1997 <br> **Projection year:**  2008 <br> **Scenario:** Remove all tariffs on agriculture, food, manufacturers, agricultural export subsidies, domestic support. <br> **Effects on world rice trade** <br> - Exports would increase by 21.59%. <br> - Export price would increase by 5.52%. <br> **Remarks:** <br> - Developing countries would mainly gain from developed countries' elimination of manufacturing tariffs. <br> - Regarding policy types, 84% of global welfare gains would come from tariff liberalisation. <br> - Regarding commodity types, agricultural and food commodities would contribute to more than half of global gains. |

Despite the different approaches used in these studies, several predicted that free trade would bring about more benefit than loss for Vietnam. Global trade liberalisation would result in Vietnam increasing its rice production, export quantities and price. Such impacts may hurt poor consumers, due to an increased price for rice. However, there are opinions put forward that an increase in the price of rice can help to reduce poverty, rather than increase the incidences of poverty in Vietnam, for some reasons (Heo & Doanh, 2009; Ivanic & Martin, 2008). Two of these reasons are a significant proportion of poor farmers depend on rice production for their livelihood ─ rice is one of Vietnam's key exportable agricultural goods, together with coffee and rubber. An approximate 20% of rice production, on average over the last decade, was exported. Therefore, rice trade liberalisation leads to an increase in the export price, thus contributing to the raising of rice farmers' income and reducing poverty.

To sum up, the literature review covers three main topics, which include: the impacts of global rice trade liberalisation on Vietnam and some ASEAN member, in regards to price, production, trade, poverty reduction and food security; the debate on the role of rice trade restriction for the purpose of self-sufficiency and price stabilisation; and the inconsistent results of studies on the trade creation and trade diversion of AFTA. The literature review highlights the need for research that can quantify the impacts of ASEAN tariff reforms on ASEAN members' agricultural prices, production, trade, self-sufficiency, and economic welfare; and especially on rice. This study, therefore, attempts to address this topic with a focus on exploring the additional benefits that ASEAN member countries would receive, if free rice trade among ASEAN members is put forward.

# Chapter Four  KEY FEATURES OF ASEAN FREE TRADE AGREEMENT

## 4.1. An overview of ASEAN free trade agreement (AFTA)

Malaysia, the Philippines, Singapore, Indonesia and Thailand, together, established the Association of Southeast Asian Nations (ASEAN) in 1967. In 1984, Brunei Darussalam joined ASEAN and became the sixth member. Together, they are known as the ASEAN six or 'old members'. Vietnam, Lao, Cambodia and Myanmar joined ASEAN between 1995 and 1999 and they are known as 'new members', or CMLV members. 1992 marked a deeper economic integration among ASEAN members when the ASEAN Free Trade Agreement, or AFTA, was formed. This agreement came into force in 1993. The formation of AFTA was followed by later agreements in services, the ASEAN Framework Agreement on Services (AFAS) in 1995; and the ASEAN Investment Area (AIA) agreement in 1998. These agreements reflected ASEAN members' objectives to promote intra-trade in goods, services and investment among member countries. Following AFTA, ASEAN reduced trade barriers, including tariffs and non-tariff measures, which had been subjected to the Common Effective Preferential Tariff Scheme (CEPT).

Initially, the CEPT Scheme included four lists: inclusion list, temporary exclusion list, sensitive list, and general exclusion list. Goods in the inclusion list were subject to tariff reduction, removal of quantitative restriction and other trade barriers since early 1993. Tariff reduction for goods in the temporary exclusion list was delayed until 2000 for old ASEAN members and 2003 for new members, but it was transferred into the inclusion list afterward. The sensitive list includes unprocessed agricultural goods, which were excluded from the tariff reduction scheme at first. However, in 1995, AFTA members amended the 1992 Agreement, and these goods were included in trade liberalisation. Old members were set to reduce tariffs on these goods by 2010, while new members had a

longer deadline, i.e. by 2013 – 2017. The general exclusion list comprises goods which are exempted from trade liberalisation for certain reasons, including national security, animal or plant life and health (Chia, 2013).

Table 4.1 shows comparisons in tariff reduction among ASEAN members, which have different deadlines for fulfilling their tariff commitments. The old members are set to complete their tariff reduction/elimination earlier than the new members. Indonesia, Malaysia, the Philippines and Thailand's zero tariff lines account for more than 98% of the total national tariff lines. Lao, Vietnam, Cambodia and Myanmar's 0% tariff lines account for a smaller share of the total national tariff lines, compared to the original members' 0% tariff lines. For example, it accounts for approximately two thirds of Vietnam's total tariff lines, compared to 99% of Thailand's total tariff lines. Vietnam still maintains a number of tariff lines above 40%, many of which are levied on motor vehicles and vehicle parts. Vietnam, the Philippines, Indonesia and Malaysia have less than 1% of total tariff lines designated into general exclusion lists. The other three countries do not have general exclusion lists in their schedule.

Table 4.1: A summary of ASEAN members' commitments on tariff reduction under CEPT

| Countries | Vietnam (by 2013) | | Philippines (by 2015) | | Indonesia (by 2015) | | Thailand (by 2012) | | Malaysia (by 2012) | | Cambodia (by 2015) | | Lao (by 2015) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % | Number | % |
| Total number of tariff lines included in the CEPT schedule, including | 8,300 | 100.00 | 9,819 | 100.00 | 10,012 | 100.00 | 9,558 | 100.00 | 12,329 | 100.00 | 7,914 | 100.00 | 9,558 | 100.00 |
| 0% | 5,954 | 71.73 | 9,684 | 98.63 | 9,899 | 98.87 | 9,544 | 99.85 | 12,174 | 98.74 | 3,209 | 40.55 | 8,509 | 89.02 |
| 1-5% | 2,111 | 25.43 | 90 | 0.92 | 2 | 0.02 | 14 | 0.15 | 60 | 0.49 | 4,572 | 57.77 | 962 | 10.06 |
| 5-10% | 8 | 0.10 | - | - | 5 | 0.05 | - | - | | - | 27 | 0.34 | | - |
| >10-20% | 9 | 0.11 | - | - | - | - | - | - | 13 | 0.11 | 33 | 0.42 | | - |
| >20-30% | - | - | - | - | 10 | 0.10 | - | - | - | - | 2 | 0.03 | | - |
| 30-40% | 2 | 0.02 | 19 | 0.19 | - | - | - | - | - | - | 71 | 0.90 | | - |
| Above 40% | 47 | 0.57 | - | - | - | - | - | - | - | - | | | | - |
| Unknown yet | 57 | 0.69 | - | - | - | - | - | - | - | - | | | 87 | 0.91 |
| General exclusion lists | 112 | 1.35 | 26 | 0.26 | 96 | 0.96 | - | - | 82 | 0.67 | | | | - |

Source: author's calculation from (Association of Southest Asian Nations, 2009)
Note: Singapore is not included because the majority of Singapore's tariffs are now at zero.

Tariff reduction for rice is different for each ASEAN country. Rice tariffs in Thailand, Lao, Cambodia and Vietnam are reduced to 0 - 5% between 2012 and 2015. However, rice tariffs in Malaysia, Indonesia, and the Philippines are exempt from preferential tariff reduction. The Philippines charges the highest tariff on rice imports from ASEAN members (50%), followed by Malaysia (40%) and Indonesia. According to the CEPT schedule, by 2015 the Philippines and Malaysia will reduce intra-ASEAN rice tariffs to 35% and 20%, respectively while Indonesia's rice tariff will be reduced to 30%. However, it is helpful to note that Indonesia's current tariff is much lower than 30%. This situation is because Indonesia employs specific tariffs (430-450 Rp/kg) on rice imports from all sources. When converted into ad valerom tariffs, they are lower than 30%. Consistently, Clarete (2012) found that, when converted into ad valorem rates, Indonesia's current tariffs vary from 9% to 11%. Therefore, Indonesia's reduced ad valorem tariffs on rice imports from ASEAN partners by 2015 under CEPT are actually higher than the current tariffs. In other words, Indonesia's rice tariff will remain unchanged in 2015.

# 4.2. Commitments to reduce rice tariffs in selected RTAs

Below is a summary of the current tariff and tariff cut commitments in the regional trade agreements (RTA) between ASEAN and each of the following countries: China, India, South Korea and Japan. Although this study primarily analyses the impacts of AFTA on the above mentioned research question (section 3.1.4), this summary is helpful for further understanding the current tariff and commitments to reducing tariffs on Vietnam's rice exports.

**ASEAN - New Zealand and Australia**[25]

Date of signature: 27/2/2009. Date of entry into force: 01/01/2010

Tariff cut schedule:  By 2020 all tariffs will be reduced to 0.

The tariff imposed on Vietnam's rice exports is already zero.

**ASEAN-China** [26]

Date of signature: 29/11/2004 (Goods) and 14/1/2007 (Services)

Date of entry into force: 01/01/2005 (G) and 01/07/2007 (S)

Tariff cut schedule: Tariff elimination commenced in January 2005 in accordance with schedules currently under negotiation.

Tariffs on several products belonging to Normal Track list will be eliminated by 2010 (6 founder countries) and by 2018 for Cambodia, Laos, Myanmar and Viet Nam (CLMV).

Rice falls into the exemption list, and thereby is exempt from liberalisation.

**ASEAN-Korea, Republic of**[27]

Date of signature: 24-08-2006 (G) and 24-11-2008 (S)

Date of entry into force: 01-01-2010 (G) and 01-05-2009 (S)

Tariff cut schedule: Tariffs on all products in the Normal Track will be eliminated by South Korea  no later than 1 January 2010.

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[25] Based on (MOFAT, 2009)
[26] Based on (WTO, 2006)
[27] Based on (WTO, 2009)

Rice falls into the highly sensitive list (Group E) which gives tariff lines exempt from tariff concessions.

**ASEAN-Japan**[28]

Date of signature: 26-03-2008. Date of entry into force: 01-12-2008

Tariff cut schedule: Schedule of tariff elimination corresponds to different categories, i.e A, B5, B7, B10, B15, C and R. Rice fall into the R category which is the exclusion list.

**ASEAN-India** [29]

Date of signature: 13/08/2009

Date of entry into force: 01/6/2010 (For Vietnam and India)

Tariff cut schedule: ASEAN-India Free Trade Area would be realized with Vietnam by 2018

Rice is exempt from liberalization.


In summary, rice is excluded from tariff elimination in four out of six RTAs in which Vietnam participates. National food security is usually a rationale for that exclusion (detailed discussion in chapter two). ASEAN – New Zealand and Australia FTA are the only ones that allow a zero tariff on Vietnam's rice. However, Vietnam's rice exports to these two markets are very small. AFTA is another agreement under which tariffs on rice will be reduced by 2015, but there will be only a small reduction in tariffs and no changes in quantitative restrictions on rice imports under AFTA. In this Scenario, how might these small tariff reductions affect Vietnam's rice industry? What are the impacts in the event of deeper rice tariff reductions by ASEAN partners to 0%? These questions have been unanswered as yet.

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[28] Based on (WTO, 2009)
[29] Based on (WTO, 2010b)

Table 4.2: Tariff rate quota in selected countries*

| Countries | Tariff rate quota | | | Tariff concession in FTA |
|---|---|---|---|---|
| | In quota tariff | Out quota tariff | Quota (m tonnes) | |
| **China** | 0% | 65% | 5 320 000 | No concession |
| **The Philippines** | 40% | 50% | 350 | 35% |
| **Japan[30]** | 0% | ¥375/ kg | 682 | No concession |
| **Korea, Republic of** | 5% | no provision for imports above the quota | 408 by 2014 | No concession |
| **Vietnam** | 0%[31] | 5%[32] | 300[33] | 5% |
| **India** | | | | No concession |
| **Malaysia** | | | | 20% |

Note: * average applied tariff on rice (HS code 1006)

India, Malaysia and Indonesia do not adopt TRQ. India's tariff is 80%，
Malaysia's tariff is 35% and Indonesia's tariff is 450Rp/kg.

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[30] In addition to tariff, Japan also levy a mark-up of Yen 292/kg
[31] Applied to rice from Cambodia
[32] Applied to white rice either semi milled, wholly milled or polished
[33] Allocated to Cambodia only

# 4.3. Composition of Vietnam's exports

Table 4.3 shows the composition of Vietnam's total exports in 1997 and 2007. The key exports in 2007 were extraction, including crude oil (20%), textiles (30%) and equipment (9%). Compared to 1997, the share of agricultural and food processing goods declined, while extraction, textile and manufacturing increased. Nevertheless, agricultural and food products continuously accounted for 19% of total exports in Vietnam, as opposed to 12% in Indonesia and 7% in Malaysia. In regards to manufacturing exports, Vietnam highly specialises in just a few goods and exports labour intensive goods, i.e. textiles and clothing, which account for the largest share.

Table 4.3: Composition of Vietnam's exports in 1997 and 2007

| Goods | 1997 | | 2007 | |
|---|---|---|---|---|
| | Value (US$ Million) | Share (%) | Value (US$ Million) | Share (%) |
| **Manufacturing goods** | **6508** | **74.56** | **39182** | **80.66** |
| Textiles & clothing | 3262 | 37.37 | 14352 | 29.55 |
| Extraction | 1694 | 19.41 | 9585 | 19.73 |
| Equipment | 803 | 9.20 | 6392 | 13.16 |
| Paper | 389 | 4.46 | 3332 | 6.86 |
| Petroleum and chemical products | 270 | 3.09 | 3326 | 6.85 |
| Metal products | 38 | 0.44 | 779 | 1.60 |
| Motor and transportation | 15 | 0.17 | 763 | 1.57 |
| Metal | 37 | 0.42 | 653 | 1.34 |
| **Agricultural goods** | **2221** | **25.44** | **9393** | **19.34** |
| Other food products | 754 | 8.64 | 4279 | 8.81 |
| Other crops | 762 | 8.73 | 2342 | 4.82 |
| Processed rice | 426 | 4.88 | 1405 | 2.89 |
| Veg and fruit | 66 | 0.76 | 791 | 1.63 |
| Other agricultural and food products | 213 | 2.44 | 576 | 1.19 |
| **Total** | **8729** | **100** | **48575** | **100** |

Source: (GTAP Data Base, Version 8)

## 4.4. Vietnam's exports to ASEAN market

The ASEAN market, which accounted for 15% of Vietnam's exports in 2007, was one of Vietnam's key exporting markets after the US and EU. Agricultural and food processing exports had continuously accounted for a large proportion of Vietnam's exports to the ASEAN market ─ although this share declined from 35% in 1997 to 20% in 2007 (see Table 4.4). This decline was due to an increased share of manufacturing exports. In terms of export value, agricultural and food processing exports to ASEAN increased threefold, from $US 449 million to $US 1513 million over ten years. Processed rice and 'other food products' including food processing products, were Vietnam's key exports to ASEAN members. Specifically, approximately two thirds of Vietnam's processed rice exports were sold to ASEAN partners in 2007. Among Vietnam's exports of agricultural and food products to ASEAN markets, processed rice also had the highest export value, namely $US 147 million in 1997 and $US 949 million in 2007.

Table 4.4 Composition of Vietnam's exports to ASEAN members in 1997 and 2007

| Goods | 1997 | | 2007 | |
|---|---|---|---|---|
| | Value (US$ Million) | Share | Value (US$ Million) | Share |
| **Manufacturing goods** | **843** | **65.40** | **5,866** | **79.50** |
| Extraction | 322 | 24.98 | 2,772 | 37.57 |
| Petroleum and chemical products | 40 | 3.10 | 967 | 13.10 |
| Equipment | 364 | 28.24 | 958 | 12.98 |
| Textiles and clothing | 70 | 5.43 | 385 | 5.22 |
| Metal | 22 | 1.71 | 338 | 4.58 |
| Other manufacturing goods | 25 | 1.94 | 446 | 6.04 |
| **Agricultural goods** | **446** | **34.60** | **1,513** | **20.50** |
| Processed rice | 176 | 13.65 | 949 | 12.86 |
| Other food products | 54 | 4.19 | 264 | 3.58 |
| Other crops | 131 | 10.16 | 162 | 2.20 |
| Other agricultural and food products | 85 | 6.59 | 138 | 1.87 |
| **Total** | **1289** | **100** | **7379** | **100** |

Source:  (GTAP Data Base, Version 8)

# 4.5. Composition of Vietnam's total imports

There were not any significant changes in the composition of Vietnam's imports between 1997 and 2007 (see Table 4.5 ). Over 90% of total imports are intermediate inputs (chemicals, plastic, fertiliser, leather and textiles) and capital goods (transport equipment and machinery). The share of manufacturing and agricultural and food products increased slightly in 2007, while textile, leather and weather apparel declined.

Table 4.5: Composition of Vietnam's total imports in 1997 and 2007

| Goods | 1997 | | 2007 | |
|---|---|---|---|---|
| | Value (US$ Million) | Share | Value (US$ Million) | Share |
| **Manufacturing goods** | **9,187** | **93.13** | **48,864** | **90.72** |
| Petroleum & chemical products | 2,625 | 26.61 | 15,548 | 28.87 |
| Equipment | 3,059 | 31.01 | 12,923 | 23.99 |
| Metal | 615 | 6.23 | 6,930 | 12.87 |
| Textiles and clothing | 1,634 | 16.56 | 6,384 | 11.85 |
| Motor & transportation | 584 | 5.92 | 3,721 | 6.91 |
| Other manufacturing goods | 670 | 6.79 | 3,358 | 6.23 |
| **Agricultural goods** | **678** | **6.87** | **4,999** | **9.28** |
| Vegetable oil | 64 | 0.65 | 1,150 | 2.14 |
| Other food products | 228 | 2.31 | 962 | 1.79 |
| Other agricultural and food products | 386 | 4 | 2,887 | 5 |
| **Total** | **9865** | **100** | **53863** | **100** |

Source: (GTAP Data Base, Version 8)

# 4.6. Vietnam's imports from ASEAN

ASEAN suppliers accounted for 23% of Vietnam's total imports in 2007. Table 4.6 shows that the composition of Vietnam's imports from ASEAN members remained unchanged between 1997 and 2007. Heavy manufacturing products accounted for the bulk share, while agricultural and food processing products accounted for less than 10% of the composite imports from ASEAN. Further

examination into the absolute value of agricultural imports from ASEAN partners shows that Vietnam increased its imports of vegetable oil, processed food, beverage and tobacco. Vietnam's imports of processed rice from ASEAN partners accounted for just 0.15% of Vietnam's agricultural and food imports from ASEAN, although its value increased remarkably from zero in 1997 to $US 2 billion in 2007.

Table 4.6 Composition of Vietnam's imports from ASEAN

| Goods | 1997 | | 2007 | |
|---|---|---|---|---|
| | Value (US$ million) | Share (%) | Value (US$ million) | Share (%) |
| **Manufacturing goods** | **2242** | **89.82** | **10354** | **83.53** |
| Petroleum and chemical products | 920 | 36.86 | 5495 | 44.33 |
| Equipment | 780 | 31.25 | 2379 | 19.19 |
| Metal | 86 | 3.45 | 1184 | 9.55 |
| Paper | 95 | 3.81 | 760 | 6.13 |
| Textiles and clothing | 123 | 4.93 | 536 | 4.32 |
| Other manufacturing goods | 238 | 9.54 | 0 | 0 |
| **Agricultural goods** | **254** | **10.18** | **845** | **6.82** |
| Vegetable oil | 38 | 1.52 | 387 | 3.12 |
| Other food products | 37 | 1.48 | 338 | 2.73 |
| Beverage & tobacco | 148 | 5.93 | 120 | 0.97 |
| Other agricultural and food products | 0 | 0.00 | 0 | 0.00 |
| Total | **2496** | **100** | **11199** | **90.35** |

Source: (GTAP Data Base, Version 8)

# Chapter Five METHODOLOGY, ASSUMPTION AND DATA

## 5.1. Methodology

### 5.1.1. GTAP Model

This study employs the GTAP model (Global Trade Analysis Project), which is a computable general equilibrium model with multi-regions and commodities (Hertel, 1997) . The model is solved using GEMPACK (Harrison & Pearson, 1996). Each region features four agents: producer, private household, government and a regional household. Connections among these agents within a region and also with the rest of the world are illustrated in Figure 5.1.
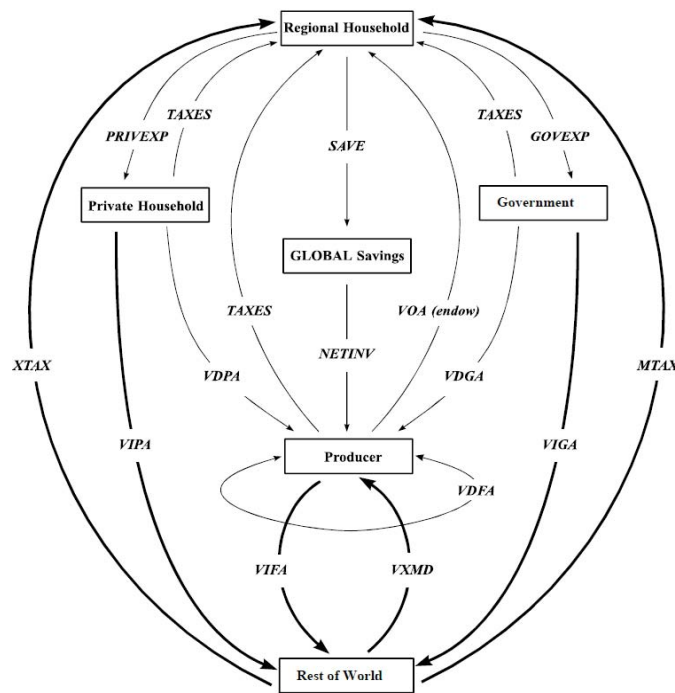


Figure 5.1 : Interaction among economic agents in GTAP model. Adapted from Brockmeier (2001, p. 16)

**Regional household income and allocation of income**

The regional household receives income from endowment returns (VOA) and tax revenues (TAXES). The entire income is allocated to private household expenditure, government expenditure and savings. In the default GTAP model,

each category receives a fixed share of the regional income. The ratio of savings to the regional income is assumed to be exogenous and constant. Therefore, quantities of savings increase as regional income increases — these savings contribute to a savings pool. This savings pool can then be invested into each region in two ways. Firstly, investment into each region increases proportionally in relation to the global pool. Secondly, investment into each region is based on that region's relative rates of return. The regions that have a higher rate of return, relative to the global average, will have an increased share of the savings pool — and vice versa. The ways in which the government and households use their budget is described in the following section.

**Government and household expenditure**

There is a difference between government and private household allocation of expenditure. Government expenditure is governed by the Cobb Douglas utility function, which states that each commodity used by government occupies a fixed share. Meanwhile, private household expenditure is governed by a constant difference of elasticity (CDE) function. This function allows the budget share for each commodity to change when its relative price changes.

**Firms in the GTAP model**

Each producer in the model receives payments from selling goods to domestic and foreign agents. This research employs a constant return to scale production function for all firms. This implies a change in production output results in the same proportionate change as in the demand for all intermediate inputs and aggregate primary inputs (see Figure 5.2). Primary inputs and intermediate inputs are modelled as two independent bundles. So substitution between primary and intermediate bundles is equal to zero in the standard model. Therefore, a firm's choice of aggregate primary inputs is not influenced by intermediate input prices and vice versa. A firm's choice of intermediate inputs is subject to a Leontief production structure (fixed share). A firm sources intermediate inputs from both domestic and foreign markets under a minimum cost condition. Domestically produced goods can be substituted by imported goods. For example, imported

paddy rice used for processed rice production can be substituted with domestically produced paddy rice. This substitution allows a firm to choose an optimal mix of domestically produced and imported paddy rice.

A firm's choice of primary inputs (i.e. land, natural resources, capital, unskilled labour and skilled labour) varies with relative prices of primary inputs. For example, if the unskilled labour wage increases, producers can reduce their costs by reducing the unskilled labour input and increasing, for example, capital input. This substitution subjects to a constant elasticity of substitution (CES).

Industry output of commodity i in region r

Leontief

Value added in industry j of region r
region r

Demand for commodity i for use by j in region r

CES

CES

Land markets    Labour    Capital    Domestic market    Foreign
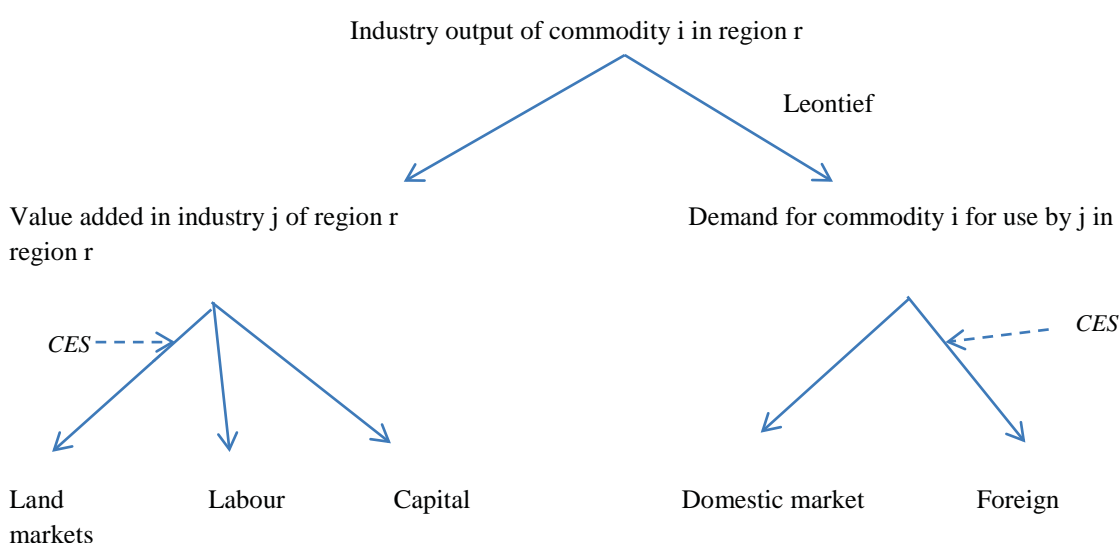
Figure 5.2: Source of a producer's inputs

**Trade flow and Armington elasticity in GTAP model**

The model employs the Armington assumption that goods traded internationally are differentiated by origin. To the extent that country may specializes in a certain type of rice, GTAP model takes into account since it differentiates rice by origin. Figure 5.3 describes how a regional agent makes decision when choosing goods. Tariff reductions among RTA members are a good example, which can explain this figure. This tariff reduction results in a fall in the import price (CIF price) charged by RTA partners, thus causing a private household, for example, to alter its sourcing away from non-RTA partners in favour of RTA partners. The magnitude of alteration depends on the Armington elasticity of substitution

parameter (CES 2) and the fall in CIF prices. After deciding the sourcing for imported goods, the firms decide an optimum bundle of imported and domestically produced goods. Again, another Amington elasticity of substitution parameter (CES 1) and relative prices determine the magnitude of the shifting away from domestic goods in favour of imported goods, or vice versa.
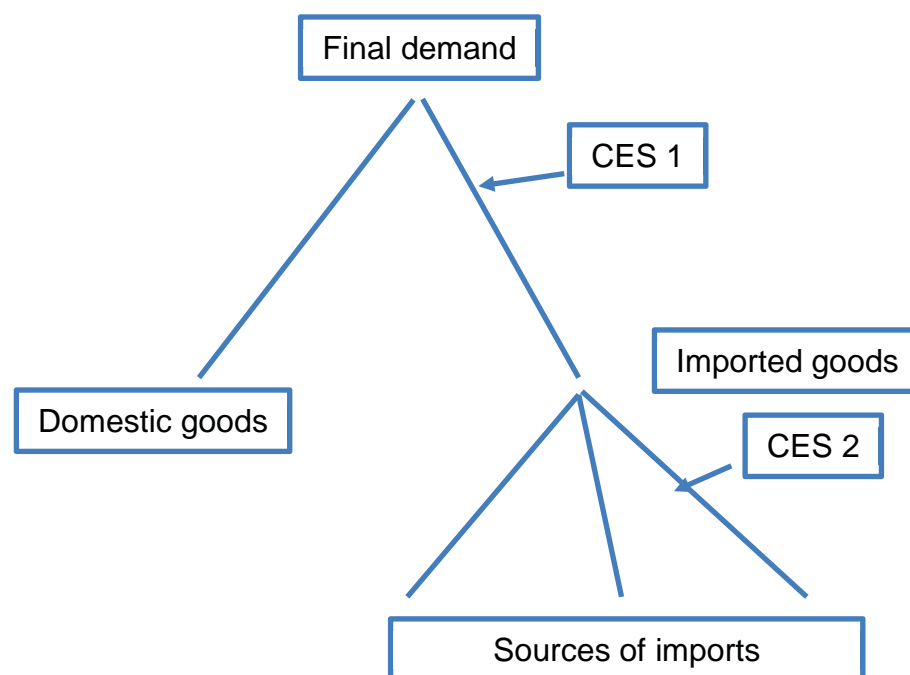


Figure 5.3: Firms and private households' decision on sourcing goods

As described above, Armington elasticity of substitution parameters, i.e. CES 1 and CES 2, are crucial for computing changes in the sourcing of imports. This change, in turn, may lead to a trade diversion/trade creation affect and changes in terms of trade. If CES 2 is large, they elaborate the switch in sourcing away from non-RTA members' goods in favour of RTA members' goods.  On the contrary, if CES 2 is small, it could dampen the effects of a large fall in the import price from RTA partners following the tariff reforms and then there would not be a significant switch in sourcing away from non-RTA members in favour of RTA members. A similar situation occurs for the substitution between domestic goods and imported goods.

## 5.1.2. Model assumptions

This research applies the standard GTAP closure. Some key features of this standard closure are listed as follows:

- The fixed (exogenous) variables include: population, supply of primary factors and technical change variables.

- Labour and capital are modelled as mobile factors across sectors. This means they can be freely migrated across sectors at zero cost, following a shock. In contrast to labour and capital, land and natural resources are modelled as sluggish factors. Therefore, land used for paddy rice production, for example, can be converted sluggishly into pasture and vice versa. Land is employed by agricultural sectors only. Similarly, a natural resource is employed by extractive sectors only.

- A firm production function is subject to constant return to scale. The model allows substitution among primary factors, i.e. land, labour and capital, in response to relative price changes. In the GTAP standard closure, the substitution parameter among aggregate primary and intermediate inputs equals to 0, due to lack of data. Similarly, the standard model does not allow substitutions among intermediate inputs and therefore a proportion of each intermediate input to the total cost intermediate inputs are fixed.

- Firms earn zero profit and operate under perfectly competitive market conditions.

## 5.1.3. Why is GTAP employed in this research?

The GTAP model is employed in this study for four reasons. Firstly, GTAP is a general equilibrium model with an advantage over partial equilibrium in two ways. The former can model the mobility of endowment resources, capital, labour and land among regional sectors, thus allowing the interaction among regional sectors, following a shock, to be examined. Secondly, although the GTAP database does not differentiate rice by type (long, short/medium grain), or

level of process (paddy, brown and white rice), GTAP can differentiate rice by origin of production, thus enabling bilateral trade flows to be modelled. To a limited extent, this also captures product differentiation. Thirdly, this model can measure the economic benefits of tariff reductions through computing welfare changes. In addition, GTAP decomposes welfare changes into several components, including those due to changes in terms of trade, resource allocation and technological change. This enables researchers to examine the sources of welfare gain after a tariff reduction has been applied. Fourthly, the GTAP model is one of the most sophisticated models that can be easily accessible. The model runs an approachable and ready-made database, which is updated to a 2007 benchmark for all regions worldwide. In addition, the model and data users can easily receive technical support from the providers; and gain access to technical papers and previous CGE-based research available on the GTAP website. Thus, the resources available can assist particularly beginning modellers in employing the techniques for their own purposes.

Despite its advantages, GTAP has some limitations. Firstly, the standard GTAP model is a static one, which is unable to produce the time-path of trade liberalisation implication and effects. The results from a GTAP model are usually interpreted as medium-term effects, following implementation of tariff cut commitments. Secondly, the results from GTAP may be sensitive to the model's assumptions. The common assumptions are perfectly competitive markets, full employment and constant returns to scale. For example, a study by Nguyen, Tran Kim, Madanmohan and John (2005) found that the impacts that trade liberalisation has on Vietnam are significantly different, when assumptions about Vietnam's labour market are changed. Nguyen et al. (2005) concluded that model structure choice is vital to how trade liberalisation impacts are seen. Nevertheless, changing the GTAP model structure was beyond the scope of the current research.

Thirdly, it is agreed that the impacts of tariff reform are sensitive to the choice of substitution elasticities. Armington elasticity of substitution parameters are very important for this research. They influence imports and therefore they determine economic welfare gain effects. The results from GTAP may have a bias, because GTAP uses identical Armington parameters for every region. Therefore, in order to be able to have more reliable results, Hertel (2010) suggests the GTAP users should consider how the results will change (when Armington elasticity of substitutions parameters changes), by conducting a sensitivity analysis. Nevertheless, given that the aim is to gain a deeper understanding of the directional impacts of RTAs, rather than to numerically measure the impacts in absolute terms, the sensitivity test goes beyond the scope of this study.

In spite of the limitations, GTAP is the most sophisticated trade analysis model publicly available to researchers. GTAP is also a well-known tool used for liberalised trade studies, because it incorporates trade flows of many commodities across all regions in the world. In addition, the model is supported by an extensive and accessible database. Therefore, this model is applied in this research.

## 5.2. Data

### 5.2.1. Data aggregation

This research employs the latest GTAP database Version 8. This database contains a wide range of data for 129 regions and 57 commodities, including bilateral trade flows, protection and transport data. This database also includes input-output data that characterise the connections among sectors within regions, thus allowing a study of intra-industry trade and mutual affects among sectors following tariff reforms.  The latest data available for all countries is for the year 2007.

The GTAP database provides data for 58 commodities and 129 regions. Since this study uses a limited GEMPACK licence, it was unable to study beyond 30 aggregated commodities. Thus, 59 commodities and 129 regions are aggregated into 30 commodities and 19 regions. Due to the focus of this research on ASEAN agricultural trade, 23 agricultural and food commodities out of these 59 commodities remain almost unchanged, with the aim to examine the linkage among these sectors, following the tariff reforms. 35 remaining manufacturing goods are aggregated into seven goods, including one primary good, i.e. crude oil nested in 'extraction goods'. Extraction, equipment and textile goods are key contributors to Vietnam's exports, while chemical and petroleum products are Vietnam's key imports. See Appendix 2 for details of this commodity aggregation.

ASEAN countries in this research refer to Vietnam, Indonesia, the Philippines, Thailand, Singapore, Malaysia, Lao and Cambodia. The remaining ASEAN members, i.e. Myanmar and Brunei are excluded from the simulation and analysis. This exclusion is due to the GTAP database aggregating those two countries into one region named 'other ASEAN' member. Such aggregation makes it difficult to know the extent to which this aggregated region would reduce its intra-ASEAN tariffs, due to lack of required data.

Under CEPT, each country's timeline for tariff cut/elimination varies. The ASEAN founders, except Singapore, are to fulfil their tariff cut commitments by 2012. Singapore differs from the other members, because the majority of Singapore's tariffs are already at zero.  New members have a longer time than older members to reduce/eliminate tariffs. For simplicity, this research assumes that all ASEAN countries will fulfil their commitments on tariff reduction by the same year, i.e. 2015.

# 5.2.2. ASEAN members' tariffs

There are some noteworthy points in regard to tariff data in the GTAP database, which is of importance for this research. One individual tariff out of a GTAP region's tariff set is derived from a trade-weighted aggregation of a bundle of ad volerem equivalent tariff lines. This weight is based on the weight of the reference group of the region in concern. Specifically, this weight is computed through the use of the reference group trade flows, rather than bilateral trade flows. The reference group refers to the group of countries that share similarity with the importer, in terms of trade openness and GDP per capita (PPP). Computation of this weight is subjected to the following equation:

$$Weight_{i,partner,reporter} = M_{i,partner,RefGrp\,(reporter)} \frac{M_{.,.,reporter}}{M_{.,.,RefGrp\,(reporter)}}$$

$Weight_{i,partner,reporter}$ : refers to the value of product i (defined at the HS6 level) imported by country 'reporter' from country 'partner'.

$M_{i,partner,RefGrp(reporter)}$ : refers to product i import value of the reference group to which the country reporter belongs

$M_{.,.,reporter}$ : refers to the total value of reporter's imports.

$\frac{M_{.,.,reporter}}{M_{.,.,RefGrp\,(reporter)}}$ : implies the share of total imports from the reporter out of the total imports of its reference group.

It is also important to note that a tariff in the CEPT schedule (shown in Table 4.1 in section 4.1) differs from a GTAP tariff that the former is just a single tariff line at national levels (HS8 or HS10 level). Whereas, the latter is a result of trade weighted aggregation of a bundle of tariff lines at HS6 levels. For example, 'grains' tariff in the GTAP database is aggregated from HS6 tariffs on maize, barley, rye, oats and other cereals. For further details about tariff aggregation methods, see Bouët, Decreux, Fontagné, Jean and Laborde (2008) .

Figure 5.4  shows that ASEAN members' intra-ASEAN tariffs on agricultural and food products are low, with zero tariffs accounting for 50%, except for Thailand. Thailand has a greater number of non-zero tariffs on agricultural and food products than the remaining ASEAN members. Malaysia differs from the remaining ASEAN members that it has the largest proportion of zero tariffs, and the highest peak tariff (137.85% on imports of "other crops", including non-manufactured tobacco and tobacco refuse from the Philippines). Tariffs charged by Vietnam have a wider range in comparison to those of Thailand, the Philippines, Cambodia and Lao. Vietnam's peak tariff is imposed on the aggregated tobacco and beverage commodity, which is exempt from trade liberalisation.
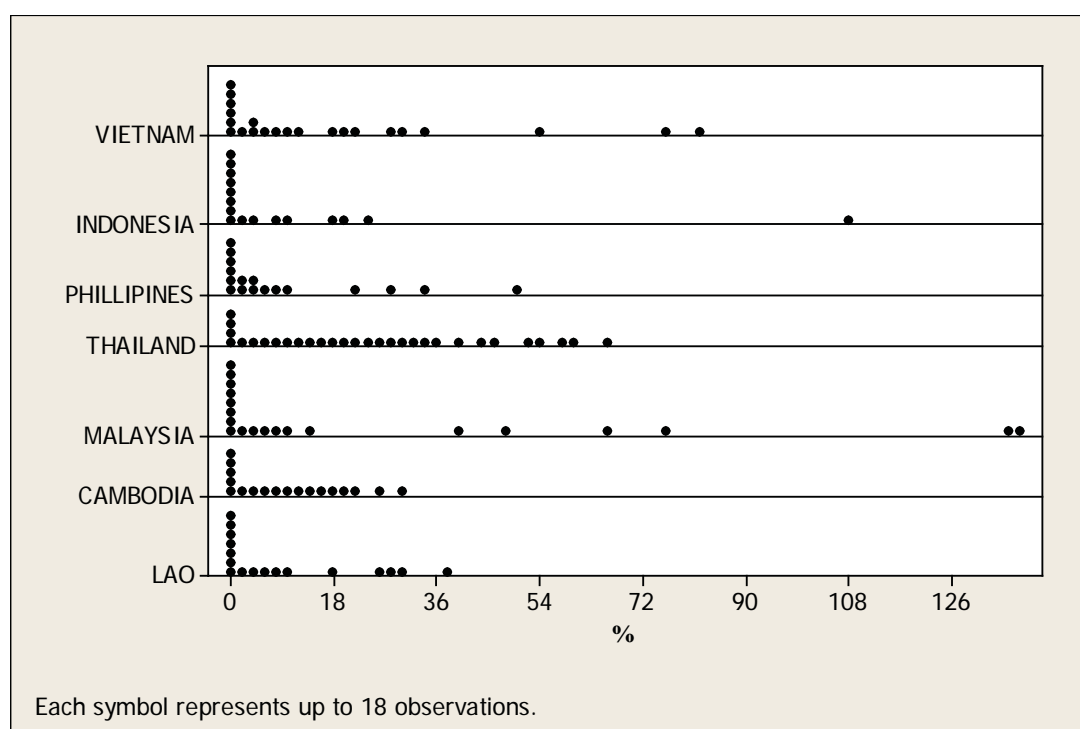


Figure 5.4: Comparison of intra-ASEAN tariffs on agricultural and food products among ASEAN members  (Source:(GTAP Data Base, Version 8))

There are a few possible explanations for the low agricultural tariffs among ASEAN members. They could be a result of gradual tariff reduction in accordance with the CEPT schedule. However, this is not the case for some goods that show a nil initial trade flow.  The case of Vietnam's paddy rice is an example of this situation. Vietnam did not export paddy rice to ASEAN members

in 2007, so there was a nil trade flow of paddy rice between Vietnam and its ASEAN partners. Hence, these partners' tariffs on paddy rice imports from Vietnam are 0%, which appears to be ambiguous free trade. In reality, Vietnam's export of paddy rice to Malaysia, for example, could be subject to a tariff of 40%. This situation occurs because the computation of GTAP tariffs employs a trade-weighted average method, as mentioned above. This example illustrates that the aggregation method fails to take into accounts the problem arising from nil trade flows that are possibly due to prohibitive tariffs. Hence, in the absence of such prohibitive tariffs, the model could underestimate the impacts of the tariff reforms on trade, production and the other relevant variables. Similar examples of this problem include the wheat, wool and raw milk tariffs of all ASEAN members.

## 5.2.3. ASEAN members' tariffs on Vietnamese rice

Table 5.1: Proportion of Vietnam's processed rice exports to ASEAN markets by level of tariffs

| Countries | Exports | | Tariffs (%) | |
|---|---|---|---|---|
| | Value (US$ Million) | Share (%) | Base data | To be reduced by 2015 under AFTA |
| Indonesia | 435.43 | 30.22 | 8.04 | No change |
| Philippines | 430.11 | 29.85 | 50 | 35 |
| Malaysia | 67.53 | 4.69 | 40 | 20 |
| Singapore | 17.86 | 1.24 | 0 | 0 |
| Lao | 0.23 | 0.02 | 5 | 5 |
| Thailand | 0.21 | 0.01 | 8.99 | 0 |
| Cambodia | 0.1 | 0.01 | 6.21 | 5 |
| SSA | 187.45 | 13.01 | 9.92 | - |
| Other countries | 301.80 | 20.95 | - | - |
| Total | **1440.72** | **100.00** | | |

Source: (GTAP Data Base, Version 8)

Table 5.1 shows that Indonesia, the Philippines and Malaysia are Vietnam's largest rice importing partners, with the two first partners accounting for 60% of Vietnam's rice exports. Compared with the remaining ASEAN partners, the

Philippines charge the highest tariff of 50%, followed by Malaysia (40%) and Indonesia (8.04%). According to the CEPT schedule, by 2015 the Philippines will reduce its intra-ASEAN rice tariffs to 35%, while Indonesia's rice tariff will remain unchanged by 2015 (as mentioned in section 4.1). Therefore, no shock was applied to Indonesia's rice tariffs when modeling AFTA.

## 5.3. Scenario designs[34]

Scenario designs are based on the following research questions:

1. What will be the impacts of AFTA agricultural tariff reductions on the rice sectors in Vietnam and ASEAN members, in terms of production, private household consumption, exports and imports and rice self-sufficiency?

2. What will be the impacts of AFTA manufacturing tariff reductions on the rice sectors in Vietnam and ASEAN members, in terms of production, private household consumption, exports and imports and rice self-sufficiency?

3. Under CEPT commitments, the Philippines, Malaysia are to reduce their rice tariffs to the agreed levels by 2015, but will not eliminate their rice tariffs. To what extent will this rice tariff reduction increase Vietnam's rice production and rice exports? Would rice tariff elimination further enhance or reduce each member's welfare? What could be the hurdles against ASEAN members further reducing their rice tariffs to 0%?

4. Will AFTA result in trade creation or trade diversion, when all members complete their tariff reduction commitments, as stated in the CEPT schedule?

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[34] Following the rice price crisis in 2007, there exists a debate on the role of rice trade liberalization to preventing price volatility in the future. Some studies pointed out that rice trade policy of major rice players were significant factors behind the rice crisis in 2007/2008. There is a suggestion for further trade reforms to avoid a similar crisis in the future. The suggestions however have not yet been evaluated through empirical research. However, this topic is beyond the scope of this current study.

5. Will Vietnam gain or loss from AFTA? From where does the gain/loss arise?

**Four scenarios are designed to answer these five questions stated above:**

Baseline scenario: 2007 data

Scenario 1 (agricultural tariff reduction): ASEAN member countries reduce intra-ASEAN tariffs on agricultural and food products to their 2015 levels, with the exception of rice.

Scenario 2 (manufacturing tariff reduction): Intra-ASEAN tariffs on manufacturing goods are reduced to their 2015 levels.

Scenario 3 (partial rice trade liberalisation): Intra-ASEAN tariffs on paddy rice and processed rice are reduced to their 2015 levels.

Scenario 4 (complete rice trade liberalisation): Intra-ASEAN tariffs on paddy rice and processed rice are reduced from 2015 levels to 0%.

In this study, the results of each scenario serve as a base for the subsequent scenario. In other words, the result is incremental to the previous scenario's results. This approach has two advantages. Firstly, it enables a separate examination of the impacts of agricultural and manufacturing trade liberalisation on the rice industry. This approach also allows a separate study on the economic static impacts of AFTA: that is, welfare change, trade creation and trade diversion. Secondly, this approach enables the isolation of the contribution of rice tariff reduction/elimination to regional welfare changes.

# Chapter Six RESULTS AND INTERPRETATION

For each scenario, the changes in producer price, import and export prices are discussed first, because these changes affect private households' decisions in choosing an optimum combination of goods to provide maximum utility. Likewise, the price chsanges affect producers' decision on sourcing of goods, from foreign or domestic market. The price changes also results in output expansion and contraction for each sector. Following discussion of changes in exports and imports section, changes in rice production and other sectors are discussed. Changes to private households' consumption and an analysis of welfare outcomes are the last sections in each Scenario.

## 6.1. Scenario 1[35]

### 6.1.1. The impacts of agricultural tariff reforms on Vietnam

#### 6.1.1.1. Composite import prices[36] of agricultural goods

The import prices of most agricultural goods decline in response to the intra-ASEAN tariff reduction, but the decline is very minor for most goods (See Table 6.1). This result is influenced by low initial intra-ASEAN tariffs, and low shares of intra-ASEAN imports in the imports of each good. There were a few products with a share above 30%, such as processed rice (100%), sugar (76%), forestry (36%), fishing (32%), vegetable oil (34%), and processed food (35%). However, forestry, fishing and processed food imports are initially subject to low tariffs and

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[35] In Scenario 1, ASEAN member countries reduce intra-ASEAN tariffs on agricultural and food products to 2015 levels, with the exception of rice.

[36] Composite import/export price for each good is computed by weighted-trade import/export price an importer/exporter pays/receives to all of its suppliers/buyers of that good. The weight is based on suppliers'/buyers' share of the good in question.

therefore, their import price reduces only slightly, following the tariff reforms. Consequently, by 2015 only sugar and vegetable oil import prices fall by more than one per cent, following the agricultural tariff reforms.

Table 6.1: The changes in Vietnam's agricultural prices, production and trade following intra-ASEAN tariff reforms (%)

| Goods | Producer's price | Production | Composite export price | Aggregate exports | Composite import price | Aggregate imports |
|---|---|---|---|---|---|---|
| Paddy rice | 0.35 | 0.07 | 0.35 | -2.65 | -0.01 | 1.88 |
| Wheat | -0.4 | 1.82 | -0.4 | 3.35 | -0.01 | 0.18 |
| Grains | 0.36 | 0 | 0.36 | 1.16 | 0.3 | 0 |
| Vegetable and fruit | 0.53 | 0.38 | 0.53 | 1.93 | -0.61 | 1.26 |
| Oil seed | 3.72 | 9.53 | 3.72 | 21.03 | -0.43 | 4.12 |
| Sugar cane/beets | -0.05 | -1.16 | -0.05 | 0.35 | 0.02 | -1.33 |
| Other crops | 0.13 | -0.46 | 0.13 | -0.33 | -1.97 | 0.81 |
| Cattle and animal products | 0.33 | 0.01 | 0.33 | -1.28 | 0.12 | 0.41 |
| Other animal products | 0.2 | -0.11 | 0.2 | -0.23 | -0.02 | 0.14 |
| Raw milk | 0.17 | 0.2 | 0.17 | -1.19 | -0.01 | 0.16 |
| Wool | 0.22 | -0.14 | 0.22 | -2.82 | -0.01 | 1.07 |
| Forestry | 0.02 | -0.08 | 0.02 | -0.07 | -0.03 | 0.03 |
| Fishing | 0.22 | 0.09 | 0.22 | -0.52 | 0.02 | 0.45 |
| Extraction | 0 | -0.02 | 0 | -0.02 | 0 | 0.02 |
| Meat | 0.07 | 0.05 | 0.07 | 2.23 | -0.01 | 0.09 |
| Meat products | 0.09 | -0.91 | 0.09 | 1.21 | -0.7 | 2.09 |
| Vegetable oil | 0.47 | -4.33 | 0.47 | -1.63 | -1.32 | 1.05 |
| Dairy products | -0.05 | 0.38 | -0.05 | 5.22 | -0.02 | 0.08 |
| Processed rice | 0.28 | 0.07 | 0.28 | 0.17 | 0.23 | 0.15 |
| Sugar | -0.18 | -1.26 | -0.18 | 20.51 | -7.39 | 19.85 |
| Other food products | 0.11 | 0.23 | 0.11 | 0.42 | -0.08 | 0.34 |

## 6.1.1.2. Producer prices of agricultural goods

Table 6.1 shows that the price of oilseeds has increased the most among all goods. This increase is due to an increase in export demand which leads to higher export price and the producer price. These increasing prices encourage the producer to expand production. This expansion leads to demand for land, thus pushing up the land price. Oilseed production is land and labour intensive, because land and

labour account for approximately 40% and 32% of production costs, respectively. Similarly, vegetables, fruits, grain and paddy rice prices increase and those sectors slightly expand their production. Vegetable oil price increases, due to the increased price of oilseed used for vegetable oil.

One would expect that intra-ASEAN agricultural tariff reforms would cause wages in Vietnam to rise should outputs expand. However, the outcome of Scenario 1 shows that the unskilled labour wage in Vietnam increases only marginally (data is not shown). This is, in part, because there is not any significant change in Vietnam's trade and production pattern with the exception of oilseeds, following the agricultural tariff reforms. These changes are further discussed in the following sections.

## 6.1.1.3. **Aggregate exports**

In 2007, Vietnam's three top agricultural exports were processed foods such as processed fish and seafood included in 'other food products', processed rice and vegetable and fruits. The simulated outcome of the agricultural tariff reforms are that Vietnam can increase its exports of these goods only slightly. The exports of vegetables and fruits increase by 1.93% (see Table 6.1). Further examination shows that the exports to Thailand increase almost 200% while the exports to non-ASEAN members fall considerably, thus resulting in just a minor increase in composite exports of vegetable and fruit. Regarding the export of 'other food products', in which Vietnam also has a comparative advantage, Table 6.1 shows little change in these exports. This result is because the initial intra-ASEAN tariffs are low and therefore, there is negligible change in the import price and import demand of Vietnamese processed food by ASEAN partners. Similarly, Vietnam's exports of paddy rice and processed rice increase only slightly. This result can be explained in two ways. Firstly, intra-ASEAN rice tariffs remain unchanged in this Scenario. Secondly, Vietnam's exports of rice to most non-ASEAN members have declined while the exports to a few ASEAN members, such as the Philippines and Malaysia, increase slightly. This result is due to

Vietnam's export price of rice increasing slightly, relative to the export price of rice from non-ASEAN members, for example India (data is not shown).

The unexpected outcomes of Scenario 1 are the increased exports of products in which Vietnam does not have a comparative advantage, i.e. oilseed and sugar. Interestingly, these exports register the largest increases among all agricultural products. The increase in export of oilseed mainly results from increased import demand from Thailand, following Thailand cutting its tariffs on oilseed from Vietnam by 29.9%. Similarly, Vietnam's export of sugar increases significantly by 20%, mainly due to Indonesia's increased import of sugar from Vietnam by 57%, following Indonesia's tariff cut on sugar imported from Vietnam. The tariff cut leads to a decline in the relative price of sugar imported from Vietnam, relative to the price of local products in Thailand and Indonesia and thus, this encourages Thai and Indonesian agents to switch their sourcing in favour of sugar from Vietnam.

## 6.1.1.4. Aggregate imports

Following the agricultural tariff reforms, imports of highly protected goods, i.e. sugar and meat, show large increases. The sugar sector registers a significant increase in both imports and exports. The increase in imports is due to a fall in the import price of imported sugar, following Vietnam's tariff cut for imported sugar from Thailand, which is the only net sugar exporter among ASEAN members. Table 6.1 shows the import price of sugar falls the most among agricultural imports, namely 7.39%. Similarly, the import of meat products increases, since Vietnam reduces tariffs on the Philippines and Thailand's products.

The remaining sectors show only minor changes in imports, for example, the import of "other crops" and vegetable and fruit goods increase by 0.81% and 1.26%, respectively. Examination of import sourcing reveals that imports from ASEAN members increase remarkably, but this increase is offset by a decline in

the imports from non-ASEAN members, thus resulting in a minor change in the composite import quantities of these goods. It is useful to mention the minor changes in imports of "other crops" and vegetable oil, for two reasons. Firstly, the imported "other crop" goods are subject to large tariff cuts, especially imports from the Philippines, Cambodia and Lao. Conversely, vegetable oil has low initial tariffs and thus experiences a lower tariff cut compared to "other crops" goods. However, vegetable oil accounts for the largest share of Vietnam's agricultural imports, namely 22%, compared to 9% of "other crops"[37].

## 6.1.2. Impacts of agricultural tariff reforms on ASEAN members

### 6.1.2.1. Change in trade balance of selected goods of ASEAN members

Table 6.2 presents the changes in trade balances in some key agricultural goods as a result of agricultural tariff reforms. The sectors with the largest falls in trade balance are Malaysia's "other crops", Indonesia's sugar, the Philippine's sugar and Thailand's vegetable and fruit. Those sectors are initially protected by high tariffs and the reduction of such protection can understandably increase imports and reduce domestic production and exports. Consequently, the trade balances fall. Vietnam's vegetable oil trade balance reduces, as opposed to Indonesia's and Malaysia's trade balance of the same commodity, which increase. Another example is Indonesia and the Philippines's deteriorated trade balance, as opposed to Thailand's improved trade balance in sugar.

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[37] Vegetable oil, processed foods and "other crops" accounted for 45%, 17% and 8%, respectively, of Vietnam's total agricultural imports in 2007.

Table 6.2: Changes in trade balance ($US million) of ASEAN members following intra-ASEAN agricultural tariff reforms

| Goods | Vietnam | Indonesia | Philippines | Singapore | Thailand | Malaysia | Cambodia | Lao |
|---|---|---|---|---|---|---|---|---|
| Paddy rice | -0.3 | -0.03 | -0.02 | -0.13 | -3.65 | -0.04 | -0.14 | -0.17 |
| Processed rice | 6.5 | 0.8 | -11.31 | -3.08 | -22.94 | -1.1 | -1.17 | 0 |
| Vegetables and fruits | 12.26 | 12.72 | -17.65 | -4.28 | -40.74 | 7.97 | 2.3 | 1.15 |
| Oil seed | 15.9 | -0.12 | -2.74 | -0.19 | -10.11 | -3.68 | 6.06 | 1.32 |
| Sugar cane/beet | 0 | 0.02 | 0 | -0.04 | -0.01 | -0.06 | 0 | 0 |
| Other crops | -10.83 | 21.55 | 182.63 | -1.79 | 127.98 | -69.94 | 13.15 | 1.23 |
| Extraction | -1.75 | 4.16 | 3.86 | 5.57 | 22.87 | -43.93 | 0.1 | -0.02 |
| Vegetable oil | -13.77 | 24.65 | -24.71 | 2.44 | -7.56 | 72.55 | -0.97 | -0.3 |
| Sugar | -7.32 | -66.3 | -29.28 | 11.1 | 140.53 | 6.15 | -1.18 | -0.04 |
| Other food products | 19.88 | 24.2 | -19.79 | 63.61 | 42.07 | 210.91 | -15.79 | -2.88 |
| Textile and clothing | -0.07 | -7.39 | -9.47 | -0.72 | 39.36 | -3.36 | 0.25 | -0.02 |
| Paper | -3.47 | -7.09 | -1.51 | -0.91 | -10.19 | -20.32 | 0.85 | 0.08 |
| Petroleum and chemical products | 0.1 | -10.09 | -3.33 | -9.32 | -39.53 | 82.6 | -4.12 | 0.02 |
| Equipment | -8.62 | -7.68 | -7.58 | -28.53 | -130.61 | -179.79 | 1.15 | 0.13 |
| Services | -8.3 | -3.42 | -9.48 | -14.61 | -66.47 | -49.32 | 3.64 | 0.2 |
| Total | -5.76 | -3.11 | 60.18 | 10.45 | -9.13 | -18.33 | 6.61 | 2.63 |

As far as the processed rice trade balance is concerned, Vietnam's exports increase marginally while Thailand's rice exports fall. This difference is due to the increasing import demand for rice from Malaysia and the Philippines. Vietnam's share of the rice market in those two markets is larger than Thailand's market share. The Philippines and Malaysia's rice trade balances are also projected to fall, following agricultural trade reforms. This reduction in the Philippines' trade balance is due to the expansion of a more relatively profitable sector, for example, "other crops" production (i.e. cash crops) in response to the tariff reforms. These reforms lead to primary resources flowing from the protected sectors to the relatively more profitable sectors following liberalisation and therefore enabling the production of '"other crops"' to expand. The increase in production of labour-intensive goods, such as cash crops, causes labour wages

to rise. As a result, profit in rice production is lower, relative to cash crop production, for example, and thus causes rice production to slightly contract. The demand for rice, therefore, is partially met by increasing rice imports. The case of Malaysia is slightly different from the Philippines. Processed rice production in Malaysia expands, following the tariff reforms. As Malaysia relies on imported processed rice for intermediate input use in its own production of these goods, the expansion of its processed rice production leads to an increase in import demand for processed rice, as a key intermediate input.

Overall, agricultural trade reform enables the Philippines, Cambodia and Lao to improve their total trade balance. However, the remaining ASEAN members' total trade balance is projected to fall. Thailand's and Malaysia's trade balances are notable examples. One noteworthy outcome of the agricultural tariff reform is that it enables ASEAN members to increase the production and export of processed food (denoted as 'other food products'), due to cheaper sourcing of inputs. The evidence is displayed in Table 6.2. Processed food exports in Malaysia increase the most, compared to the remaining ASEAN members, followed by Thailand and Vietnam.  However, this increase is partly diminished by a reduction in the export of equipment from Malaysia and Thailand, because the increased export price of this product places the exports of these two countries at a disadvantage.  Such an increasing export price can be attributed  to higher wages and capital costs used for equipment production, as a result of increasing agricultural production in some sectors which are labour intensive relative to manufacturing production, for example "other crops" in Thailand and wheat production in Malaysia.

# 6.1.2.2. Change in ASEAN's production

The reduction in tariffs causes changes in production patterns in liberalising countries and other countries. Some sectors are projected to expand, which can be attributed to increased export and domestic demand. Meanwhile, some sectors are projected to contract, due to a fall in relative prices and an increase in imports. Table 6.3 shows significant changes in the production of some selected goods.[38] The increase in production of most goods can be attributed to the increased export price and export demand.  Examples of goods with increased production, along with exports, are "other crops" in the Philippines, Cambodia and Thailand and oilseed in Lao and Vietnam, 'other food products' in Malaysia and sugar in Singapore and Thailand.  Conversely, the contraction in some sectors is due to a decreased import price and an increase in imports. Notable examples of sectors that are projected to contract the most are Vietnam's vegetable oil and Indonesia's sugar and sugar cane production.

Vietnam's production of oilseed increases by 8% in respond to Thailand's increased imports of oilseed. Conversely, vegetable oil production contracts slightly by about 4%, since the price of vegetable oil declines and imports increase, as discussed previously.  The remaining sectors show minor changes in output. For example, paddy rice and processed rice production are projected to fall by only 0.07%. Similarly "other crops" and sugar productions fall by only 0.47% and 1.26%, respectively. The domestic production of sugar experiences a minor change irrespective of a large tariff cut. This can be possibly explained by increasing export demand in response to Thailand's increased import demand for sugar.

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[38] The remaining goods, including paddy rice and processed rice, are not included in Table 6.3 because they show neglegible hanges.

Table 6.3: Key changes in selected sectors in some selected ASEAN members (%)

| Goods | Countries | Production | Domestic price | Aggregate exports | Export price | Aggregate imports | Import price |
|---|---|---|---|---|---|---|---|
| Sugar | Vietnam | -1.26 | -0.18 | 20.51 | -0.18 | 19.85 | -7.39 |
| Sugar | Indonesia | -3.91 | -0.75 | -6.71 | -0.75 | 5.09 | -4.77 |
| Sugar | Philippines | -2.93 | 0.19 | 0.97 | 0.19 | 38.82 | -12.36 |
| Sugar | Singapore | 20.59 | 0.05 | 32.22 | 0.05 | 1.19 | 0.34 |
| Sugar | Thailand | 5.43 | 0.68 | 9.84 | 0.68 | 9.42 | -2.63 |
| Sugar | Malaysia | 4.18 | 0.82 | 4.97 | 0.82 | 0.43 | 0.07 |
| Sugar | Cambodia | -2.7 | 0.15 | -0.94 | 0.15 | 1.06 | -1.27 |
| Sugar | Lao | 1.48 | -0.26 | 1.31 | -0.26 | -0.1 | 0.59 |
| Sugar cane/beet | Vietnam | -1.16 | -0.05 | 0.35 | -0.05 | -1.33 | 0.02 |
| Sugar cane/beet | Indonesia | -3.84 | -1.29 | 7.43 | -1.29 | -7.18 | 0.02 |
| Sugar cane/beet | Philippines | -2.77 | 0.37 | -1.87 | 0.37 | 0.91 | 0.02 |
| Sugar cane/beet | Singapore | -0.87 | 4.21 | -19.99 | 4.21 | 6.35 | 0.01 |
| Sugar cane/beet | Thailand | 5.4 | 2.14 | -10.71 | 2.14 | 2.17 | 0.02 |
| Sugar cane/beet | Malaysia | 2.45 | 0.82 | -4.24 | 0.82 | 3.16 | -0.03 |
| Sugar cane/beet | Cambodia | -2.53 | 0.9 | -4.63 | 0.9 | 2.15 | 0.01 |
| Sugar cane/beet | Lao | -0.19 | 0.45 | -2.3 | 0.45 | 1.02 | 0.01 |
| Vegetable oil | Vietnam | -4.33 | 0.47 | -1.63 | 0.47 | 1.05 | -1.32 |
| Vegetable oil | Indonesia | 0.15 | 0.06 | 0.27 | 0.06 | 0.32 | -0.02 |
| Vegetable oil | Philippines | -1.59 | 0.21 | -1.14 | 0.21 | 2.35 | -1.09 |
| Vegetable oil | Singapore | 5.23 | 0.1 | 6.3 | 0.1 | 3.16 | 0.16 |
| Vegetable oil | Thailand | -0.13 | -0.24 | 3.65 | -0.24 | 2.47 | -2.41 |
| Vegetable oil | Malaysia | 0.57 | 0.21 | 0.71 | 0.21 | 1.01 | 0.01 |
| Vegetable oil | Cambodia | -3.32 | 1.77 | -9.64 | 1.77 | 2.76 | 0.04 |
| Vegetable oil | Lao | -2.88 | 1.01 | -5.32 | 1.01 | 6.01 | -1.76 |
| Oil seeds | Vietnam | 9.53 | 3.72 | 21.03 | 3.72 | 4.12 | -0.43 |
| Oil seeds | Indonesia | 0.1 | 0.16 | 5.03 | 0.16 | 0.45 | 0.01 |
| Oil seeds | Philippines | -1.28 | 0.95 | -4.38 | 0.95 | 1.83 | -0.31 |
| Oil seeds | Singapore | -2.81 | 2.95 | -11.2 | 2.95 | 0.86 | 0.08 |
| Oil seeds | Thailand | -1.56 | 0.3 | 5.55 | 0.3 | 1.07 | -1.11 |
| Oil seeds | Malaysia | 0.45 | 0.38 | 0.71 | 0.38 | 1.28 | 0.05 |
| Oil seeds | Cambodia | 7.31 | 5.63 | 61.96 | 5.63 | 12.07 | 0.28 |
| Oil seeds | Lao | 5.43 | 3.14 | 69.27 | 3.14 | 5.95 | 0.48 |
| Veg and fruits | Vietnam | 0.38 | 0.53 | 1.93 | 0.53 | 1.26 | -0.61 |
| Veg and fruits | Indonesia | 0.09 | 0.17 | 3.37 | 0.17 | 0.18 | 0.06 |
| Veg and fruits | Philippines | -0.88 | 0.99 | -2.59 | 0.99 | 1.88 | -0.23 |
| Veg and fruits | Singapore | -5.35 | 2.53 | -7.07 | 2.53 | 0.39 | 0.21 |
| Veg and fruits | Thailand | -0.53 | 0.67 | -0.92 | 0.67 | 12.8 | -5.94 |
| Veg and fruits | Malaysia | 2.59 | 0.96 | 7.71 | 0.96 | 0.82 | -0.25 |
| Veg and fruits | Cambodia | -0.05 | 2.08 | 5.64 | 2.08 | 3.94 | -0.4 |
| Veg and fruits | Lao | -0.06 | 0.61 | 53.79 | 0.61 | 25.45 | -14.65 |

| Other crops | Vietnam | -0.46 | 0.13 | -0.33 | 0.13 | 0.81 | -1.97 |
|---|---|---|---|---|---|---|---|
| Other crops | Indonesia | 0.2 | 0.19 | 1.1 | 0.19 | 0.19 | -0.02 |
| Other crops | Philippines | 16.77 | 6.16 | 321.14 | 6.16 | 17.57 | -1.16 |
| Other crops | Singapore | 2.76 | 5.18 | 3.03 | 5.18 | 2.35 | -0.11 |
| Other crops | Thailand | 8.07 | 3.13 | 35.97 | 3.13 | 4.83 | -3.68 |
| Other crops | Malaysia | -6.86 | -1.92 | 17.98 | -1.92 | 11.64 | -10.49 |
| Other crops | Cambodia | 3.6 | 3.37 | 159.56 | 3.37 | 9.6 | -0.05 |
| Other crops | Lao | 1.06 | 1.14 | 2.93 | 1.14 | 1.82 | 0.19 |
| Other food products | Vietnam | 0.23 | 0.11 | 0.42 | 0.11 | 0.34 | -0.08 |
| Other food products | Indonesia | 0.09 | -0.04 | 2.44 | -0.04 | 3.82 | -2.04 |
| Other food products | Philippines | -0.26 | 0.28 | 0.73 | 0.28 | 2 | -0.91 |
| Other food products | Singapore | 4.39 | 0.01 | 5.13 | 0.01 | 0.76 | -0.14 |
| Other food products | Thailand | 0.69 | -0.4 | 1.91 | -0.4 | 3.42 | -3.11 |
| Other food products | Malaysia | 4.38 | -0.65 | 10 | -0.65 | 0.91 | -0.45 |
| Other food products | Cambodia | -2.21 | -0.24 | 1.34 | -0.24 | 8.59 | -5.38 |
| Other food products | Lao | -0.62 | 0.03 | 8.66 | 0.03 | 4.46 | -2.51 |

Table 6.3 also shows three cases of goods that do not follow the expected trend, which are Malaysia's 'other food products', Lao's vegetables and fruits, Indonesia's sugar cane. Firstly, Malaysia's 'other food products' production experience a moderate increase, while its producer price and export price decrease. Increase in output of 'other food products' can be attributed to both increased export demand and domestic demand. The domestic demand for 'other food products' increases partly as a result of producer price of these products declining by 4.38%. The export demand increase because the relative export price of Malaysia's products fall following ASEAN's partners' reducing tariffs on Malaysia's 'other food products'. This decreased price triggers agents in many ASEAN markets to switch sourcing in favour for products from Malaysia. This enables Malaysia to increase its 'other food products' exports to Thailand by 92%, to Indonesia by 48%, to the Philippines by 12% for example.

The second unusual case is Lao's vegetable and fruit. Its production remains almost unchanged while its import price decreases by 14% and its imports of these goods increase by 24%. The unchanged output is due to Lao increasing its aggregate exports of this good by 54%. Particularly, Lao's exports of vegetables and fruits to Thailand increase by 171% and Vietnam by 9% following these two countries' reduction of tariffs for its ASEAN partners. This large increase offsets

decreased domestic demand, thus leading to unchanged output. Another unusual case is Indonesia's sugar cane. Its production decreases although its import price is almost unchanged. The decrease in sugar cane production is attributed to the contraction of the downstream sector, i.e. sugar, which results in a decrease in input demand, where sugar cane is the key input.

In brief, the tariff reforms enable Vietnam to significantly increase its exports of oilseed and sugar, in which Vietnam does not have a comparative advantage. With respect to import composition, Vietnam significantly increases its imports of sugar, especially from Thailand and slightly increases its imports of "other crops" and vegetable oil. Except for sugar imports, there is not any significant change in imports of other agricultural goods. This is because the price changes are small due to the low tariff cuts and low share of intra-ASEAN trade. In the case of vegetable oil for example, the increase in imports from ASEAN member is offset by a reduction in imports from non-ASEAN members, for example from China.  Vietnam's exports of paddy rice and processed rice increase only slightly in this Scenario because intra-ASEAN rice tariffs remain unchanged in this Scenario. It is also due to Vietnam's exports of rice to a few ASEAN members increasing, but its rice exports to non-ASEAN members declining. This result is due to Vietnam's export price of rice increasing slightly, relative to the export price of rice from non-ASEAN competitors. Regarding changes in agricultural outputs, oilseed production is projected to expand, while vegetable oil production is projected to slightly contract.  Productions of the remaining sectors are observed to change only slightly.

## 6.1.3. Change in consumption

Table 6.4 shows descriptive statistics on the change in private households' consumption demand for goods in ASEAN members. The agricultural tariff reforms are projected to have only a minor impact on consumption patterns. In Vietnam, there is a minor increase in the consumption of most goods, with the

consumption of "other crops", vegetable oil and sugar increasing the most, but the increase is no more than 0.4%. There are possibly two reasons for such minor increases. Firstly, with regards to the income effect, agricultural tariff reforms bring about a minor increase in income of 0.05% for Vietnamese private households. Secondly, with regards to price effects, there are no significant price effects, as the prices paid by private household for most products changes only marginally. In Vietnam, there are a few goods which become cheaper, i.e. "other crops" and vegetable oil and sugar, as the tariffs on those products are reduced. The prices of the remaining agricultural products increase slightly, while the prices of manufacturing goods remain almost unchanged. A similar outcome is projected for the remaining ASEAN members.

Table 6.4 Summary of changes in private household consumption of 30 goods in ASEAN members (%)

| Countries | Mean | Minimum | Median | Maximum |
|---|---|---|---|---|
| Vietnam | 0.5 | -0.09 | 0.05 | 0.4 |
| Indonesia | 0.02 | -0.02 | 0 | 0.42 |
| The Philippines | -0.02 | -0.49 | 0.03 | 0.22 |
| Singapore | -0.09 | -1.77 | 0 | 0.1 |
| Thailand | 0 | -0.26 | 0.03 | 0.3 |
| Malaysia | 0.06 | -0.17 | 0.04 | 1.06 |
| Cambodia | 0 | -0.55 | 0.03 | 1.27 |
| Lao | 0 | -0.32 | 0.04 | 0.14 |

## 6.1.4. Welfare outcomes

Figure 16 shows that Vietnam benefits from a gain in welfare, with most coming from improved terms of trade (TOT). Since approximately a third of Vietnam's exports were agricultural exports in 2007, the improved export price of processed rice, "other food products", vegetable and fruits, and oil seeds are the main

contributors to an improvement in Vietnam's TOT. In addition, the contribution of allocative efficiency to welfare gain is not insignificant. There are two possible explanations for the allocative efficiency gain. Firstly, there is better allocation of resources among sectors in Vietnam. As a result of tariff elimination, land, labour and capital will flow from sectors that are initially protected, to the more efficient sectors. Secondly, tariff reduction allows some producers to gain access to cheaper sources of imported inputs, thus reducing production cost and contributing to output expansion, for example 'other food products', including processed food.

An additional key outcome of Scenario 1 is that agriculture and food liberalisation brings about a welfare gain for all ASEAN members, but there would be an unequal gain. Malaysia and Thailand are projected to have the largest gain. With regards to Malaysia, more than half of Malaysia's welfare gain comes from allocative efficiency gain. There are two explanations for this gain. Firstly, Malaysia has the widest range of agricultural tariffs among ASEAN member, with the peak being at 137%. Therefore, the elimination of such a peak tariff leads to improved resource allocation. In addition, Malaysia tends to have the largest amount of free tariff lines by 2015. Hence, the wider and deeper tariff cut levels enables Malaysia to source cheaper inputs, thus increasing domestic production of food processing sectors. As a result, the outcome of Scenario 1 shows that 20 out of 30 sectors in Malaysia are projected to expand (data is not shown), as opposed to 13 out of 30 in Vietnam. Although Thailand has lower allocative efficiency gains than Malaysia, Thailand's terms of trade gain is

approximately double that of Malaysia. Thailand's TOT improvement is attributed to the increased export prices of rice and "other crops". These goods account for approximately half of Thailand's TOT gains.
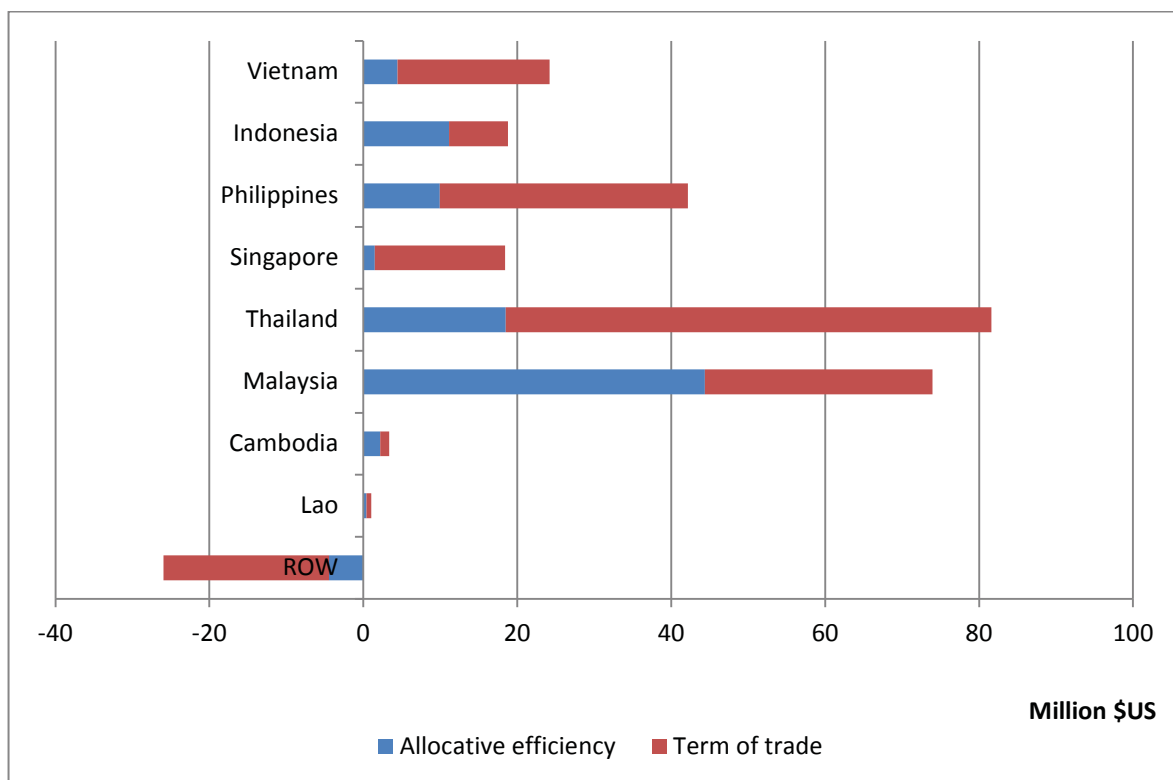


Figure 6.1: Welfare outcomes of Scenario 1

# 6.2. Scenario 2[39]

## 6.2.1. Impacts of manufacturing tariff reforms on Vietnam

### 6.2.1.1. Import prices

Table 6.5 displays changes in the composite import prices of imported goods. Although Vietnam's tariffs on petroleum and chemical products and motor and transportation goods reduce the most, the import prices of these goods fall by less than 4%. The composite import price of each good is the sum of trade-weighted changes in import prices from all Vietnam's suppliers of this good. This computation method takes into consideration the importance of the suppliers, as the weight is based on the share of each supplier. In the 2007 baseline, ASEAN members accounted for 30% of Vietnam's petroleum and chemical imports, but they accounted for only 6% of Vietnam's motor and transportation imports. Therefore, even though Vietnam greatly reduces its import tariffs for ASEAN members, the composite import price of these goods falls only slightly. Likewise, the composite import price of textiles falls only by 0.22%. This minor decrease is because ASEAN members accounted for only 7% of Vietnam's total textile imports, in comparison with China (28%), South Korea (23%) and the rest of the world (ROW) 27%. Therefore, Vietnam's reduction of intra-ASEAN tariffs on textiles has little influence on the composite import price of this good. As far as

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[39] In Scenario 2, ASEAN members reduce their intra-ASEAN manufacturing tariffs to 2015 levels. From this point forward, manufacturing tariff reduction refers to this simulation. Results in Scenario provide updated data which is used as the starting point for Scenario 2 simulation. Therefore, Scenario 2 results are incremental to Scenario 1, and changes in Scenario 2 refer to a comparison with Scenario 1 results.

the import prices of agricultural goods are concerned, changes are small because these tariffs are unchanged in this scenario.

Table 6.5: Changes in Vietnam's agricultural prices, production and trade following intra-ASEAN manufacturing tariff reforms (%)

| Goods | Production | Domestic price | Aggregate exports | Composite export price | Aggregate imports | Composite import price |
|---|---|---|---|---|---|---|
| Metal products | 3.28 | 0.09 | 3.96 | 0.09 | 1.57 | -0.48 |
| Metal | 2.6 | -0.05 | 4.98 | -0.05 | 0.72 | -0.13 |
| Textile and clothing | 1.9 | -0.18 | 2.06 | -0.18 | 1.69 | -0.22 |
| Equipment | 1.35 | -0.1 | 2.16 | -0.1 | 1.18 | -0.42 |
| Services | 0.41 | 0.36 | -1.22 | 0.36 | 0.82 | 0.01 |
| Processed rice | -0.13 | 0.19 | -0.21 | 0.19 | -1.44 | 0.72 |
| Paddy rice | -0.17 | 0.02 | -0.17 | 0.02 | 0 | -0.01 |
| Motor and transportation | -0.18 | -0.07 | 3.07 | -0.07 | 2.12 | -1.18 |
| Other crops | -0.2 | 0.04 | -0.23 | 0.04 | -0.16 | 0.03 |
| Other animal products | -0.26 | 0.36 | -0.84 | 0.36 | 0.09 | 0.04 |
| Extraction | -0.31 | 0.36 | -0.17 | 0.36 | 0.56 | -0.01 |
| Other food products | -0.63 | 0.24 | -0.84 | 0.24 | -0.08 | 0.07 |
| Oil seeds | -0.99 | 0.13 | -0.57 | 0.13 | -0.72 | 0.02 |
| Paper | -1.2 | 0.23 | -0.75 | 0.23 | 1.4 | -0.92 |
| Forestry | -1.39 | 0.66 | -2.82 | 0.66 | -0.45 | 0.33 |
| Meat products | -1.74 | 0.51 | -3.96 | 0.51 | 0.97 | 0.02 |
| Vegetable oil | -2.34 | 0.78 | -3.83 | 0.78 | 0.24 | 0.07 |
| Petroleum and chemical products | -2.85 | -0.75 | 6.37 | -0.75 | 2.85 | -3.88 |

## 6.2.1.2. **Producer prices**

Table 6.5 shows that the producer prices of all agricultural and food processed goods increase marginally. The small increases in these prices are primarily due to an increase in the unskilled labour wage. Manufacturing tariff reforms enable a reduction in the cost of some manufacturing inputs for agricultural production, such as fertiliser, which is included in petroleum and chemical products. However, such a decline is offset by an increase in the unskilled labour wage, due to an increase in labour intensive manufacturing production (especially

textiles). This increased production causes the demand for unskilled labour to rise, thus pushing up the labour wage.

The producer prices of all manufacturing goods are estimated to fall minimally (see Table 6.5). These small reductions imply that the tariff reforms have little effect on reducing intermediate input costs for the domestic production of several manufacturing goods, as discussed previously.  Taking textiles as an example, the producer price declined by only 0.18%. This decline is due to the minor decline in production costs, of which textile inputs accounts for 59%. This textile input price decreases by only 0.21% following the tariff reforms. In response to lower production cost, production of textile expands slightly. In the meantime, the domestic demand and export demand for textile increase. As a result of adjustments of both supply and demand, the equilibrium price decreases slightly by 0.18%.

## 6.2.1.3. Exports

Vietnam is projected to increase its exports of most manufacturing goods following the manufacturing tariff reforms (see Table 6.5). Exports of textile and crude oil are worthy of attention because these goods are Vietnam's key exports and they accounted for almost 50% of Vietnam's total exports in 2007. The exports of textiles increase by 2%, while exports of extraction, including crude oil remain unchanged.  Vietnam's textile exports to Thailand increase by 83%, to Cambodia by 46% and to the Philippines by 27%, in comparison with the baseline exports to each country. Despite of such large increases in proportionate terms,  Vietnam's aggregate exports of textiles increase marginally because ASEAN markets accounted for only 3% of Vietnam's textile exports in 2007as opposed to 36% (USA) and 36% (the EU).

Exports of petroleum and chemical products are projected to increase the most among manufacturing goods, namely 6%.  Further examination shows that Vietnam's exports of petroleum and chemical products to Thailand and Indonesia

increase by 101% and 18% in comparison with the base values, respectively. This increase is mainly due to these two countries switching their sourcing of these goods in favour of ASEAN partners, following their liberalisation. Moreover, Vietnam's exports of petroleum and chemical products to the EU and the USA[40], which are Vietnam's key buyers of these goods, are also each projected to increase by 4%. This increase is due to Vietnam's lower export price which causes the EU countries and the USA to switch their sourcing in favour of Vietnam's products.

### 6.2.1.4. Imports

The manufacturing tariff reforms result in a small increase in imports of most goods into Vietnam (see Table 6.5). Imports of petroleum and chemical products, motor and transportation and textiles and clothing register the largest increase, but the increase is less than 3%. It is worth mentioning the imports of petroleum and chemical products due to two reasons. Firstly, imports of these goods accounted for the largest share of Vietnam's imports in 2007, namely 27%. Secondly, fertilizers which are included in these products accounted for a large share of production costs of many crops, including paddy rice. Change in import demand of these products is due to output effect and price effect. Regarding output effects, several sectors that use petroleum and chemical products as intermediate inputs, such as "other crops" and paddy rice (in which fertilisers are a key input), are modelled to contract in this scenario. The production of petroleum and chemical products, in which petroleum and chemicals are the key intermediate inputs, also reduce slightly. These factors reduce the demand for petroleum and chemical products. On the other hand, following Vietnam's tariff reduction for imports of these products from ASEAN partners, the aggregate import price falls, thus causing the domestic agents to switch sourcing away from domestic products in favour of imported products from these partners. Eventually, this price effect outweighs the output effect, thus leading to an increase in the imports of these products.

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[40] The EU and the USA account for 21% and 10%, respectively.

**Vietnam's trade balance**

Figure 6.2 shows that Vietnam's total trade balance falls irrespective of an increase in the export of several manufacturing goods. Only the extraction and textile sectors register an increase in their trade balance. Petroleum and chemical products and the services trade balances fall the most, indicating that imports increase greater than exports.
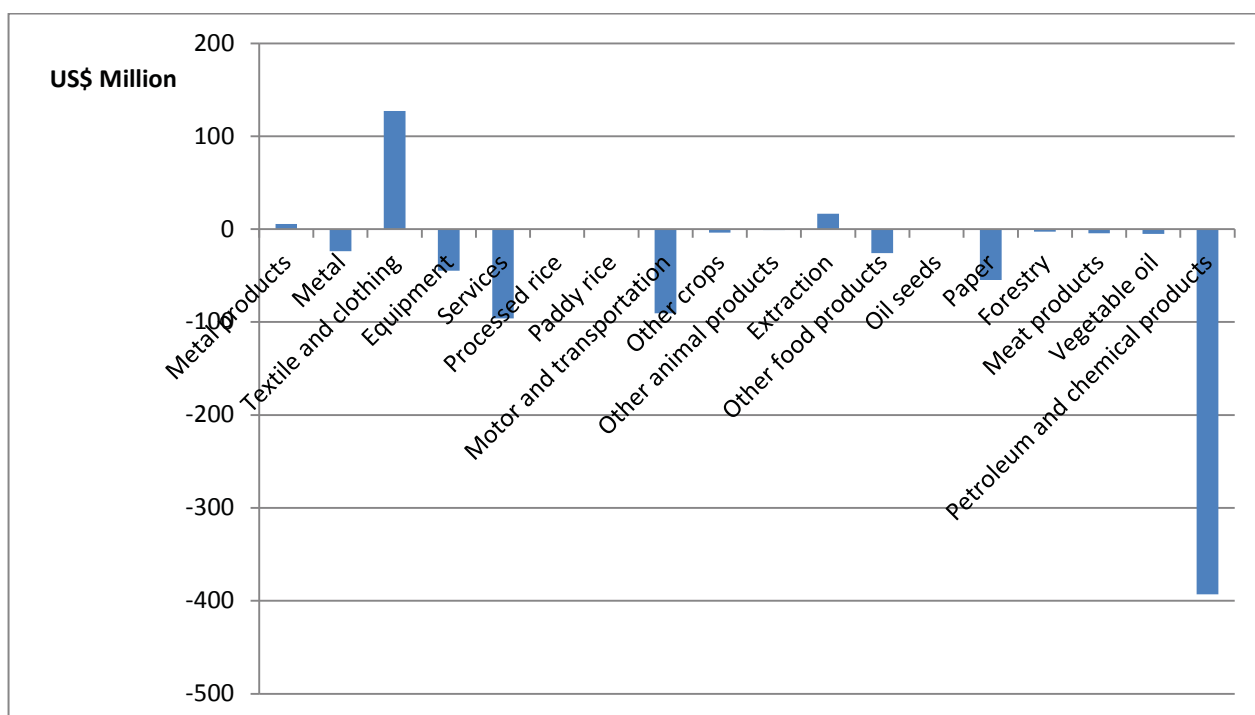


Figure 6.2: Changes in Vietnam's trade balance following intra-ASEAN manufacturing tariff reforms

# 6.2.1.6. **Production**

There are small changes in the outputs of the manufacturing sectors, including metal products, textiles and petroleum and chemical products (see Table 6.5). The textile sectors are worthy of attention due to its large share of Vietnam's total exports in 2007. Textile output is estimated to increase slightly due to a small increase in the export demand for textiles (as discussed in section 6.2.1.3) and a small increase in the domestic demand for textiles (further discussed in section 6.2.3). In contrast to the textile sector, petroleum and chemical products output is projected to contract the most among the manufacturing sector, mainly due to a decrease in domestic demand for petroleum and chemical products (see

Table 6.5). This result can be explained in two ways. Firstly, following Vietnam's tariff reduction for petroleum and chemical products, the import price falls and thus, domestic agents substitute away from local products in favour of imported products. Secondly, domestic demand for petroleum products, used as intermediate inputs, is projected to decline. This decline is due to the contraction of some manufacturing sectors, notably the petroleum and chemical sectors, together with agricultural sectors (in which fertiliser accounts for a significant share of input cost), such as coffee and pepper production, included in the "other crops" sector.  Although Vietnam can increase its export of these goods by 6%, the decrease in domestic demand outweighs the increase in export demand, thus leading to a fall in domestic production.

As far as agricultural production is concerned, Table 6.5 shows that most agricultural sectors contract in this scenario. The production of vegetable oil reduces the most, followed by meat products, but always less than 2%. Paddy rice and processed rice production remain almost unchanged. Such small changes in paddy rice and processed rice output can also be attributed to a minor decline in both domestic and export demand for these goods. The small change in private household demand, for example, is due to minor change in the price of rice paid by private households and the slight decrease in regional income. This decrease leads to reduced demand for agricultural products. Note that the private household's income elasticity of demand is lower for agricultural goods than for manufacturing goods.

In brief, manufacturing tariff reforms have only small impacts on Vietnam's production patterns.  Vietnam increases its production of labour intensive goods (i.e. textiles) and reduces its production of petroleum and chemical products following liberalization. There are minor changes in the remaining manufacturing sectors.  In regards to Vietnam's trade pattern following the tariff reforms, Vietnam still specialises in exporting crude oil, textiles and equipment. As for its trade balance, Vietnam's total trade balance would fall largely due to

decrease in the trade balance of some manufacturing goods, notably petroleum and chemical products and motor and transportation.

## 6.2.2. Impacts of manufacturing tariff reforms on ASEAN members

### 6.2.2.1. Changes in prices, production and trade of selected goods in ASEAN member countries

An interesting outcome of Scenario 2 is that the motor and transportation sectors of all ASEAN members, except Vietnam, expand following the manufacturing tariff reforms[41], although these countries do not have a comparative advantage in these goods (see Table 6.6.). Thailand's motor and transportation production is an example. Thailand is the largest exporter of motor and transportation among ASEAN members. Thailand's increase in its production of these goods is expected to have a significant impact on trade and production of the same goods in some ASEAN members. This belief is based on Thailand's intra-ASEAN tariffs on these goods being the highest among ASEAN members, according to the GTAP tariff database.  Following intra-ASEAN tariff reforms, Thailand's output of motor and transportation is projected to increase by 10%. This increase is largely due to an increase in export demand. In particular, Thailand's exports to Vietnam increase by 39%, Indonesia by 24%, the Philippines by 27% and Lao by 49%.  An examination of Thailand's exports of motor and transportation to its ASEAN partners shows that the increase in exports is largely driven by AFTA preferential tariffs since Thailand's ASEAN partners switch their sourcing of

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[41] In this study, intra-ASEAN manufacturing tariff reforms were found to result in increasing intra-industrial trade of motor and transportation goods among ASEAN members. This increase explains the improved trade balance of these goods for Indonesia, the Philippines, Thailand, Singapore and Lao. Such expansion in intra-industrial trade can be attributed to taste difference, different quality, a broad aggregation and different stages along the vertical integration within the production of motor and transportation products. However, further analysis in intra-industrial trade goes beyond the scope of this study.

motor and transportation from non-ASEAN members in favour of Thailand's goods.

Table 6.6: Changes in prices, production and trade of selected goods following intra-ASEAN manufacturing tariff reforms in ASEAN members (%)

| Goods | Countries | Production | Domestic price | Aggregate exports | Composite export price | Aggregate imports | Composite import price |
|-------|-----------|-----------|----------------|-------------------|------------------------|-------------------|------------------------|
| **Motor and transportation** | Vietnam | -0.18 | -0.07 | 3.07 | -0.07 | 2.12 | -1.18 |
| | Indonesia | 3.41 | 0.21 | 23.34 | 0.21 | 3.41 | -1.32 |
| | Philippines | 18 | 0.08 | 51.81 | 0.08 | 6.17 | -1.43 |
| | Singapore | 1.23 | 0.34 | 2.29 | 0.34 | 0.99 | -0.02 |
| | Thailand | 3.6 | -0.84 | 10.29 | -0.84 | 9.45 | -4.95 |
| | Malaysia | 2.37 | 0.13 | 8.49 | 0.13 | 1.26 | -0.22 |
| | Cambodia | 1.71 | -1.11 | 21.26 | -1.11 | 4.16 | -2.9 |
| | Lao | 362.44 | -10.61 | 1374.47 | -10.61 | 12.64 | -16.5 |
| **Equipment** | Vietnam | 1.35 | -0.1 | 2.16 | -0.1 | 1.18 | -0.42 |
| | Indonesia | 0.1 | 0.18 | 0.74 | 0.18 | 0.69 | -0.22 |
| | Philippines | -1.59 | 0.25 | -1.85 | 0.25 | -0.35 | -0.06 |
| | Singapore | -0.92 | 0.31 | -0.82 | 0.31 | -0.11 | 0.04 |
| | Thailand | -0.25 | 0.07 | 0.03 | 0.07 | 1.56 | -0.6 |
| | Malaysia | -0.67 | 0.2 | -0.68 | 0.2 | -0.01 | 0.05 |
| | Cambodia | 6.24 | -0.12 | 56.79 | -0.12 | 3.34 | -0.62 |
| | Lao | 7.44 | 0.62 | 41.3 | 0.62 | 2.08 | -0.94 |
| **Paddy rice** | Vietnam | -0.17 | 0.02 | -0.17 | 0.02 | 0 | -0.01 |
| | Indonesia | 0.01 | 0.12 | -1.03 | 0.12 | 0.63 | 0 |
| | Philippines | -0.05 | 0.29 | -2.62 | 0.29 | 1.27 | 0.03 |
| | Singapore | -0.13 | 0.03 | -0.19 | 0.03 | -0.66 | 0.01 |
| | Thailand | -0.1 | -0.11 | 0.95 | -0.11 | -1.53 | 0.17 |
| | Malaysia | -0.06 | 0.07 | -0.46 | 0.07 | 0.14 | 0.01 |
| | Cambodia | -0.06 | 0.28 | -2.41 | 0.28 | 1.11 | 0.05 |
| | Lao | 0.37 | 3.3 | -26.79 | 3.3 | 17.9 | -0.07 |
| **Processed rice** | Vietnam | -0.13 | 0.19 | -0.21 | 0.19 | -1.44 | 0.72 |
| | Indonesia | 0.02 | 0.18 | -0.79 | 0.18 | 0.11 | 0.14 |
| | Philippines | -0.05 | 0.31 | -1.48 | 0.31 | 0.38 | 0.14 |
| | Singapore | -0.05 | 0.26 | -1.15 | 0.26 | -0.36 | 0.07 |
| | Thailand | -0.12 | 0.08 | -0.14 | 0.08 | 0 | 0.06 |
| | Malaysia | -0.04 | 0.14 | -0.58 | 0.14 | 0.04 | 0.1 |
| | Cambodia | -0.05 | 0.34 | -1.63 | 0.34 | 0.7 | 0.07 |
| | Lao | 0.08 | 3.11 | -14.2 | 3.11 | 8.51 | 0.03 |

Similar to Thailand, Indonesia's output of motor and transportation increases due to an increase in export demand (23.34%) which is attributed to two factors. The first is an increase in the import demand for these goods in many ASEAN partners, especially Thailand (9.45%), Lao (12%) and the Philippines (6%). The second factor is that ASEAN partners divert sourcing in favour of ASEAN goods following the intra- ASEAN tariff reforms.  However, Indonesia differs from Thailand in that while Thailand's domestic price of these goods decreases, Indonesia's domestic price increases slightly following liberalisation. It is necessary to mention this difference because a change in producer price and export price mainly contributes to TOT gains and therefore welfare gains (further discussed in section 6.2.4). This difference is due to Thailand's initial tariffs on motor and transportation being the highest, compared with the remaining ASEAN members. Hence, Thailand's tariff reduction enables it to greatly reduce its production cost of motor and transportation. Thailand's composite import price reduces by 4.95%, thus leading to the input cost of motor and transportation being reduced by 3.71%. Because motor and transportation parts account for a significant share of the motor and transportation sector's cost, the decreased cost of this key input enables Thailand to reduce its production cost of motor and transportation, and thus reduce the producer export price by 0.84%.  In the case of Indonesia, its initial tariffs on motor and transportation are much lower compared with Thailand's tariffs. Therefore, Indonesia's tariff cuts have little impact on reducing the production costs of motor and transportation intermediate inputs for production in the same sector.

Noticeably, Lao's exports and production of motor and transportation show a large increase by 362% and 1,374%, respectively. These increases arise from strong import demand from ASEAN partners, notably Thailand and Indonesia. Despite these substantial increases in percentage terms, Lao's production of these goods (US$16 million) is much smaller than Thailand's (USD $35 605 million) and Indonesia's production (US $17 251 million) both in the simulated  and base line scenario.

It is necessary to note that there are small changes in production and trade in equipment in ASEAN members (see Table 6.6.) The equipment sector is worth mentioning for two reasons. Firstly, this sector accounts for a significant share of the original ASEAN members' exports. Secondly, four ASEAN members have a comparative advantage in exports of equipment. This small change in the production of equipment in Malaysia, for example, can be explained in two ways. Firstly, the initial tariffs on its ASEAN partners are low. When low initial tariffs are eliminated, it results in minor changes in import prices. This minor change leads to a small change in import and export demand and domestic production. Secondly, Malaysia's equipment is largely exported to non- ASEAN members, with China's, the EU's and USA's share accounting for 61% in comparison to 15% of ASEAN markets. Therefore, even a large increase in the exports to ASEAN markets has little impacts on Malaysia's aggregate exports of this good.

As far as agricultural production is concerned, there are small changes among ASEAN members.  Table 6.6 shows that paddy and processed rice production for most ASEAN members decreases marginally. This result is due to a small change in demand for these goods, which will be further discussed section 6.2.3.

## 6.2.3. Changes in consumption

Table 6.7 shows that in Indonesia, the Philippines, Singapore and Malaysia, consumption of most goods on average increases only slightly. While agricultural tariff reforms (Scenario 1) lead to a mixed change in consumption, the manufacturing tariff reforms lead to an increase in the consumption of most goods. This difference is due to manufacturing tariffs reforms bringing about larger incomes, thus enabling private households in these countries to increase their consumption.

Table 6.7: Summary of % changes in private household consumption of 30 goods in ASEAN members

| Countries | Number of goods | Mean | Minimum | Maximum |
|-----------|-----------------|------|---------|---------|
| **Vietnam** | 30 | -0.1 | -0.14 | 0.54 |
| **Indonesia** | 30 | 0.07 | 0.02 | 0.22 |
| **Philippines** | 30 | 0.13 | 0.06 | 0.31 |
| **Singapore** | 30 | 0.48 | 0.02 | 0.72 |
| **Thailand** | 30 | 0.06 | -0.1 | 0.52 |
| **Malaysia** | 30 | 0.13 | 0.04 | 0.3 |
| **Cambodia** | 30 | 0.09 | -0.11 | 1 |
| **Lao** | 30 | 0.16 | -0.38 | 3.78 |

The situation in Vietnam, Cambodia and Lao is slightly different from the original ASEAN members that there is a mixed change in the consumption of goods. In Vietnam, the consumption of manufacturing goods increases marginally (data are not shown.) following the tariff reforms. This increase is due to the price of some manufacturing goods being reduced, mainly due to a decrease in the import price following the manufacturing tariff reforms. Despite of a decrease in private household's income, the decrease in prices leads to substitution effect outweighs income effect, thus resulting in an increase in consumption of these goods. Meanwhile, the consumption of agricultural goods decreases slightly due to two reasons: an increase in prices of agricultural goods (see section 6.2.1.2.) and a decrease in the incomes of private households. It is helpful to mention that private households' income in Vietnam declines while that in the original members increases following the manufacturing tariff reforms. The decline is due to a decline in regional incomes.

## 6.2.4. **Welfare outcomes**

Figure 6.3 shows that only Vietnam experiences a welfare loss in this Scenario, and other ASEAN countries experience a welfare gain. Vietnam's welfare loss is mainly due to a loss in allocative efficiency. Changes in allocative efficiency is partially contributed to by changes in production tax and import tax (Huff &

Hertel, 2000). Most of Vietnam's reduction in import tax is attributed to tariff loss for petrol and chemical products (i.e. manufacturing of refined petroleum products, basic chemicals and rubber and plastic products). These goods account for almost a third of Vietnam's total import value, of which Vietnam sourced 33% from ASEAN members, 20% from China and the remainder from rest of the world in 2007. These goods are also subject to Vietnam's largest tariff cuts. Following this manufacturing tariff reduction, Vietnam increases its imports of petrol and chemical products from ASEAN by 14%. In particular, imports from Thailand and Singapore are predicted to increase significantly by 77% and 33%, respectively, while those from China decline by 18% compared to the baseline. This trade diversion occurs because in this Scenario Vietnam eliminates its tariffs on chemical and petroleum imports from Thailand and Singapore [42] and maintain tariffs on China's goods. This tariff preference makes the import price from ASEAN members to fall relative to that from China and non-ASEAN members, thus encouraging Vietnamese agents to switch their sourcing from China to Thailand and Singapore.
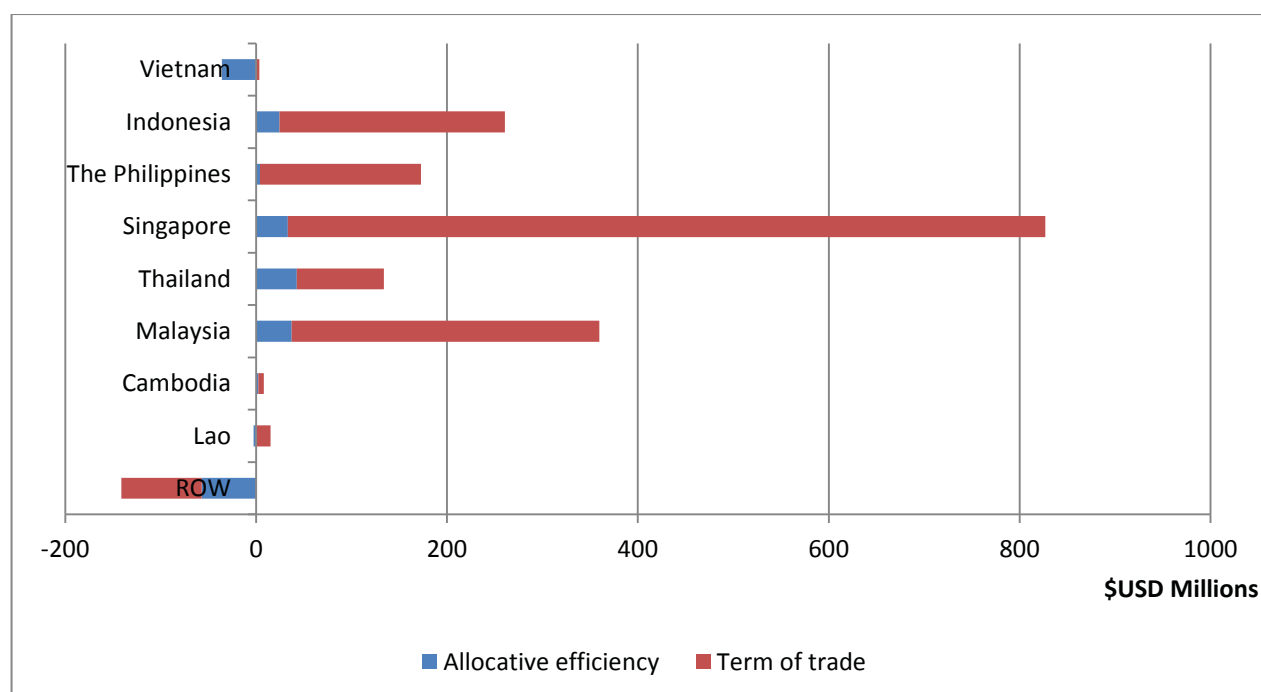


Figure 6.3: Welfare outcomes of Scenario 2

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[42] Vietnam's initial tariffs on chemical and petroleum imports from Thailand, Singapore and China are 8.73%, 14.38% and 9.36%, respectively.

The outcomes of Scenario 1 and 2 are similar to the extent that welfare gains are unequal among AFTA members (see Figure 6.3). The original ASEAN members' welfare gains far exceed the new members' gains. Specifically, Singapore's gain, in terms of trade, is projected to be $USD 794 million, compared to Cambodia's gain of $USD 4 million and Lao's gain of $USD 15 million. Sectors that make significant contribution to TOT improvements are equipment in the Philippines, Singapore, Malaysia, and Thailand, petroleum and chemical and services in Singapore, Malaysia's equipment and services, Indonesia's textile and clothing and extraction. The gains in allocative efficiency for Thailand, the Philippines and Singapore are mainly derived from the motor and transportation sector due to production expansion in these three countries.

# 6.3. Scenario 3 and 4[43]

## 6.3.1. Changes in prices, trade and production of rice in ASEAN members

### 6.3.1.1. Rice imports

The Philippines and Malaysia show the largest increase in imports of processed rice by 17% and 16%, respectively, following their rice tariff reductions to 2015 levels. These imports are further increased by 52% and 19% in Scenario 4, when these two countries completely liberalise their rice trade (see Table 6.8). These increases are due to the fact that import prices of paddy rice and processed rice from ASEAN partners fall, relative to the price of their domestically produced rice following ASEAN rice liberalisation. Specifically, the composite import prices in the Philippines and Malaysia fall by 34% and 28%, respectively, in Scenario 4, as shown in Table 6.8.  Hence, cheaper import prices cause agents in these two countries to shift their sourcing away from locally produced rice in favour of imported rice. Since these two countries import rice mainly from ASEAN partners, their aggregate imports of rice increase.

Vietnam's processed rice imports increase by only 1.56% in Scenario 3, but increase by 16% in Scenario 4 (complete rice liberalisation), when all ASEAN members are modelled to reduce their rice tariffs to 0%. The impacts of increased imports on domestic production will be further discussed in section 6.3.1.3.

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[43] Results in Scenario 2 are updated data which is used as the starting point for Scenario 3 simulation. Therefore,  Scenario 3 results are incremental to Scenario 2, and changes in Scenario 3 refers to an comparison with Scenario 2 results. The results for Scenario 4 are similar.

In Scenario 3, intra-ASEAN tariffs on paddy rice and processed rice are reduced to 2015 levels (also named as partial rice trade liberalization). Only Thailand, Malaysia and the Philippines' rice tariffs are reduced to the agreed 2015 levels as stated  in the CEPT. Indonesia's rice tariff in Scenario 3 is unchanged as mentioned in Section 4.1. The remaining ASEAN members' current rice tariffs already equate to 2015 levels, therefore they remain unchanged in Scenario 3.

In Scenario 4, all ASEAN members reduce their rice tariffs from 2015 levels to 0% for ASEAN partners.

Vietnam's paddy rice imports increase by only 5% in Scenario 3, but increases by 23% in Scenario 4. This large increase in Scenario 4 is due to an increase in demand for paddy rice, which is used for processed rice production. Further examination of import sourcing shows no changes in paddy rice imports from ASEAN members because Vietnam imported paddy rice primarily from China in the base scenario. Specifically, this nil bilateral trade flows for rice between Vietnam and its ASEAN partners remain unchanged following ASEAN rice trade liberalization.

Table 6.8: Changes in aggregate imports and composite import price of processed rice and paddy rice for ASEAN members

| Goods | Countries | Aggregate Imports | | | Composite import price | | |
|---|---|---|---|---|---|---|---|
| | | Sce 3 | Sce 4 | Sce 3+4 | Sce 3 | Sce 4 | Sce 3+4 |
| Processed rice | Vietnam | 1.56 | 16.46 | 18.02 | 0.05 | -3.26 | -3.21 |
| | Indonesia | -1.03 | 15.46 | 14.43 | 0.45 | -6.23 | -5.78 |
| | Philippines | 17.27 | 52.48 | 69.74 | -9.51 | -24.50 | -34.01 |
| | Singapore | -0.04 | -0.08 | -0.12 | 0.19 | 0.72 | 0.91 |
| | Thailand | 4.20 | 2.43 | 6.63 | -1.35 | -0.14 | -1.50 |
| | Malaysia | 16.00 | 19.01 | 35.00 | -13.20 | -15.19 | -28.39 |
| | Cambodia | 3.85 | 10.41 | 14.26 | -1.44 | -3.82 | -5.26 |
| | Lao | -0.32 | 6.47 | 6.15 | 0.13 | -2.43 | -2.29 |
| Paddy rice | Vietnam | 5.57 | 23.44 | 29.00 | 0.00 | 0.01 | 0.01 |
| | Indonesia | 0.20 | -2.96 | -2.76 | 0.00 | -0.18 | -0.17 |
| | Philippines | -10.08 | -14.43 | -24.51 | 0.01 | -3.17 | -3.16 |
| | Singapore | -0.11 | -0.36 | -0.48 | 0.15 | 0.53 | 0.68 |
| | Thailand | 12.54 | 5.95 | 18.49 | -2.05 | 0.00 | -2.06 |
| | Malaysia | 63.12 | 73.44 | 136.56 | -13.28 | -15.96 | -29.24 |
| | Cambodia | -2.44 | 7.41 | 4.97 | 0.52 | -1.43 | -0.91 |
| | Lao | -1.34 | 16.80 | 15.46 | 0.29 | -3.07 | -2.78 |

## 6.3.1.2. **Rice exports**

Table 6.9 shows that Vietnam's processed rice exports increases by only 5% in Scenario 3, but increase by 18% in Scenario 4 when ASEAN partners further reduce their tariffs from 2015 levels to 0%. The moderate increase in Scenario 3 is due to an increase in exports to ASEAN partners, but exports to non-ASEAN countries decline. Specifically, Vietnam's exports to the Philippines and Malaysia increase by 17% and 20%, respectively, while exports to the EU, USA,

and Sub-Sahara Africa fall by around 2.5% in Scenario 3. However, when ASEAN countries reduce their rice tariffs from 2015 level to 0%, Vietnam's exports to the Philippines, Malaysia, Indonesia and Thailand increase by 18%. Especially, Vietnam's exports of processed rice to the Philippines and Indonesia[44] increase by 50% and 10%, respectively. These increases offset the decrease in the exports to non-ASEAN countries, and leads to a net increase in processed rice exports. It is helpful to note that the large increase in exports to ASEAN partners is mainly due to their increased import demand and their shift sourcing in favour of rice imports from Vietnam.

Table 6.9: Changes in aggregate exports and composite export price of processed rice and paddy rice for ASEAN members

| Goods | Countries | Aggregate exports | | | Composite export price | | |
|---|---|---|---|---|---|---|---|
| | | Sce 3 | Sce 4 | Sce 3+4 | Sce 3 | Sce 4 | Sce 3+4 |
| Processed rice | Vietnam | 4.91 | 17.94 | 22.85 | 0.63 | 2.53 | 3.16 |
| | Indonesia | -0.25 | 3.23 | 2.98 | 0.03 | -0.50 | -0.47 |
| | Philippines | 10.21 | 34.10 | 44.31 | -1.88 | -5.41 | -7.30 |
| | Singapore | -0.49 | 1.15 | 0.66 | 0.08 | 0.31 | 0.40 |
| | Thailand | 1.14 | 3.91 | 5.05 | 0.23 | 0.81 | 1.04 |
| | Malaysia | 16.70 | 23.88 | 40.58 | -2.75 | -3.16 | -5.90 |
| | Cambodia | 1.39 | 0.92 | 2.31 | 0.03 | 0.01 | 0.04 |
| | Lao | 0.28 | 3.07 | 3.35 | 0.01 | -0.01 | 0.00 |
| Paddy rice | Vietnam | -6.77 | -23.77 | -30.54 | 0.81 | 3.26 | 4.07 |
| | Indonesia | 14.07 | 31.82 | 45.89 | 0.03 | -0.61 | -0.57 |
| | Philippines | 20.62 | 73.39 | 94.00 | -2.06 | -5.94 | -8.00 |
| | Singapore | -0.65 | -0.72 | -1.37 | 0.03 | 0.11 | 0.14 |
| | Thailand | -0.94 | -5.31 | -6.25 | 0.30 | 1.06 | 1.36 |
| | Malaysia | 24.34 | 32.05 | 56.39 | -2.70 | -3.40 | -6.09 |
| | Cambodia | 37.35 | 53.72 | 91.07 | 0.04 | 0.01 | 0.04 |
| | Lao | 2.98 | 0.88 | 3.86 | 0.02 | -0.01 | 0.01 |

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[44] The Philippines and Indonesia wereVietnam's largest importing partners accounting for 62% of Vietnam's processed rice exports in 2007.

In Scenarios 3 and 4, most ASEAN members, including Vietnam, the Philippines, Indonesia and Malaysia, substantially increase their processed rice exports following their rice tariff reductions (see Table 6.9). This finding is consistent with the findings of Strutt et al (2010) and Urata & Kiyota (2003) that if an industry is initially protected by high tariffs, then it will expand exports following its tariff reduction. There are several reasons for these responses. Following the Philippines' tariff reduction, its producer price and export price both decrease, while the prices in Vietnam increase (see Table 6.9). These decreased prices lead to the Philippines' rice exports, notably to the EU, becoming cheaper relative to Vietnam's rice. Agents in the EU, therefore, switch their sourcing away from Vietnam's rice in favour of the Philippines' rice. Therefore, the Philippines can considerably increase its processed rice exports to non-ASEAN countries, in contrast to Vietnam.

With regard to exports of paddy rice, Vietnam's exports of paddy rice decline by 6% and 24% in Scenarios 3 and 4, respectively. The larger decline in Scenario 4 is due to the increased export price. According to the base data, Vietnam's export of paddy rice was small, namely US$1.29 million compared to US$ 94 million for Thailand. Vietnam's paddy rice exports were mainly sold to the EU and ROW in the base data. Therefore, when its export price increases, these partners substitute away from Vietnam's paddy rice in favour of other suppliers who offer lower prices, for example the Philippines, Malaysia, Indonesia and non-ASEAN countries such as India. Specifically, Table 6.9 shows that the Philippines' and Malaysia's exports of paddy rice increase by more than 91% when Scenario 3 and 4 are taken together.

## 6.3.1.3. Rice production and producer prices

In Vietnam, both paddy rice and processed rice production increase minimally following ASEAN partial rice liberalisation in Scenario 3. However, its rice output increase by 5-6% in Scenario 4 (see Table 6.10). The larger increase in

rice output in Scenario 4 is in response to increased export demand. In Scenario 4, increased export demand can offset the decreased domestic demand for processed rice, and causing domestic production to rise. The decreased domestic demand for local processed rice is due to cheaper imported rice, following Vietnam removing its rice tariffs.

Table 6.10: Changes in production and producer prices of processed rice and paddy rice for ASEAN members

| Goods | Countries | Production | | | Producer price | | |
|---|---|---|---|---|---|---|---|
| | | Sce 3 | Sce 4 | Sce 3+4 | Sce 3 | Sce 4 | Sce 3+4 |
| Processed rice | Vietnam | 1.53 | 5.77 | 7.31 | 0.63 | 2.53 | 3.16 |
| | Indonesia | 0.06 | -0.88 | -0.82 | 0.03 | -0.50 | -0.47 |
| | Philippines | -4.06 | -12.90 | -16.96 | -1.88 | -5.41 | -7.30 |
| | Singapore | 0.01 | 0.10 | 0.10 | 0.08 | 0.31 | 0.40 |
| | Thailand | 0.53 | 1.85 | 2.38 | 0.23 | 0.81 | 1.04 |
| | Malaysia | -6.24 | -7.73 | -13.97 | -2.75 | -3.16 | -5.90 |
| | Cambodia | -0.05 | -0.21 | -0.26 | 0.03 | 0.01 | 0.04 |
| | Lao | 0.00 | -0.05 | -0.05 | 0.01 | -0.01 | 0.00 |
| Paddy rice | Vietnam | 1.34 | 5.03 | 6.37 | 0.81 | 3.26 | 4.07 |
| | Indonesia | 0.06 | -0.81 | -0.75 | 0.03 | -0.61 | -0.57 |
| | Philippines | -3.89 | -12.34 | -16.22 | -2.06 | -5.94 | -8.00 |
| | Singapore | 0.09 | 0.36 | 0.45 | 0.03 | 0.11 | 0.14 |
| | Thailand | 0.49 | 1.64 | 2.13 | 0.30 | 1.06 | 1.36 |
| | Malaysia | -6.32 | -8.25 | -14.57 | -2.70 | -3.40 | -6.09 |
| | Cambodia | 0.04 | -0.01 | 0.03 | 0.04 | 0.01 | 0.04 |
| | Lao | 0.01 | -0.02 | -0.01 | 0.02 | -0.01 | 0.01 |

The situations in Malaysia and the Philippines are in contrast to Vietnam. In the Philippines, for example, its paddy and processed rice production falls by16% under complete rice trade liberalization. This decrease is mainly due to a large decrease in domestic demand for local rice, since imported rice becomes cheaper relative to domestic rice, thus encouraging agents to shift their sourcing away from domestic rice. The decreased domestic demand causes production to contract despite a large increase in the export demand for processed rice as discussed in section 6.3.1.2.

Unlike the Philippines and Malaysia, Indonesia's rice production shows a minor change even in Scenario 4 since Indonesia's rice tariffs are lower than the Philippines. Indonesian agents purchase rice mainly from domestic markets for their country's usage and Indonesia has a higher level of rice self-sufficiency. According to the GTAP base data, imported rice accounted for a smaller share of total private household demand for rice in Indonesia (7%) than in the Philippines (24%). Therefore, a decreased import price following Indonesia's rice liberalisation has little impact on reducing the rice price paid by Indonesian private households. This minor decrease in price, in turn, has little impact on increasing the private household's demand for rice consumption.

The producer price of processed rice in Vietnam increases slightly in line with the export price in Scenarios 3 and 4 while these prices in Malaysia, the Philippines and Indonesia decrease moderately. The producer prices in these three countries fall further in Scenario 4 than in Scenario 3 when their rice tariffs become zero. In Malaysia, for example, a decrease in paddy rice output results in a decreased demand for land for paddy rice production, which causes the price of paddy rice land to fall. This fall in land price largely contributes to the decreased production costs of paddy rice production and a decreased producer price to return to normal profit. Note that land accounts for a large share of the paddy rice production cost, namely 42% in Malaysia (GTAP database). The decreased price of paddy rice then leads to a decreased production cost for processed rice, because paddy rice accounts for the bulk share of processed rice production costs.

## 6.3.1.4. Rice trade balance

Table 6.11: Changes in rice trade balance among ASEAN members

| Goods | Countries | Sce 3 | Sce 4 | Sce 3+4 |
|---|---|---|---|---|
| Processed rice | Vietnam | 80.55 | 319.01 | 399.56 |
| | Indonesia | 3.86 | -115.92 | -112.06 |
| | Philippines | -117.76 | -431.59 | -549.35 |
| | Singapore | -0.24 | -0.87 | -1.11 |
| | Thailand | 43.66 | 153.03 | 196.69 |
| | Malaysia | -37.5 | -54.86 | -92.36 |
| | Cambodia | -0.24 | -1.16 | -1.40 |
| | Lao | 0.03 | -0.3 | -0.27 |
| Paddy rice | Vietnam | -0.88 | -3.82 | 29.00 |
| | Indonesia | 0.18 | 0.61 | -2.76 |
| | Philippines | 0.04 | 0.05 | -24.51 |
| | Singapore | 0 | 0 | -0.48 |
| | Thailand | -0.66 | -4.1 | 18.49 |
| | Malaysia | -1.99 | -3.92 | 136.56 |
| | Cambodia | 0.49 | 0.97 | 4.97 |
| | Lao | 0.08 | 0.02 | 15.46 |

Table 6.11 shows that in ASEAN members, except Thailand and Vietnam, the trade balance falls for processed rice and paddy rice although all ASEAN members' exports of these goods increase in both Scenarios 3 and 4. The trade balance falls are due to imports for these goods increasing more than their exports. The Philippines has the largest fall in the rice trade balance because it has the highest initial rice tariffs, it has the largest fall in import price, and it has the largest increase in aggregate imports for these goods.

## 6.3.2. Impacts of ASEAN rice liberalisation on other agricultural sectors in ASEAN members

**In Vietnam**

Most producer prices for agricultural goods increase slightly, but production declines. This increase is partly due to the increased cost of unskilled labour. As

Vietnam's production of paddy rice and processed rice (which is labour intensive) expand, following ASEAN rice liberalisation, the demand for unskilled labour increases, thus pushing up the unskilled labour wage in Vietnam. This increased labour wage, in turn, causes the production costs of most labour intensive goods to rise. One example is the producer price of sugar cane, which increases by 2% in Scenarios 3 and 4 taken together.

In regards to changes in trade, there are relatively small changes except for imports of sugar cane/beets. The increase in these imports is due to the import price of these goods from the Philippines being reduced, following the Philippines' rice tariff reduction. The price of imported sugar cane/beets falls relative to domestically produced sugar cane, and therefore encourages Vietnamese agents to increase their imports of sugar cane/beets. However, this decreased import of sugar cane/beets has little effect on domestic production.

Table 6.12: Changes in prices, production and trade of selected goods in selected ASEAN member countries (Scenario 3 + Scenario 4)

| Countries | Goods | Production | Producer price | Aggregate exports | Composite export price | Aggregate imports | Composite import price |
|---|---|---|---|---|---|---|---|
| Vietnam | **Oil seeds** | -3.52 | 0.94 | -4.37 | 0.94 | -0.62 | 0.04 |
| | **Sugar cane/beet** | -0.49 | 2.09 | -10.85 | 2.09 | 5.25 | -0.01 |
| | **Other crops** | -3.89 | 0.69 | -4.04 | 0.69 | -0.38 | -0.03 |
| | **Cattle and Animal products** | -0.27 | 1.94 | -7.49 | 1.94 | 3.75 | -0.12 |
| The Philippines | **Vegetables and fruits** | 2.70 | -2.69 | 8.55 | -2.69 | -4.14 | 0.01 |
| | **Other crops** | 4.55 | -2.29 | 11.44 | -2.29 | -4.05 | 0.09 |
| | **Meat products** | 0.91 | -2.16 | 19.84 | -2.16 | -8.60 | 0.01 |
| | **Vegetable oil** | 3.25 | -0.94 | 5.52 | -0.94 | -1.08 | -0.05 |
| | **Cattle and Animal products** | 1.21 | -3.12 | 12.66 | -3.12 | -4.98 | 0.00 |
| | **Sugar cane/beet** | 1.27 | -2.75 | 15.65 | -2.75 | -7.08 | -0.01 |
| Malaysia | **Wheat** | 3.50 | -0.56 | 3.64 | -0.56 | 1.06 | -29.24 |
| | **Other crops** | 0.48 | -0.34 | 1.75 | -0.34 | 0.06 | 0.00 |
| | **Other food products** | 1.07 | -0.50 | 1.78 | -0.50 | -0.35 | 0.02 |
| | **Beverage and tobacco** | 1.04 | -0.95 | 1.86 | -0.95 | -0.37 | 0.02 |

**In remaining ASEAN members**

Table 6.12 shows that the producer prices for several agricultural goods fall in countries which initially charged high tariffs on rice imports, such as the Philippines and Malaysia. In the Philippines, for example, a decrease in rice production leads to a decrease in the demand for unskilled labour in paddy and processed rice sector. This results in a decrease in the labour wage. Because most agricultural goods are labour intensive, a decreased labour wage largely contributes to a decrease in production costs, expansion in output, and a fall in the producer prices of agricultural goods.

Another important impact of ASEAN rice liberalisation is that the production of several other agricultural goods expands while the production of rice falls. For example, in the Philippines, production of "other crops", wheat, vegetables and fruit are projected to expand by less than 1.5 % in Scenario 3 and further increase by more or less than 3% in Scenario 4. In Malaysia, the production of wheat is projected to increase the most, by more than 2% in both Scenarios 3 and 4. The outputs of downstream sectors also increase slightly, such as 'other food products', including processed food in Malaysia and cattle and animal products in the Philippines. These sectors expand due to increased domestic and export demand. Malaysia's exports of 'other food products' increase by 1% and the Philippines's exports of meat products increase by almost 20%. Following rice liberalisation, prices of agricultural raw materials (for example rice, oilseeds and grains as intermediate inputs) decrease, thus leading to a decrease in production costs, and expansion in outputs in the employing sectors. This expansion of production with comparative advantages brings about an allocative efficiency gain, thus contributing to a welfare gain in the liberalising countries (further illustrated in section 6.3.5.)

### 6.3.3. Changes in consumption

ASEAN rice trade liberalisation brings about a minor increase in private household consumption in all ASEAN members. Consumption of rice registers the largest increase for a few ASEAN members, notably the Philippines and Malaysia. Table 6.13 shows that consumption of rice in Malaysia and the Philippines increases by less than 4%. This increase in consumption is due to the price paid by private households falling largely by 14.82% and 28% in the Philippines and Malaysia, respectively, following the liberalisation. Furthermore, it is important to mention that rice trade liberalization contributes to increased consumption of other agricultural food products in these liberalizing countries, notably in the Philippines and Malaysia. This increase is mainly due to decreases in prices for these goods paid by private households as a result of reduced producer prices following rice trade liberalization. Moreover, a decrease in the rice price leads a fall in budget share of rice, thus allowing an increase in consumption of other food products.

Complete rice trade liberalization also improves household food security in Vietnam, but Vietnam differs from Malaysia and the Philippines in that private households' income increases while that in the latter two countries declines. The increase in income can offset the substitution effect which was caused by increased prices of agricultural goods, thus enabling Vietnam's households to increase consumption of several goods, such as wheat, meat products, "other food products", and all manufacturing goods. Even for rice consumption, despite of increased price of rice following the tariff reform, the private households' rice

consumption declines marginally due to the increased income offsetting the increased price effect.

Table 6.13: Summary of changes in private household consumption of 30 goods for ASEAN members (%) (Scenario 3 + 4)*.

| Countries | Number of goods | QUANTITIES | | | PRICES | | |
|---|---|---|---|---|---|---|---|
| | | Mean | Minimum | Maximum | Mean | Minimum | Maximum |
| **Vietnam** | 30 | 0.17 | -0.19 | 0.37 | 0.578 | -0.5 | 3.152 |
| **Indonesia** | 30 | 0.01 | 0 | 0.12 | -0.11 | -0.88 | 0 |
| **Philippines** | 30 | 0.23 | -0.07 | 2.00** | -1.65 | -14.82** | 0.06 |
| **Singapore** | 30 | 0.02 | 0 | 0.21 | 0 | -0.33 | 0.42 |
| **Thailand** | 30 | -0.01 | -0.17 | 0.05 | 0.23 | -0.14 | 1.34 |
| **Malaysia** | 30 | 0.22 | 0 | 3.93** | -1.48 | -28** | 0.02 |
| **Cambodia** | 30 | -0.01 | -0.03 | 0 | 0.03 | -0.08 | 0.12 |
| **Lao** | 30 | -0.01 | -0.03 | 0 | 0.01 | -0.04 | 0.13 |

*: Changes in private consumption in Scenarios 3 and 4 are added together with the aim of examining the impacts of rice tariff removals on private household consumption.
**: Belongs to rice

## 6.3.4. Change in rice self sufficiency[45]

Table 6.14 shows that rice self-sufficiency decreases in the Philippines and Malaysia in contrast to Vietnam and Thailand's rice self-sufficiency. The Philippines's rice self-sufficiency falls the most because the Philippines' initial tariff is the highest. Therefore, its rice tariff elimination leads to a plunge in import and producer prices, thus causing the large fall in rice output. In Scenario 4, a larger decline in self-sufficiency for the Philippines is due to a larger increase in imports of rice and a larger decrease in domestic production. However, it is important to note that the magnitude of the decline in domestic production and rice self-sufficiency are sensitive to private household's willingness to substitute between domestic rice and imported rice. GTAP has a

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[45] Self sufficiency equates to the total domestic production value of the good in interest divided by the total domestic purchases of that good. Rice self-sufficiency is computed through domestic output divided by grand total purchase by all agent in a region.

limitation in having one identical set of substitution elasticities between domestic goods and imported goods for all regions.

Table 6.14: Rice self-sufficiency in ASEAN members following rice tariff reduction

| Goods | Countries | Base data | Scenario 3 | Scenario 4 |
|---|---|---|---|---|
| Processed rice | Vietnam | 1.45 | 1.47 | 1.56 |
| | Indonesia | 0.94 | 0.94 | 0.94 |
| | Philippines | 0.79 | 0.76 | 0.70 |
| | Singapore | 0.5 | 0.49 | 0.49 |
| | Thailand | 1.95 | 1.95 | 1.99 |
| | Malaysia | 0.71 | 0.69 | 0.67 |
| | Cambodia | 1.01 | 1.01 | 1 |
| | Lao | 1 | 1 | 1 |
| Paddy rice | Vietnam | 1 | 1 | 1 |
| | Indonesia | 1 | 1 | 1 |
| | Philippines | 1 | 1 | 1 |
| | Singapore | 0.51 | 0.5 | 0.5 |
| | Thailand | 1.02 | 1.02 | 1.02 |
| | Malaysia | 0.99 | 0.98 | 0.98 |
| | Cambodia | 1 | 1 | 1 |
| | Lao | 1.01 | 1 | 1 |

## 6.3.5. **Welfare outcomes**

Scenarios 3 and 4 aim to separately evaluate the contribution made by rice tariff reduction/elimination to regional welfare changes. A similarity between the outcomes of Scenarios 3 and 4 is that Vietnam and Thailand have the largest gains in welfare from ASEAN rice liberalization, with TOT gains being the main contributors (see Table 6.15). Further examination of TOT gains show that this gain is largely derived from processed rice, followed by the textile, food processing and 'other crop' sectors. With regards to allocative efficiency gain, there is little gain from resource re-allocation among Vietnam's production sectors, due to two reasons: Vietnam kept its rice tariffs unchanged till 2015, as stated in the CEPT; and Vietnam's rice tariffs are currently low (5%) compared to 50% in the Philippines and 40% in Malaysia. While Vietnam's welfare gain mostly arises from improved terms of trade, Malaysia's and the Philippines's

gains are mostly from allocative efficiency in Scenario 3. This gain dominates
the loss from deteriorated TOT in Scenario 3, thus leading to a gain in welfare.

Table 6.15: Welfare outcome of Scenarios 3 and 4 (US$ million)

| WELFARE | Scenario 3 | | | Scenario 4 | | | Scenario 3 + Scenario 4 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Allocative efficiency | TOT | Total | Allocative efficiency | TOT | Total | Allocative efficiency | TOT | Total |
| Vietnam | 0.65 | 29.26 | 32.73 | 2.29 | 119.75 | 133.04 | 2.94 | 149.01 | 165.77 |
| Indonesia | -1.07 | -2.83 | -3.81 | 11.66 | -32.49 | -19.05 | 10.59 | -35.32 | -22.86 |
| Philippines | 49.92 | -22.94 | 30.14 | 65.88 | -92.44 | -16.31 | 115.8 | -115.38 | 13.83 |
| Singapore | 0.23 | 1.58 | 1.68 | 0.3 | 2.75 | 2.94 | 0.53 | 4.33 | 4.62 |
| Thailand | 0.42 | 16.33 | 16.08 | 1.1 | 57.9 | 56.84 | 1.52 | 74.23 | 72.92 |
| Malaysia | 20.56 | -12.99 | 8.21 | 14.06 | -18.42 | -3.04 | 34.62 | -31.41 | 5.17 |
| Cambodia | 0.01 | -0.19 | -0.17 | -0.02 | -1.04 | -1.06 | -0.01 | -1.23 | -1.23 |
| Lao | 0 | -0.08 | -0.07 | 0 | -0.41 | -0.42 | 0 | -0.49 | -0.49 |
| ROW | -6.46 | -8.16 | -20.55 | -33.15 | -35.92 | -91.13 | -39.61 | -44.08 | -111.68 |
| Total | **64.26** | **-0.02** | **64.24** | **62.12** | **-0.32** | **61.81** | **126.38** | **-0.34** | **126.05** |

Table 6.16: Contribution to allocative efficiency in ASEAN members in
Scenario 3 + Scenario 4 (US$ million)

| Goods | Vietnam | Indonesia | Philippines | Singapore | Thailand | Malaysia | Cambodia | Lao |
|---|---|---|---|---|---|---|---|---|
| Paddy rice | 1.57 | 0.51 | -0.02 | 0 | 0.01 | 22.38 | 0 | 0 |
| Processed rice | 0.74 | 10.95 | 113.37 | 0 | 0.01 | 14.96 | 0.07 | 0 |
| Other goods | 0.63 | -0.87 | 2.45 | 0.53 | 1.5 | -2.72 | -0.08 | 0 |
| Total | **2.94** | **10.59** | **115.8** | **0.53** | **1.52** | **34.62** | **-0.01** | **0** |

The key difference between Scenario 3 and 4 is that deeper rice tariff cuts
(Scenario 4) reduce welfare in Indonesia, Malaysia and the Philippines,
Cambodia and Lao. Table 6.15 shows that these countries gain from allocative
efficiency, but this gain is diminished by deteriorated TOT despite of the gain in

allocative efficiency. Taking Malaysia as an example, examination into allocative efficiency gains shows that processed rice is the main contributor (see Table 6.16). The gain in allocative efficiency in Malaysia, is because paddy production is subsidized from the government. Following Malaysia's rice tariff removal, paddy rice output decreases while outputs of other sectors, such as vegetable oil and other food products increase. This leads to a decrease in the government's subsidy for the paddy rice sector and an increase in production tax collection from other sectors.  Regarding TOT, Malaysia's TOT loss is derived from the fall in TOT of vegetable oils and 'other food products' because the export prices of these goods fall (as discussed in section 6.3.2). Therefore, despite allocative efficiency gains from better resource allocation, this gain is diminished by TOT loss, thus resulting in welfare loss in Scenario 4 for Malaysia as well as the Philippines and Indonesia. In brief, when the welfare of Scenario 3 and 4 are added together, Vietnam, Thailand Singapore, Malaysia and the Philippines have welfare gains from rice trade liberalization. However, the gain for Vietnam, Thailand and Singapore is greater than for the Philippines and Malaysia. In contrast, Indonesia, Cambodia and Lao suffer from welfare losses due to deteriorated TOT.

# 6.4. Trade diversion and trade creation

AFTA leads to an increase in imports for all ASEAN members. Table 6.17 shows total intra-ASEAN imports increase by US$17,659 million compared to the baseline. Key contributors to this increase are tobacco and beverage imports (US$8,947 million), petroleum and chemical products (US$ 6,099million), motor and transportation (US$ 3,493 million), and equipment (US$2,201million). Further examination shows that agricultural goods, except for beverage and tobacco goods, account for a small share of an increase in intra-ASEAN's imports, which is driven by four key agricultural goods:  processed rice, "other crops", vegetable oil, and other food products.

While the imports from ASEAN members increase, the imports from non-ASEAN members decrease by US$6,909 million. Specifically, imports of most

manufacturing goods, notably petroleum and chemical goods from China, motor and transportation goods from Japan and extraction goods from ROW fall.

Table 6.17: Changes in value of ASEAN's imports from ASEAN and non-ASEAN members by commodities (US$ million)

| Commodity | Intra-ASEAN | china | India | South Korea | Japan | AusNew | USA | EU | SSA | ROW | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Paddy Rice | 7 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| Vegetable and Fruits | 87 | -16 | 0 | 0 | 0 | -1 | -4 | -1 | 0 | -2 | 62 |
| Oil seed | 37 | -1 | -1 | 0 | 0 | 0 | -7 | 0 | 0 | -19 | 9 |
| Other crops | 571 | -42 | -74 | -1 | -2 | -17 | -59 | -17 | -144 | -50 | 165 |
| Animal products | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Other animinal products | 15 | -1 | 0 | 0 | -1 | -1 | -2 | -1 | -1 | 0 | 9 |
| Meat products | 25 | 0 | 0 | 0 | 0 | 2 | -2 | -4 | 0 | -1 | 19 |
| Vegetable oil | 233 | -3 | -46 | 0 | -1 | 0 | -12 | -2 | 0 | -92 | 76 |
| Dairy products | 47 | 0 | 0 | 0 | 0 | 2 | 0 | -1 | 0 | 0 | 48 |
| Processed rice | 813 | -1 | -2 | 0 | 0 | 0 | 0 | 0 | 0 | -14 | 795 |
| Sugar | 197 | -2 | -16 | -5 | 0 | -41 | 0 | 0 | -7 | -14 | 111 |
| Other food products | 509 | -46 | -5 | -15 | -18 | -18 | -34 | -41 | -2 | -82 | 249 |
| Beverage and tobacco | 8947 | 604 | 60 | 6 | 66 | 1583 | 14 | -511 | 1451 | 58064 | 70285 |
| AGRICULTURE | 11504 | 499 | -86 | -16 | 45 | 1512 | -103 | -577 | 1297 | 57796 | 71871 |
| Extraction | -8111 | -594 | -60 | -5 | -68 | -1587 | -14 | 513 | -1445 | -57410 | -68781 |
| Textile and clothing | 750 | -108 | -4 | -34 | -25 | -5 | -11 | -29 | -1 | -88 | 445 |
| Paper | 529 | -44 | -1 | -11 | -36 | -18 | -31 | -51 | -7 | -56 | 276 |
| Petroleum and chemical products | 6099 | -864 | -101 | -432 | -557 | -38 | -146 | -323 | -6 | -987 | 2644 |
| Metal | 605 | -23 | -6 | -13 | -25 | -27 | -3 | -9 | -8 | -38 | 453 |
| Metal products | 613 | -65 | -3 | -18 | -99 | -4 | -10 | -38 | 0 | -32 | 343 |
| Motor and transportation | 3493 | -177 | -15 | -95 | -861 | -13 | -192 | -360 | -3 | -67 | 1710 |
| Equipment | 2201 | -292 | -24 | -74 | -340 | -8 | -113 | -185 | -1 | -181 | 982 |
| Services | -24 | 32 | 23 | 17 | 51 | 30 | 122 | 357 | 8 | 192 | 808 |
| MANUFACTURING | 6155 | -2136 | -190 | -664 | -1960 | -1670 | -398 | -126 | -1464 | -58667 | -61121 |
| Total | 17659 | -1637 | -277 | -680 | -1916 | -158 | -501 | -704 | -167 | -871 | 10749 |

*Note.* The value is a difference between value of updated value of imports at world price (VIWS) in Scenario 4 compared to original baseline VIWS

As far as trade creation/diversion in agriculture is concerned, it is likely that trade creation occurs in the processed rice sector for two reasons. Intra-ASEAN imports of this good increase by $US 813 million following the complete rice trade liberalization. This trade creation is affirmed by the fact that both Vietnam and Thailand have a comparative advantage in producing and exporting processed rice, as their revealed comparative advantages (RCA) are 36 and 32, respectively (see Appendix 3 ). Likewise, trade creation occurs in vegetable oil and other food crops for two reasons. Firstly, intra-ASEAN imports of vegetable oil and other food crops increase following the tariff reforms (see Table 6.17).

Secondly, all ASEAN members have a high RCA in those sectors. For example, Indonesia's RCA in vegetable oil is 13.92.

In regards to manufacturing trade, trade creation might occur in equipment, petroleum and chemical products for two reasons. Firstly, intra-ASEAN equipment imports increase by US$2,201 million. Secondly, several ASEAN members have a comparative advantage in this sector, since the RCAs of the Philippines, Singapore, Indonesia Malaysia and Cambodia are all above 1. Likewise, the intra-ASEAN imports of petroleum and chemical products increase by US$6,099 million, while the extra-ASEAN imports of the same goods decline by US$3,455 million. Both Singapore and Thailand have a comparative advantage in these goods. Meanwhile, trade diversion is likely to occur in the motor and transport sector, because intra-ASEAN imports of motor and transport increase by US$3,493million, while the imports from Japan and EU fall by US$861 million and US$361 million, respectively. In regards to RCA, no ASEAN members have a comparative advantage in the motor and transport sector, while Japan's and the EU's RCAs are 2.29 and 1.72, respectively.

The above evidence for trade creation and trade diversion is suggestive but inconclusive. Therefore, to throw further light on this problem, the approach suggested by Ginger (2011) was employed. This approach uses allocative efficiency, a component of welfare decomposition, in order to examine trade creation and diversion. Seven factors as associated with allocative efficiency[46], including tariff collection.  This component of allocative efficiency is decomposed into two parts: a contribution of tariff collection from ASEAN members and the one from non -ASEAN members. An increase in the former value, which is derived from an increase in intra-ASEAN imports, indicates trade creation.  A decrease of the latter value (which is derived from a decrease in

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[46]   These factors include changes to tax collection levied on output; all endowment inputs; imported intermediate inputs; domestic intermediate inputs; private household consumption; government consumption; and exports and imports.

imports from non-ASEAN members) indicates trade diversion. These values are sourced from GTAP outputs. The results show that the contribution of tariff collection from intra- ASEAN trade to allocative efficiency increases while that value from extra ASEAN trade falls (see Table 6.18). However, the increase is greater than the loss, thereby enabling AFTA members, as a group, to have a net increase of $US73.44 million. This net increase might suggest that trade creation outweighs trade diversion. Further details are given in Table 6.18, which shows that trade creation occurs in the processed rice and "other crops" sectors while trade diversions occurs in most manufacturing sectors, notably motor and transportation goods, equipment, petroleum, and chemical products. Hence, it is likely that agricultural goods are key drivers of trade creation for AFTA.

Table 6.18: Contribution of import tax to allocative efficiency of ASEAN members as a group, by commodities

| Commodities | Contribution of tariff collection to allocative efficiency (US$ million) | | |
| --- | --- | --- | --- |
| | Intra ASEAN | Extra ASEAN | TOTAL |
| Paddy Rice | 1.05 | 0.62 | 1.67 |
| Vegetables and fruits | 11.71 | -3.55 | 8.16 |
| Oil seed | 3.89 | -5.53 | -1.64 |
| Other crops | 148.05 | -91.31 | 56.74 |
| Other animal products | 1 | -0.36 | 0.64 |
| Fishing | 0.39 | -0.31 | 0.08 |
| Vegetable oil | 9.73 | -7.77 | 1.96 |
| Dairy products | 2.92 | -0.51 | 2.41 |
| Processed rice | 146.44 | -7.79 | 138.65 |
| Sugar | 28.98 | -19.6 | 9.38 |
| Beverage and tobacco | 1.61 | 1.76 | 3.37 |
| Textile and clothing | 31.95 | -43.53 | -11.58 |
| Paper | 11.73 | -18.2 | -6.47 |
| Petroleum and chemical products | 251.23 | -300.66 | -49.43 |
| Metal products | 22.65 | -31.49 | -8.84 |
| Motor and transportation | 260.8 | -307.83 | -47.03 |
| Equipment | 37.15 | -58.66 | -21.51 |
| **Total** | **1018.33** | **-944.89** | **73.44** |

# Chapter Seven SUMMARY AND CONCLUSION

This section is designed to answer the research questions that were posed in Chapter One. The results of Scenarios 1-3 are summed up to represent the full impacts of AFTA by 2015 Scenario 4 results are displayed separately, which represent the impacts of rice tariff reduction from the 2015 level to 0%. Finally, the results of Scenarios 1-4 are aggregated, to represent the total impacts of complete regional trade liberalisation.

This study's research questions were:

1. What will be the impacts of intra-ASEAN tariff reductions on the rice sectors in Vietnam and ASEAN members, in terms of prices, exports and imports, production, private household consumption and rice self-sufficiency?

2. Under CEPT commitments, the Philippines, Malaysia and Indonesia are to reduce their rice tariffs to an agreed level by 2015, but they will not eliminate their rice tariffs. To what extent will this rice tariff reduction increase Vietnam's rice production and rice exports? Would rice tariff elimination further enhance or reduce each member's welfare? What could be the hurdles against ASEAN members further reducing their rice tariffs to 0%?

3. Is Vietnam likely to gain or lose as a result of AFTA? What will drive these gains or losses?

4. Will AFTA result in trade creation and trade diversion when all members complete their tariff reduction commitments, as stated in the CEPT schedule?

# 7.1. Rice prices

AFTA has only a minor effect on Vietnam's rice export prices, as they increase by only 1% (see Table 7.1). Agricultural and manufacturing tariff reforms (Scenarios 1 and 2, respectively) have negligible impacts on rice prices and therefore this increase is mainly derived from Scenario 3, when ASEAN members decrease their rice tariffs to 2015 levels. However, if ASEAN member countries reduce their rice tariffs from 2015 levels to 0%, the increase would be greater at 2.53%. This situation is similar for paddy rice.

Table 7.1: Percentage changes in producers' price and import and export prices over four Scenarios

| Goods | Countries | SCE 1 + SCE 2 + SCE 3 | | | SCE 4 | | | SCE 1 + SCE 2 + SCE 3 + SCE 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Producer price | Composite export price | Composite import price | Producer price | Composite export price | Composite import price | Producer price | Composite export price | Composite import price |
| Processed rice | Vietnam | 1.10 | 1.10 | 1.00 | 2.53 | 2.53 | -3.26 | 3.63 | 3.63 | -2.26 |
| | Indonesia | 0.33 | 0.33 | 0.87 | -0.50 | -0.50 | -6.23 | -0.17 | -0.17 | -5.36 |
| | Philippines | -0.57 | -0.57 | -9.10 | -5.41 | -5.41 | -24.50 | -5.99 | -5.99 | -33.60 |
| | Singapore | 0.51 | 0.51 | 0.54 | 0.31 | 0.31 | 0.72 | 0.83 | 0.83 | 1.26 |
| | Thailand | 0.75 | 0.75 | -1.22 | 0.81 | 0.81 | -0.14 | 1.56 | 1.56 | -1.37 |
| | Malaysia | -2.89 | -2.89 | -12.79 | -3.16 | -3.16 | -15.19 | -6.04 | -6.04 | -27.98 |
| | Cambodia | 1.87 | 1.87 | -0.99 | 0.01 | 0.01 | -3.82 | 1.88 | 1.88 | -4.81 |
| | Lao | 3.26 | 3.26 | 0.38 | -0.01 | -0.01 | -2.43 | 3.25 | 3.25 | -2.04 |
| Paddy rice | Vietnam | 1.18 | 1.18 | -0.02 | 3.26 | 3.26 | 0.01 | 4.44 | 4.44 | -0.01 |
| | Indonesia | 0.29 | 0.29 | 0.00 | -0.61 | -0.61 | -0.18 | -0.31 | -0.31 | -0.17 |
| | Philippines | -0.66 | -0.66 | 0.04 | -5.94 | -5.94 | -3.17 | -6.60 | -6.60 | -3.13 |
| | Singapore | 3.95 | 3.95 | 0.48 | 0.11 | 0.11 | 0.53 | 4.06 | 4.06 | 1.01 |
| | Thailand | 0.75 | 0.75 | -1.85 | 1.06 | 1.06 | 0.00 | 1.81 | 1.81 | -1.86 |
| | Malaysia | -1.93 | -1.93 | -12.66 | -3.40 | -3.40 | -15.96 | -5.32 | -5.32 | -28.62 |
| | Cambodia | 1.90 | 1.90 | 0.81 | 0.01 | 0.01 | -1.43 | 1.90 | 1.90 | -0.62 |
| | Lao | 3.93 | 3.93 | 0.62 | -0.01 | -0.01 | -3.07 | 3.92 | 3.92 | -2.45 |

In contrast to Vietnam, the Philippines and Malaysia's producer and export prices of paddy and processed rice fall slightly following AFTA, but the fall becomes greater under Scenario 4. Indonesia differs from the Philippines and

Malaysia in that its prices only fall slightly in Scenario 4- complete rice liberalisation. This difference occurs because Indonesia's initial rice tariffs are lower than the other two countries, and because Indonesia's has less reliance on rice imports, given its self-sufficiency being 99% in 2007, in comparison with approximately 70% in the Philippines and Malaysia (GTAP Data Base, Version 8).

## 7.2. Rice imports, exports and production

Table 7.1 shows that AFTA leads to an increase in imports of rice for several ASEAN members. However, the Philippines and Malaysia register the largest increases, by more than 16%. This increase is greater in the Philippines and Malaysia in Scenario 4 (52% and 19% respectively), which is partially due to a greater fall in the import price. The lower import price encourages agents in these countries to substitute away from domestically produced rice in favour of imported rice. A deeper tariff cut leads to greater imports and a larger fall in production. As shown in Table 7.1 and Table 7.2 , in the Philippines, for example, the import price of processed rice falls by 24% and imports increase by 52%, and production declines by 13% in the event of complete rice liberalization (Scenario 4).

Table 7.2: Percentage changes in production, aggregate exports and aggregate imports of processed rice and paddy rice in four scenarios

| Goods | Countries | SCE 1 + SCE 2 + SCE 3 | | | SCE 4 | | | SCE 1 + SCE 2 + SCE 3 + SCE 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Production | Aggregate exports | Aggregate imports | Production | Aggregate exports | Aggregate imports | Production | Aggregate exports | Aggregate imports |
| Processed rice | Vietnam | 1.47 | 4.87 | 0.27 | 5.77 | 17.94 | 16.46 | 7.25 | 22.81 | 16.73 |
| | Indonesia | 0.10 | -1.12 | -1.31 | -0.88 | 3.23 | 15.46 | -0.78 | 2.11 | 14.15 |
| | Philippines | -4.63 | 4.14 | 18.98 | -12.90 | 34.10 | 52.48 | -17.53 | 38.24 | 71.45 |
| | Singapore | 0.03 | -2.03 | 1.46 | 0.10 | 1.15 | -0.08 | 0.12 | -0.88 | 1.38 |
| | Thailand | -0.15 | -0.15 | 5.16 | 1.85 | 3.91 | 2.43 | 1.70 | 3.76 | 7.59 |
| | Malaysia | -5.16 | 18.13 | 16.35 | -7.73 | 23.88 | 19.01 | -12.89 | 42.01 | 35.35 |
| | Cambodia | -0.65 | -7.15 | 7.12 | -0.21 | 0.92 | 10.41 | -0.86 | -6.23 | 17.53 |
| | Lao | 0.06 | -14.06 | 7.94 | -0.05 | 3.07 | 6.47 | 0.01 | -10.99 | 14.41 |
| Paddy rice | Vietnam | 1.24 | -9.59 | 7.45 | 5.03 | -23.77 | 23.44 | 6.27 | -33.36 | 30.88 |
| | Indonesia | 0.09 | 13.00 | 1.54 | -0.81 | 31.82 | -2.96 | -0.72 | 44.82 | -1.42 |
| | Philippines | -4.44 | 9.13 | -3.45 | -12.34 | 73.39 | -14.43 | -16.77 | 82.51 | -17.88 |
| | Singapore | -2.40 | -32.55 | 5.22 | 0.36 | -0.72 | -0.36 | -2.04 | -33.27 | 4.85 |
| | Thailand | -0.21 | -4.24 | 13.26 | 1.64 | -5.31 | 5.95 | 1.43 | -9.55 | 19.21 |
| | Malaysia | -5.37 | 20.00 | 63.74 | -8.25 | 32.05 | 73.44 | -13.62 | 52.05 | 137.18 |
| | Cambodia | -0.71 | 24.11 | 4.87 | -0.01 | 53.72 | 7.41 | -0.72 | 77.83 | 12.28 |
| | Lao | 0.26 | -28.99 | 17.31 | -0.02 | 0.88 | 16.80 | 0.24 | -28.11 | 34.11 |

In response to ASEAN partners' increased import demand for processed rice, Vietnam's exports of processed rice increase by almost 23% in total. This increase is primarily derived from Scenarios 3 and 4. Moreover, the larger increase in Scenario 4 than in Scenario 3 is due to a substantial increase in Vietnam's exports to the Philippines, Indonesia and Malaysia, in response to a larger increase in import demand for rice from these countries.

In response to the increased export demand, domestic production of processed rice and paddy rice in Vietnam increases slightly (approximately 2% and 5%), following partial and complete rice liberalisation (Scenarios 3 and 4, respectively). A larger increase in production in the latter scenario is due to a larger increase in export demand. The percentage increase in production is smaller than that in exports, due to a fall in the domestic demand for local rice,

which is a result of a fall in the relative price of imported rice, following Vietnam's rice tariff elimination. It is helpful to note that Vietnam's output and farm gate price of paddy rice are driven solely by an increase in the domestic production of processed rice. More specifically, exports and imports of paddy rice between Vietnam and ASEAN members remains unchanged, following ASEAN's complete rice liberalisation since there is no trade in paddy rice between Vietnam and its ASEAN partners in the GTAP baseline database[47].

In summary, the impacts of AFTA on Vietnam's rice sector are similar to those observed in the studies of global rice trade liberalisation. A recent study by Wailes and Morat (2011) predicted that, if all countries eliminated rice tariffs, the Vietnamese producer price is predicted to increase by approximately 14%; the consumer's price increases by approximately 11%; and the export price increases by 11%. Vietnam's rice export quantity increases by approximately 25%. The differences in percentage between this study and previous studies are due to differences in model assumptions, the database and baseline and the scenario design. The findings of this study are also consistent with a study by Heo and Doanh (2009), which found that trade liberalisation leads to a decrease in the price of importable goods and an increase in the price of exportable goods in Vietnam, thus contributing to a reduction in the level of poverty. Consistently, Strutt et al. (2010) show that intra-ASEAN tariffs removal bring about economic welfare gains, and reduce poverty reduction in Vietnam.

## 7.1. Rice self-sufficiency and rice trade balance

This research provides, for the first time, quantitative evaluation into the impacts of complete regional rice trade liberalization on AFTA members' rice trade balance and rice self-sufficiency. The Philippines and Malaysia show the largest fall in both rice trade balance and self-sufficiency. It is important to note that these falls in self-sufficiency, as a consequence of rice trade liberalisation, do not imply decreased food security. Dawe, Moya, & Casiwan (2006) and Dawe (2013)

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[47] If a commodity has zero trade in the database, it will remain zero in the simulations.

point out that rice trade policy in the Philippines and Malaysia, in pursuit of rice self-sufficiency, increases domestic prices, which is likely to reduce the food security of poor households. Moreover, a restriction on rice imports reduces diversification in agricultural production. On the contrary, rice trade liberalisation leads to an improvement in household food security, but it reduces self-sufficiency. In regards to the matter of food security, Kajisa and Akiyama (2005) also suggest that the Philippines would be likely to achieve food security for poor households, in the event of rice trade liberalisation. This study makes a further contribution to existing literature reviews regarding a trade-off between a household's food security and rice self-sufficiency.

## 7.2. Impacts of AFTA trade liberalisation on remaining sectors

The findings of this study contribute additional evidence that suggests ASEAN rice liberalisation increases crop diversification in the Philippines and Malaysia. In the Philippines, the production of "other crops", wheat, vegetables and fruit are projected to expand around 1.5 % in Scenario 3: and further increase by about 3% in Scenario 4. Moreover, exports of vegetable oil and vegetables and fruit, in which the Philippines have a comparative advantage, increase by 5.5% and 8.5%, respectively, following the tariff reforms. A similar situation exists for exports of "other crops", meat products, cattle and animal products and sugar cane/beet in the Philippines. Likewise, Malaysia achieves resource allocation, due to an increase in their production and export of agricultural goods with a comparative advantage following its rice trade liberalisation (Scenarios 3 and 4). The outputs of downstream sectors, such as processed food, which is included in the 'other food products' sector, also increase slightly. This finding further supports the idea of Athukorala and Lok (2009) that rice trade liberalisation better reallocates resources into efficient and fast growing sectors, such as processed food in Malaysia.

However, a finding of this study suggests that ASEAN rice trade liberalisation has only a minor impact on Indonesia's diversification of agricultural production. This result differs from Sayaka et al's results (2007) which show that Indonesia's rice tariff elimination increases the diversification of Indonesia's agricultural production. This difference is partially due to two reasons, Firstly, Sayaka et al employed a multi-market model approach while this study employed CGE-model. The latter incorporates 30 aggregated commodities while the former does only 4 commodities. Secondly, there is a difference in rice tariffs used in the two studies. In reality, Indonesia employs a specific tariff, which is 430-450Rp/kg. In Sayaka et al's study, this tariff is equivalent to 30% although their methodology was not explained. In this study, Indonesia's ad-valorem equivalent tariffs on rice imported from ASEAN partners, range from 8.04 to 9.91%. When reduced to 0, the lower tariffs cause lower falls in the import price and imports of rice, thus leading to lower impacts on other sectors in Indonesia.

## 7.3. Changes in private households' consumption

The Philippines and Malaysia register the largest increases in rice consumption following their rice tariff reductions (Scenarios 3 and 4), due to their largest fall in the price of rice paid by private households. These findings are consistent with studies by David et al. (2009) who found that rice trade liberalisation resulted in lower rice prices for consumers, thus increasing rice consumption in the Philippines. Rice trade liberalisation also improves household food security[48], due to an increasing supply of rice at lower prices for poor consumers in the Philippines and Malaysia (Wailes & Morat, 2011). In accordance with their results, this study finds that the private household consumption of most agricultural goods and food products in the Philippines and Malaysia increase marginally in Scenarios 2, 3 and 4. This finding is similar to those observed in

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[48] This food security improvement is based on the following definition of food security: "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life" (World Health Organization, 1996)

the previous studies that rice trade liberalisation improves household's consumption of foods and agricultural products in the liberalizing countries.

Complete rice trade liberalization also contributes to the increase in private households' consumption of most goods in Vietnam. However, Vietnam's situation differs from the Philippines or Malaysia's situations in that the ASEAN rice trade liberalisation leads to an increase in private households' income in Vietnam. This effect can offset the substitution effect which is caused by increases in the prices of agricultural goods, thus enabling Vietnam's households to increase consumption of several goods, such as wheat, meat products, other food products, and all manufacturing goods. As far as private households' rice consumption is concerned, it falls marginally due to the increased price effect offsetting the increased income. Overall, when the four scenarios are aggregated, Vietnamese households' consumption of all goods increases slightly, except for a marginal decline in rice consumption. Similarly, Nguyen and Ezaki (2005) found that regional economic integration leads to an increase in household income and consumption in Vietnam, and thus this situation is likely to benefit poor and rural households in Vietnam.

## 7.4. Welfare outcomes

The results of this study support previous findings that all AFTA members benefit from a gain in welfare following the tariff reforms, but the original members' gains far exceeds the new members' gains. Singapore benefits the most, followed by Malaysia, Thailand, Indonesia and the Philippines. It is worthy to note that because most of Singapore's tariffs are zero, its welfare gain is primarily derived from TOT gain. The discrepancy between original and new members is more obvious when welfare per capita is considered. Table 7.3 shows that, when the welfare gains of all four scenarios are added together, welfare gain per capita in Vietnam is just 1.6% and 15% of that of Singapore and Malaysia, respectively. This finding supports the idea that AFTA brought about minor welfare gains for Vietnam, because Vietnam, Thailand, the Philippines and

Indonesia share similarities in comparative advantage, especially in agricultural goods (Le, 2003). Trade in agricultural goods among ASEAN partners is more competitive, rather than complementary (Daquila, 2004). Bui (2008) reports that trade among original ASEAN members was characterised by intra-industry trade, while trade between original and new ASEAN members is inter-industry trade. Tongzon and Khan (2005) also find that new ASEAN members face substantial tariff revenue loss in the short term as a result of the CEPT scheme.

Table 7.3: Summary of welfare outcomes (US$ million)

| WELFARE GAIN | SCE 1 + SCE 2 + SCE 3 | | SCE 4 | | SCE 1 + SCE 2 + SCE 3 + SCE 4 | |
|---|---|---|---|---|---|---|
| | Total | Per capita | Total | Per capita | Total | Per capita |
| **Vietnam** | 28 | 0.33 | 133 | 1.57 | 161 | 1.90 |
| **Indonesia** | 231 | 0.99 | -19 | -0.08 | 212 | 0.91 |
| **Philippines** | 231 | 2.61 | -16 | -0.18 | 215 | 2.42 |
| **Singapore** | 710 | 150.01 | 3 | 0.62 | 713 | 150.63 |
| **Thailand** | 290 | 4.28 | 57 | 0.84 | 347 | 5.11 |
| **Malaysia** | 379 | 14.01 | -3 | -0.11 | 376 | 13.90 |
| **Cambodia** | 10 | 0.75 | -1 | -0.08 | 9 | 0.67 |
| **Lao** | 14 | 2.36 | 0 | -0.07 | 14 | 2.29 |

Note. Population data in 2007 is sourced from FAOSTAT (2007)

Examination of Vietnam's welfare gains shows two key findings. Firstly, agricultural tariff reforms primarily contribute to welfare gains for Vietnam, with improved TOT being the main driver of these gains. Processed rice, processed food included in "other food products", "other crops", including coffee and pepper, and crude oil are the key contributors of TOT gains. Secondly, Vietnam experiences an allocative efficiency loss from its manufacturing tariff reduction because Vietnam has a lower share of intra-ASEAN trade and a higher share of agricultural exports in comparison with older ASEAN members. Vietnam has the lowest level of intra-trade with ASEAN partners, namely 17.2%, as opposed to 64% (Lao PDR) and 23% (Cambodia) in 2011 (Chia, 2013) and this share for

Vietnam has not changed from 1990 to 2011[49]. Because Vietnam has little manufacturing trade with ASEAN, so it has little opportunity to achieve allocative efficiency. The rationale seems consistent with the study by Bui (2008) that Vietnam's low trade flows with ASEAN partners was an underlying factor for the deterioration in its national welfare, following its regional tariff reforms. The result of this study is also consistent with the findings of previous studies Fukase & Martin (2001); Strutt et al. (2010); and Toh Mun and Gayathri (2004) that Vietnam's gains from AFTA arise from TOT improvement; and that processed foods, including processed rice, are Vietnam's core competence.

One key purpose of this study is to examine the contribution of complete rice trade liberalization to each ASEAN member's welfare change. The results suggest that complete rice trade liberalisation increases welfare for Vietnam, while it decreases welfare in Indonesia, the Philippines and Malaysia. Table 7.3 shows that the majority of Vietnam's welfare gains arise from Scenario 4 (ASEAN rice trade liberalisation), whereas, Indonesia, the Philippines and Malaysia suffer welfare losses in this Scenario. Further examination shows that gains from better resource allocation are diminished by a deteriorated TOT in these three countries. In the Philippines, for example, processed rice and equipment register the largest fall in TOT, due to decreased export prices. This finding could further explain these countries exempting rice from complete regional trade liberalisation, in addition to the rationales discussed in the literature review section.

## 7.5. Trade creation and trade diversion

The findings of this study support the trade creation effects of AFTA. AFTA has contributed to an increase in agricultural trade among members, especially in the rice sectors. This trade creation outweighs trade diversion in some manufacturing sectors. This trade creation is aligned with the finding of Korinek and Melatos (2009) that complete implementation of AFTA has significant impacts on creating trade in food and agricultural goods. However, the finding of this study

contrasts with the finding of Toh Mun and Gayathri (2004) and Fukase and Martin (2001) who used an earlier GTAP database. This difference is probably due to the evolution of intra-trade among ASEAN members. In this regards, Chia (2013) points out that intra-ASEAN trade's share out of total exports of ASEAN10 increased from 17% to 25%, between 1990 and 2011. This increase can be attributed to improvements in customs and trade logistics following AFTA. Abbott et al (2009) also showed that trade flows among ASEAN members have increased significantly between 1986 and 2004.

# 7.6. Conclusion, research limitations and ideas for future research

Using the GTAP V8 database, this study evaluated the impacts of AFTA on ASEAN members from different perspectives: agricultural production, consumption, trade, and prices for agricultural and processed food. An emphasis was placed on rice production and trade for ASEAN members. This study differs from previous studies in two ways. Firstly, it examined the contribution of regional rice trade liberalisation to regional welfare gain. Secondly, agricultural and food processing commodities of GTAP database in this study were not aggregated, whereas previous researchers aggregated agricultural goods in GTAP database into fewer goods.

The major findings of this study support trade creation of AFTA, and that AFTA has significant impacts on creating trade in food and agricultural goods. The findings of this study also advocate for intra-ASEAN rice trade liberalization from economic perspectives for two reasons. Firstly, it enhances economic welfare gains for new ASEAN members, especially Vietnam. Secondly, it brings about two important benefits for the other ASEAN members, especially the Philippines and Malaysia. These benefits include an increase in rice consumption for private households, thus contributing to increased household food security. Another benefit is a better resource allocation and an increase in production of goods with a comparative advantage. The research also pinpoints that rice

production has been distorted by rice trade protection in the Philippines and Malaysia. In the event of complete rice trade liberalization, domestic rice prices and production in these countries fall substantially.

The findings of this study also suggests that complete rice trade liberalization increases welfare for Vietnam, and supports previous studies that show rice trade liberalization contributes to improve rice farmers' incomes, and thus to reduce poverty in Vietnam. However, as highlighted in literature reviews, regional rice trade may not occur in the future as long as some issues remain unresolved. These issues include ASEAN members' persistent pursuit of rice-self-sufficiency and their lack of trust in the world rice market. To overcome these problems, Vietnam should undertake a consistent and reliable rice export policy. There is a need for an improvement in market analysis and forecasts to better cope with price volatility in the world market. Then measures to enhance Vietnam's rice export competitiveness, for example improving quality should be taken in the long term. Extreme resorts to cope with price volatility in the world market, such as the export ban in 2007/2008, should be avoided.

This research inevitably involves some limitations. Noting five of these limitations might be helpful for future researchers. Firstly, under a limited GEMPACK licence, this research was unable to study beyond 30 aggregated commodities, although the GTAP database provides data for 50 commodities. Therefore, commodities had to be aggregated. However, the outcome of tariff reforms can vary with different aggregation approaches. Future researchers should extend disaggregation beyond 30 aggregated commodities in order to evaluate the impacts of tariff reforms in more detail. Secondly, due to the nil trade flow of paddy rice between Vietnam and its ASEAN partners in the baseline database, the GTAP model is limited by not being able to produce new valid trade flows for such goods, in response to tariff reforms. This situation also occurs for wheat, wool and raw milk goods for some ASEAN members. It is

probable that the gain from agricultural trade liberalisation for ASEAN members would be greater without this limitation. Thirdly, the results of this research present changes in variables such as trade, production and consumption, in comparison with the baseline data for 2007, following the tariff reforms. The lag in data used in this research undermines the predicted outcomes of future tariff reforms. Future researchers in a similar area should, therefore, update the model to 2015, in order to better evaluate future tariff reforms. Fourthly, in this study, for simplicity, most ASEAN members' GTAP tariffs are reduced to 0%. Some new ASEAN members' tariffs are reduced to 5%. Tariffs on goods in exclusion lists are not changed. Future research in the similar area could better estimate the impact of preferential tariff reduction. For example, at the HS 6 level, all tariff lines that have been aggregated into a single GTAP commodity can be listed along with base period trade values, base tariffs, and the new liberalized tariffs. Then the trade –weighted liberalized tariff of the GTAP commodity can be computed.

Finally, the findings of this research are limited to the static impacts of a regional free trade agreement on economic welfare. It has been widely recognised that the economic impacts of RTAs may be larger if the dynamic impacts are taken into account (Burfisher, Robinson, & Thierfelder, 2004; Robinson & Thierfelder, 2002). Such dynamic impacts include capital stock accumulation and the link between trade and productivity. In regard to the impacts of AFTA on Vietnam's trade growth, Abbott et al. (2009, p. 309) pointed out that the growth of Vietnam's trade with ASEAN members far exceeded any model- based predictions, and that "bilateral trade agreements in the past have generated new and more diversified trade flows well beyond the levels that are likely to follow from modest tariff reductions". Institutional reforms are one of the key factors explaining for the robust growth of Vietnam's trade with ASEAN countries. Future research on impacts AFTA on Vietnam could extend to the dynamic impacts of AFTA and examine the impacts of RTAs between ASEAN and non-ASEAN members.

Despite the limitations mentioned above, the results of this study could assist policy makers in ASEAN partners to better evaluate the pros and cons of further opening their rice markets in the future.

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# APPENDIX

## Appendix 1: Comparison of types of rice exports among three key rice exporters

**Overview on rice types**

### Japonica and India rice

+ Japonica is produced mainly in temperate and tropical upland climatic zones, mainly in Japan, South Korea, Australia, and some areas in China, Thailand and the US. Japonica rice accounted for only about 13% of the world rice production in 2000-2005.   Short grain rice belongs to the Japonica type.

+ Indica rice is grown in the tropics. The grain length can be short, medium or long. Indica rice (long grain) is mainly grown in Vietnam and Thailand.

+ Fragrant rice (usually long grain rice) is distinctive by its aroma. One example of fragrant rice is Thai jasmine rice, registered as Hom Mali. Another example is Basmati rice which originated from India and is mainly produced in India and Pakistan.

+ Glutinous rice (or sticky rice) consists of amylose and amylopectin starch with chalky white texture. It accounts for a small share of Thailand's and Vietnam's exports.


### Rice types by degree of processing

+ Rough rice (Paddy rice): rice is harvested from the field with husk and bran layer attached

+ Brown rice: husk is removed, but bran layer is still attached.

+ Milled white rice: rice whose husk and bran layers are all removed through the milling process.

+ Head rice (or broken rice 100%): Fully milled rice grains that remain intact

+ Broken rice: is also known as damaged white rice during milling process. The higher number of broken grains each quantity unit of rice has, the lower the quality. Milled rice with higher percentage of broken grains is sold at lower price.

For example, Vietnam's milled rice with 25% and 5% broken rice were US$398/ton and US$424/ton, respectively at December 2013 (FAOSTAT, 2013).

+ Parboiled rice: rice that has passed through parboiling process under intense pressure before its bran is removed. During this process, a part of nutrients from the bran is pushed into the kernel before the bran is removed, thus some nutrients are kept in the starchy centre of rice.

### Type of rice exports by country

Almost 90% of Vietnam's rice exports are white rice with broken grains (Indica rice). The share of Vietnam's rice 5% broken, Vietnam's highest quality rice, increased from 17% in 1999 to 27% in 2010. The share of lowest quality rice (rice 25% broken and rice 100% broken) declined from 38% to 31% while the share of rice 15% broken increased double in the same period (see Figure A.1). Overall, despite the increase in proportion of higher quality rice types, a majority of Vietnam's rice exports were still white rice with broken grains. In comparison to Thailand, such low quality rice accounted for only 26% of Thai rice exports in 2010. The remainder of Thai rice exports are parboiled rice, fragrant rice and white rice 100% which Vietnam is not able to produce. The proportion of the high quality rice tends to increase (as shown in Figure A.2), thus continuing to enable Thailand to increase its global competitiveness. Due to the ability to produce high quality rice, Thailand can occupy a large market share in the US, EU, Japan and Middle East.

Indian rice exports differ from those of Thailand and Vietnam in terms of rice type. A large proportion of India's rice exports are Basmati rice. The share of Basmati rice to total rice exports increased substantially from 55% in 2000 to 96% in 2010 due to the Indian Government's restriction of exportation of non-basmati rice. India's main export markets are the EU and Middle East regions.
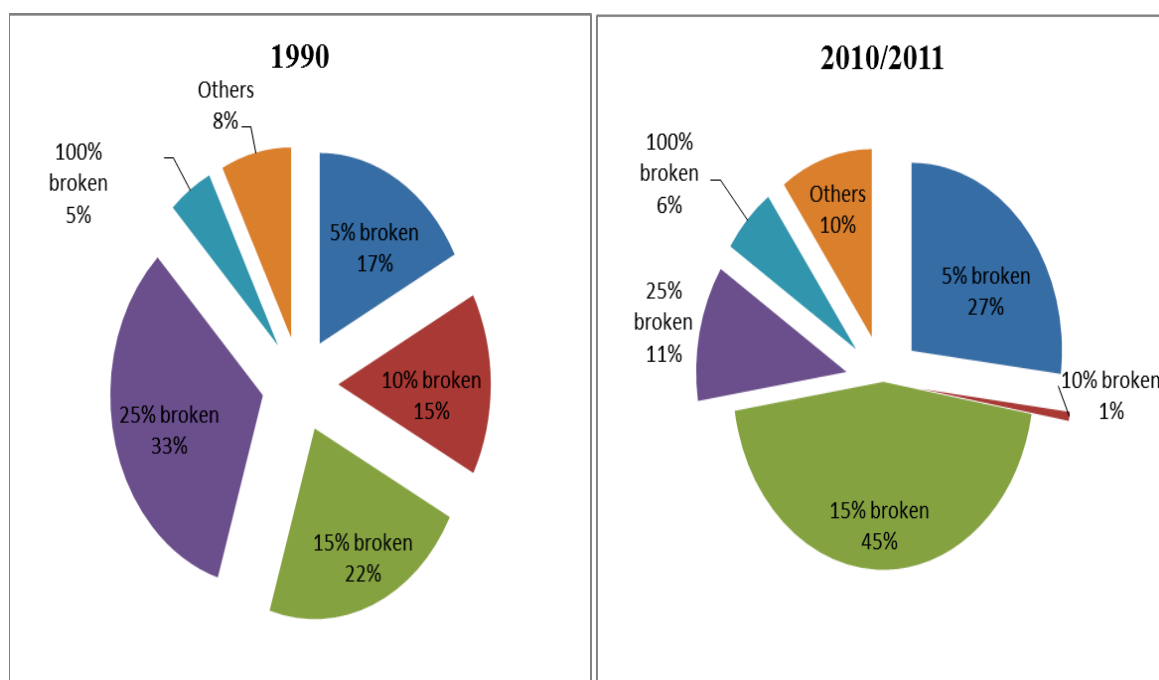
Figure A.1: Vietnam rice exports by types. Sources: (Kreamer, 2000; Quan & Taylor, 2010)
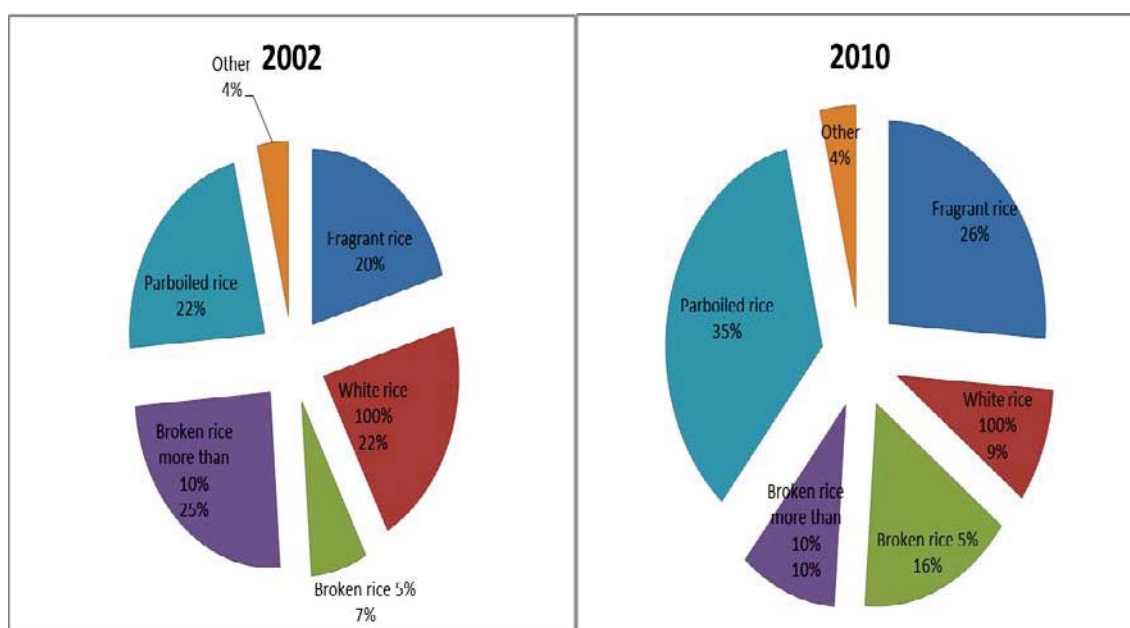
Notes: Other rice includes glutinous, jasmine rice



Figure A.2 Thai rice exports by types. Sources: (Prasertsri & McSherry, 2004; Prasertsri & Vasquez, 2011)

# Appendix 2: Aggregation of region and goods

Table A.1: Regional Aggregation

| No. | Code | Comprising regions |
|---|---|---|
| 1 | Vietnam | Viet Nam. |
| 2 | Indonesia | Indonesia. |
| 3 | Philippines | Philippines. |
| 4 | Singapore | Singapore. |
| 5 | Thailand | Thailand. |
| 6 | Malaysia | Malaysia. |
| 7 | Cambodia | Cambodia. |
| 8 | Lao | Lao People's Democratic Republ. |
| 9 | OtherSEA | Rest of Southeast Asia. |
| 10 | China | China. |
| 11 | India | India. |
| 12 | SouthKorea | Korea. |
| 13 | Japan | Japan. |
| 14 | AusNew | Australia; New Zealand. |
| 15 | USA | United States of America. |
| 16 | EU | Austria; Belgium; Cyprus; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Latvia; Lithuania; Luxembourg; Malta; Netherlands; Poland; Portugal; Slovakia; Slovenia; Spain; Sweden; United Kingdom; Bulgaria; Croatia; Romania. |
| 17 | SSA | Benin; Burkina Faso; Cameroon; Cote d'Ivoire; Ghana; Guinea; Nigeria; Senegal; Togo; Rest of Western Africa; Central Africa; South Central Africa; Ethiopia; Kenya; Madagascar; Malawi; Mauritius; Mozambique; Rwanda; Tanzania; Uganda; Zambia; Zimbabwe; Botswana; Namibia; South Africa. |
| 18 | ROW | Rest of Oceania; Hong Kong; Mongolia; Taiwan; Rest of East Asia; Bangladesh; Nepal; Pakistan; Sri Lanka; Rest of South Asia; Canada; Mexico; Rest of North America; Argentina; Bolivia; Brazil; Chile; Colombia; Ecuador; Paraguay; Peru; Uruguay; Venezuela; Rest of South America; Costa Rica; Guatemala; Honduras; Nicaragua; Panama; El Salvador; Rest of Central America; Caribbean; Switzerland; Norway; Rest of EFTA; Albania; Belarus; Russian Federation; Ukraine; Rest of Eastern Europe; Rest of Europe; Kazakhstan; Kyrgyztan; Rest of Former Soviet Union; Armenia; Azerbaijan; Georgia; Bahrain; Iran Islamic Republic of; Israel; Kuwait; Oman; Qatar; Saudi Arabia; Turkey; United Arab Emirates; Rest of Western Asia; Egypt; Morocco; Tunisia; Rest of North Africa; Rest of Eastern Africa; Rest of South African Customs ; Rest of the World. |

Table A.2: **Commodity Aggregation**

| No. | Code | Comprising sectors |
|---|---|---|
| 1 | PaddyRice | Paddy rice. |
| 2 | Wheat | Wheat. |
| 3 | Grains | Cereal grains nec. |
| 4 | VegFruits | Vegetables, fruit, nuts. |
| 5 | Oilseeds | Oil seeds. |
| 6 | Sugarcb | Sugar cane, sugar beet. |
| 7 | Othercrops | Plant-based fibers; Crops nec. |
| 8 | CattnAniprod | Cattle,sheep,goats,horses. |
| 9 | Oap | Animal products nec. |
| 10 | Rawmilk | Raw milk. |
| 11 | Wol | Wool, silk-worm cocoons. |
| 12 | Forestry | Forestry. |
| 13 | Fishing | Fishing. |
| 14 | Extraction | Coal; Oil; Gas; Minerals nec. |
| 15 | Meat | Meat: cattle,sheep,goats,horse. |
| 16 | Meatproducts | Meat products nec. |
| 17 | Voil | Vegetable oils and fats. |
| 18 | Dairyproduct | Dairy products. |
| 19 | ProRice | Processed rice. |
| 20 | Sugar | Sugar. |
| 21 | Otherfoodpro | Food products nec. |
| 22 | Berntob | Beverages and tobacco products. |
| 23 | TexNclothing | Textiles; Wearing apparel; Leather products. |
| 24 | Paper | Wood products; Paper products, publishing. |
| 25 | PetroNChemi | Petroleum, coal products; Chemical,rubber,plastic prods; Mineral products nec. |
| 26 | Metal | Ferrous metals; Metals nec. |
| 27 | Metalpro | Metal products. |
| 28 | MotorNtransp | Motor vehicles and parts; Transport equipment nec. |
| 29 | Equipment | Electronic equipment; Machinery and equipment nec; Manufactures nec. |
| 30 | Services | Electricity; Gas manufacture, distribution; Water; Construction; Trade; Transport nec; Sea transport; Air transport; Communication; Financial services nec; Insurance; Business services nec; Recreation and other services; PubAdmin/Defence/Health/Educat; Dwellings. |

# Appendix 3: Revealed Comparative advantage

This research employs method in computing revealed comparative advantage (RCA) introduced by Yeats (Yeats, 1998). RCA is computed as follows:

$$RCA_{j\,r} = \frac{\dfrac{x_{rj}}{Xrt}}{\dfrac{x_{wj}}{X_w}}$$

Whereas:

$x_{rj}$: Exports of product j of region r

$x_{rt}$: Total exports of region r

$x_{wj}$: World's exports of product j excluding the value of exports of product j from region r

$X_w$: Total world exports excluding the total value of region r's exports

RCA > 1 indicates country r has a comparative advantage in good j: the reverse indicates that country r has a comparative disadvantage in good j.

Table A.3 shows that Vietnam, Thailand and Indonesia have relatively similar patterns of comparative advantage. Both Vietnam and Indonesia have a comparative advantage in crude oil (included in 'extraction'), textile and clothing, paper production, processed foods (included in 'other food products'), animal products and coffee (included in "other crops"). Similarly, Vietnam and Thailand have a comparative advantage in vegetables and fruits and processed rice. Given that some ASEAN members have been the world's largest exporters of vegetable oil and fish, Table A.1 shows Vietnam, the Philippines and Thailand have comparative advantages in these goods. All original ASEAN members have comparative advantage in their export of equipment, which accounted for the largest share of each member's total exports in 2007. Whereas, none of these members have comparative advantage in motor and transportation goods.

Table A.3: **Relative comparative advantage**

| Commodity | Vietnam | Indonesia | Philippines | Singapore | Thailand | Malaysia | Cambodia | Lao | OtherSEA | China | India |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Paddy Rice** | 0.2 | 0.1 | 0.0 | 0.0 | 5.3 | 0.0 | 1.9 | 8.0 | 0.0 | 0.7 | 14.8 |
| **Wheat** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 |
| **Grains** | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 | 0.8 | 4.9 | 1.0 | 0.4 | 0.5 |
| **Vegetable and Fruits** | 2.3 | 0.4 | 1.7 | 0.0 | 1.2 | 0.1 | 0.9 | 0.7 | 6.6 | 0.5 | 1.2 |
| **Oil seed** | 0.5 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.7 | 1.4 | 0.2 | 1.3 |
| **Sugar cane and beets** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Other crops** | 9.3 | 2.9 | 0.2 | 0.1 | 0.5 | 0.2 | 0.2 | 5.7 | 0.1 | 0.3 | 4.3 |
| **Animal products** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.1 |
| **Other animinal products** | 1.3 | 1.2 | 0.0 | 0.2 | 0.2 | 0.8 | 0.3 | 2.8 | 0.1 | 0.8 | 0.5 |
| **Wool** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 0.0 |
| **Forestry** | 1.9 | 0.5 | 0.0 | 0.1 | 0.2 | 3.8 | 3.2 | 41.9 | 35.9 | 0.1 | 0.5 |
| **Fishing** | 0.8 | 2.4 | 1.1 | 0.2 | 1.4 | 0.5 | 0.5 | 0.0 | 3.7 | 0.5 | 0.4 |
| Extraction | 1.7 | 2.3 | 0.2 | 0.0 | 0.1 | 0.9 | 0.0 | 0.2 | 6.8 | 0.1 | 0.6 |
| **Meat** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 |
| **Meat products** | 0.3 | 0.1 | 0.1 | 0.0 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 |
| **Vegetable oil** | 0.1 | 13.9 | 2.2 | 0.2 | 0.4 | 11.1 | 0.1 | 0.0 | 0.0 | 0.1 | 2.3 |
| **Dairy products** | 0.1 | 0.1 | 0.4 | 0.3 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 |
| **Processed rice** | 36.4 | 0.0 | 0.0 | 0.0 | 32.3 | 0.0 | 0.3 | 1.1 | 0.3 | 0.3 | 18.9 |
| **Sugar** | 0.2 | 0.2 | 0.9 | 0.2 | 6.1 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 4.6 |
| **Other food products** | 4.0 | 1.2 | 0.7 | 0.4 | 3.0 | 0.6 | 0.1 | 0.0 | 0.7 | 0.8 | 0.9 |
| **Beverage and tobacco** | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.0 | 0.1 | 0.2 |
| **Textile and clothing** | 5.4 | 2.0 | 0.8 | 0.1 | 1.1 | 0.3 | 16.3 | 3.3 | 0.8 | 4.4 | 3.1 |
| **Paper** | 1.8 | 2.3 | 0.5 | 0.3 | 0.7 | 1.2 | 0.5 | 3.3 | 0.4 | 1.2 | 0.2 |
| **Petroleum and chemical products** | 0.4 | 0.9 | 0.2 | 2.0 | 1.0 | 0.8 | 0.1 | 0.1 | 0.0 | 0.5 | 1.4 |
| **Metal** | 0.2 | 0.9 | 0.6 | 0.3 | 0.5 | 0.4 | 0.1 | 6.7 | 0.1 | 0.6 | 1.5 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Metal products** | 0.7 | 0.4 | 0.2 | 0.3 | 0.8 | 0.4 | 0.1 | 0.0 | 0.0 | 1.7 | 1.1 |
| **Motor and transportation** | 0.1 | 0.2 | 0.3 | 0.2 | 0.8 | 0.1 | 0.1 | 0.0 | 0.0 | 0.3 | 0.3 |
| **Equipment** | 0.4 | 0.5 | 2.5 | 1.8 | 1.5 | 1.9 | 0.0 | 0.1 | 0.0 | 1.8 | 0.7 |

Source: data is sourced from GTAP Database Version 8

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