Impacts of ASEAN Agricultural Trade Liberalization on ASEAN-6 Economies and Income Distribution in Indonesia

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Contents

Acronyms and abbreviations

APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
CBS	Central Bureau of Statistics
CEPT	Common Effective Preferential Tariff
CGE	Computable General Equilibrium
DDA	Doha Development Agenda
FAO	Food and Agricultural Organization of the United Nations
FTA	Free Trade Area
GEL	General Exclusion List
GDP	Gross Domestic Product
GTAP	Global Trade Analysis Project
ICT	Information and Communications Technology
IL	Inclusion List
ISI	Import Substitution Industrialization
MFN	Most Favoured Nation
NTBs	non-trade barriers
OECD	Organisation for Economic Co-operation and Development
TEL	Temporary Exclusion List
ToT	Terms of Trade
WTO	World Trade Organization

Executive summary

This research paper intends to analyse: (a) the impacts of ASEAN trade liberalization on the macroeconomy variables – gross domestic product (GDP), Terms of Trade (ToT), balance of trade, inflation and real wage – and agricultural industries (output, exports and imports) in the ASEAN 6 countries (Indonesia, Malaysia, the Philippines, Thailand, Singapore, and Viet Nam); and (b) the impact of trade liberalization on income distribution in Indonesia. A multi-country and multi-commodity computable general equilibrium (CGE) GTAP model has been used as the main tool of analysis.

In order to analyse the detailed impact on the agricultural sector and income distribution in Indonesia, the GTAP model is linked with the one-country Indonesian General Equilibrium Model. To analyse the impact of trade liberalization by a group of countries, all relevant policy interventions (whether export tax, export subsidy, import tax or import subsidy) in each country have been removed in the GTAP model.

Three scenarios of ASEAN trade liberalization have been considered: prevailing zero tariffs for all agricultural products within the ASEAN 6 countries (scenario1); trade liberalization for all agricultural products except sensitive and highly-sensitive products (scenario 2); and trade liberalization as in scenario 1 complemented by trade facilitation through an increase of 10 per cent in the finance and business sectors (scenario 3).

The results show positive impacts for scenario 1 and scenario 2 in all ASEAN members except for Indonesian real GDP. The Indonesian trade balance, nominal GDP and TOT experience positive impacts while Indonesian real GDP does not change (almost zero per cent). Generally, of the ASEAN 6 countries, Indonesia experiences the smallest improvement in welfare.

Under scenario 3, ASEAN 6 countries would experience welfare improvement, particularly Singapore. The impact of ASEAN agricultural trade liberalization would increase output for the ASEAN member countries as a whole. Nevertheless, scenario 3 is found to worsen the trade balance in the majority of ASEAN members.

When zero tariffs are applied to agriculture in all the ASEAN member countries, Indonesia experiences almost zero change in real income. In contrast, when zero tariffs come in combination with improvement in trade facilitation, nominal and real income becomes positive for each household category.

Welfare of almost all household increase slightly due to ASEAN trade liberalization in all simulations, with the smallest increase (almost zero change) occurring in scenario 1. Protecting some sensitive and highly-sensitive products from liberalization is still necessary in order to raise household welfare, especially among the agriculture household categories.

Key words: ASEAN, trade liberalization and income distribution.

I. Introduction

A. Background

There are several bilateral and regional agreements on trade liberalization, such as the Singapore-China Free Trade Area (FTA), North American FTA, and the Association of Southeast Asian Nations (ASEAN) FTA. In the case of ASEAN, the latest Framework Agreement follows the ASEAN Concord II (also known as Bali Concord II) in 2003. The end-goal of economic integration is establishing the ASEAN Economic Community as outlined in ASEAN Vision 2015. Consequently, there is a free flow of goods, services and investment, a freer flow of capital as well as equitable economic development, and reduced poverty and socio-economic disparities in the ASEAN region (Lloyd and Smith, 2004). The ASEAN Concord II further declares that the ASEAN Economic Community will also establish the region as a single market and production base.

Agriculture-based industries are included in the 11 priority sectors agreed on under ASEAN economic integration. The framework agreement for the integration of priority sectors, which was signed at the tenth ASEAN Summit, includes the scope, modalities, and timelines necessary for accelerating the integration of 11 sectors: agro-based products, air travel, automotives, electronics, fisheries, health-care products, rubber-based products, textiles and garments, information and communication technology (ICT), tourism and wood-based products (Austria, 2004).

Trade liberalization has several impacts including: (a) a decrease in imported goods prices due to relaxation and reduction in tariffs; (b) an increase in consumer demand due to low prices of goods and services; and (c) an increase in domestic competitiveness in international markets due to tariff reductions across national borders. This situation clearly will create opportunities for exporting and importing. However, some experts have criticized trade liberalization by arguing that it potentially damages domestic production and food security as reductions in tariffs will cause a decline in the relative price of imported goods and an increase in imports.

Most ASEAN countries depend on the agricultural sector as a major source of gross domestic product (GDP). For example, Indonesia has an agricultural-based industry contributing around 15 per cent of total GDP and that depend largely on small-scale farming systems. Therefore, it is interesting to analyse specifically what the impact of ASEAN trade liberalization will be on ASEAN agricultural industries. In Indonesia, particularly, some 60 per cent of employees work in the agricultural sector and live in rural areas. Therefore, it is important to analyse the impact of trade liberalization on income distribution, especially in the rural areas, as an indicator of poverty incidence.

Indonesia, like other developing countries, is a small nation in terms of its position in international trade activities. It is implied that Indonesia cannot influence world market prices. As a price taker, the fluctuations of world prices will affect the performance of export commodities The capability of Indonesian commodities to face regional or global competition is still questionable, especially in the case of agricultural products that greatly depend on small-scale farming systems; the main actors in agricultural activities, particularly in production, are categorized as smallholders who live in rural areas. Most smallholders are

facing poverty and achieving stable agricultural commodity prices has become a key issue in attaining the ultimate development goals of Indonesia, as in other such countries.

B. Research questions

The implementation of ASEAN economic integration is expected to affect the performance of ASEAN exports and imports as well as other macroeconomic indicators such as GDP and inflation. Therefore, to agree on ASEAN economic integration, ASEAN members should set relevant policies so that achieving the intended targets will have a positive result. Moreover, in 2010, members of AFTA will be expected to apply zero tariffs while ASEAN economic integration will achieve the ASEAN vision in 2015. One of the priority sectors that will feel the impact of ASEAN economic integration is agriculture.

The investigation of the impact of liberalization is becoming an important issue as most ASEAN members still rely on this sector and because the sector provides a large percentage of employment. In addition, trade liberalization is expected to affect income distribution in ASEAN member countries, particularly Indonesia. As Indonesia is struggling to reduce its income disparity, it is therefore becoming very important for this aspect to be studied in depth. Based on these factors, the following research questions can be raised:

- What is the impact of ASEAN trade liberalization on the macroeconomics and agricultural sector of each ASEAN country?
- What is the impact of ASEAN trade liberalization on income distribution in Indonesia?

C. Research objectives

The ultimate objectives of the study are:
(a) To develop an Indonesian CGE model and establish its link to the global CGE model;
(b) To analyse the impacts of ASEAN trade liberalization on the macroeconomy – GDP, Terms of Trade (ToT), balance of trade, inflation and real wages – and agricultural industry (such as paddy rice and wheat output, and exports and imports of ASEAN countries); and
(c) To analyse the impact of trade liberalization on income distribution in Indonesia

D. Scope of the study

The study is focused on the impact of trade liberalization in the ASEAN 6 (Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam) because details of these six countries are available in the GTAP database and because they contribute a large proportion of ASEAN trade, including in agricultural trade.

II. Literature Review

A. Previous studies of trade liberalization

A number of previous studies have been carried out by researchers on the impact of trade liberalization on macroeconomics and income distribution, either of individual countries or a region. Their findings, however, vary in terms of size or magnitude. According to the Organisation for Economic Co-operation and Development (OECD) (2006), the most effective way to make trade work for development and poverty reduction is for countries to agree on significantly improved market access under the Doha Round of the World Trade Organization (WTO).

Ambitious trade liberalization can generate more gains for developing countries than any other area of international economic cooperation or development assistance. But while access to OECD markets is clearly a key element in developing countries' productivity growth, trade between developing countries is also vital. OECD states that the potential benefit from freer South-South trade may indeed be at least as large as the gains that developing countries can obtain from better access to rich countries' markets (North-South trade). This not only underscores the importance of a successful conclusion of the current round of WTO negotiations, but also the significance of active participation by developing countries.

In a broad region, a study of the impact of liberalization was carried out by Oktaviani and Drynan (2000). They investigated the impact of APEC trade liberalization on the Indonesian economy and its agricultural sector. An Indonesian Forecasting Model was developed based on the ORANI-F general equilibrium model for Australia. APEC trade liberalization was found to be generally beneficial in enhancing growth in most APEC members in the short term and even more so in the long term, except for North America. For a given tariff rate change scenario, the impacts of the two cases of trade liberalization were found to be generally in the same direction. The impacts of full APEC trade liberalization are more positive (or less negative) than the impacts of trade liberalization by only for the APEC developed countries. Indonesia gains more if it precisely eliminates the implied barriers existing after trade liberalization by other APEC members than if it under-adjusts or over-adjusts. Furthermore, Indonesia benefits from participating in trade liberalization, even if other developing countries do not participate, although the effects are small.

The results suggest that the Government of Indonesia needs to avoid over-reductions in tariff barriers if it seeking development focused on increased investment and increased private consumption. Indonesia's comparative advantage appears to lie with producing and exporting raw primary products rather than in processing them. Regardless of the reason for the differences, these industries have an interest in seeing full APEC trade liberalization rather than more limited liberalization. It will therefore be beneficial for Indonesia to pay more attention to develop the agricultural processing sector.

The implications of full APEC trade liberalization on a preferential basis and liberalization restricted to ASEAN member economies between 1995 and 2000 was analysed by McKibbin (1996), using a dynamic multi-sector global model called the Asia-Pacific G-Cubed Model (APGCUBED). The study focused on the role of international capital flows, expectations and physical capital accumulation in determining the size and distribution of income gains from this ambitious programme of trade reform. It was found that the largest

gains for participating economies were realized by full non-preferential liberalization. Preferential liberalization just between APEC economies by discriminating against non-APEC economies would yield only two thirds of these gains.

APEC trade liberalization can have significant effects on international capital flows, although this mechanism affects real exchange rates and trade flows. Allowing for the adjustment, international capital flow shows that some common perceptions in industrial economies of the effect of opening up to trade with developing economies need to be re-evaluated.

A positive impact by APEC trade liberalization was found by Chan and Nugent (1998). Their study showed that APEC trade liberalization could be quite important in terms of trade and income growth, both of APEC countries and the world. Using a simple econometric model of bilateral trade flows based on country size, the study showed that the removal of tariff barriers would have the greatest impact, increasing APEC imports (and presumably exports) by more than 13 per cent. Eliminating NTBs would increase APEC imports by an additional 5.5 per cent.

Another important source of benefits from APEC liberalization would be provided by stimulating the liberalization of barriers to imports in the rest of the world. Indeed, if such liberalization by the rest of the world was also complete, APEC imports would rise by an additional 4.1 per cent. Rest-of-the-world imports would also be increased by APEC liberalization, but the greatest expansion of such imports would come from liberalization by the rest of the world.

With regard to the impact of trade liberalization on poverty, one study of this aspect was carried out by Khan (2005). He used a dualistic, compact and "generic" (macroeconomic) computable general equilibrium (CGE) model specially constructed for the purpose of investigating the implications of trade liberalization for poverty reduction in South Asia. The specific generic model for South Asia, incorporating dualism and rural-urban and urban-rural migration within a Harris-Todaro framework, revealed a number of specific connections between trade liberalization and poverty reduction. Within this particular CGE model, the policy experiments showed that trade liberalization in the South Asian region could lead to further poverty reduction.

In the ASEAN area, a study of the impact of trade liberalization was carried out by Nguyen (2002). He showed that for more than a decade, Viet Nam had followed a number of unilateral as well as multilateral moves to free the trading sector, including measures directed at tariffs, quantitative restrictions, the exchange rate mechanism etc.

Three important conclusions were addressed by Nguyen. First, trade liberalization under the CEPT scheme (inclusion list, IL and temporary exclusion list, TEL) would have somewhat fruitful impacts on economic growth in Viet Nam. However, it is worth being cautious in taking another step to liberalize the industries included in the General Exclusion list (GEL). Second, the crowding-out effect on trade volume with the rest of the world and in favour of ASEAN member countries would reduce the total change in trade resulting from trade liberalization. Third, even though overall incomes would increase in all sectors due to more efficient uses of production factors, the most fruitful impacts of trade liberalization would be on the agricultural and labour-intensive sectors, which account for the largest portion of the poorest population of Viet Nam. In other words, trade liberalization directly

contributes to the poverty reduction of Viet Nam. All of those dynamic impacts would maintain the long-term and permanent high growth rate of the economy.

A study by Pasadilla (2006) analysed how various preferential trading arrangements dealt with agricultural trade liberalization, and examined a few case studies highlighting the provisions on agriculture. While tariff reduction on all goods including agriculture in ASEAN provides a marked advantage over the MFN tariff rates, intra-ASEAN agriculture trade has not been all that significant. Most of the growth in the intra-ASEAN trade has come from trade in industry; and if total agricultural trade has expanded, much of it is due to trade outside the region.

Hakim (2004), by using a recursive dynamic, multi-region computable general equilibrium model, he found that trade liberalization pursued by the ASEAN countries such as global multilateral agreements under the auspices of WTO, ASEAN Free Trade Area (AFTA) and Asia-Pacific Economic Co-operation (APEC), would improve their economies overall. Under the Uruguay Round and the Millennium Round, real GDP in all ASEAN member countries is expected to rise.

Compared to real GDP increases in the other ASEAN member countries, Hakim (2004) showed that Indonesia would have the lowest real GDP rise in response to AFTA trade liberalization because that country had relatively low trade barriers. However, Indonesia would gain from increased exports resulting from better market access to other ASEAN countries.

B. Previous studies of income distribution

One of the studies on the impact of trade reforms on income distribution was carried out by Hertel and Winters (2005). Their research combined the results from several elements of research in a novel way. First, they drew on an intensive analysis of the DDA Framework Agreement, paying particularly close attention to potential reforms in agriculture. The scenarios were built up using newly available tariff line data, and their implications for world markets were established using a global modeling framework. These world trade impacts, in turn, formed the basis for 12 country case studies of the national poverty impacts of the DDA scenarios, including Indonesia. They found that the liberalization targets under DDA would have to be quite ambitious if the round was to have a measurable impact on world markets and hence poverty. Assuming an ambitious DDA, they found the near-term poverty impacts to be mixed, with some countries experiencing small poverty increases and others undergoing more substantial poverty declines.

On balance, poverty was reduced under this DDA and the reduction was more pronounced in the longer term. Allowing minimal tariff cuts for just a small percentage of special and sensitive products virtually eliminated global poverty reduction due to the DDA. Deeper cuts in developing country tariffs would make the DDA more poverty-friendly.

Hertel and Winters also found that key determinants of the national poverty impacts included the incomplete transmission of world prices to rural households, barriers to the mobility of workers between sectors of the economy as well as the incidence of national tax instruments used to replace lost tariff revenue. Based on their findings, they suggested that complementary domestic reforms were required to enable households to take advantage of

new market opportunities made available through the DDA in order to generate significant poverty reductions.

Robinson and Robilliard (2005) explored the impact of DDA on poverty reduction in Indonesia. To provide a good technical basis for answering this question, they used an approach that combined a CGE model with a micro-simulation model. This framework is designed to capture important channels through which macroeconomic shocks affect household incomes. It allows making recommendations on specific trade reform options as well as on complementary development policy reforms.

The framework presented in the Robinson and Robilliard study generated detailed poverty outcomes of trade shocks. Given the magnitude of the shocks examined here and the structural features of the Indonesian economy, only the full liberalization scenario generates significant poverty changes. The authors examined the impact under alternative specifications of the functioning of labour markets. These alternative assumptions generated different results, all of which confirmed that the impact of full liberalization on poverty would be beneficial, with wage and employment gains dominating the adverse food price changes that could hurt the poorest households.

In addition, two alternative tax replacement schemes were examined. While direct tax replacement appeared to be more desirable in terms of efficiency gains, and which translated into higher poverty reduction, political and practical considerations could lead the Government of Indonesia to choose a replacement scheme through the adjustment of value-added tax rates across non-exempt sectors.

A study of trade liberalization, poverty and income inequality was also carried out by Cororaton and others (2005). They analysed the effects of tariff reduction on poverty and income inequality using a CGE micro-simulation approach in the Philippines. The approach relaxed the representative household assumption in traditional CGE modelling by replacing household groups with individual households. The present paper incorporates all 24,797 households of the 1994 Family Income and Expenditure Survey and simulates the tariff reduction from 1994 to 2000. Tariff reduction leads to higher imports and exports. Although domestic production for the local market declines, the overall production improves due to substitution and scale effects of tariff reduction. Resource reallocation and factor movements favour the non-food manufacturing sector. Agriculture sector wages as well as the rate of return to capital in agriculture decline as a result of the drop in agriculture output and value-added. Income of rural households in the different regions declines while income of urban households in the various regions improves. Tariff reduction results in poverty reduction in all areas not because of the improvement in household income, but because of the drop in consumer prices.

Previous research on trade liberalization, especially in the case of Indonesia, has not analysed the impact of trade liberalization on income distribution. This paper attempts to analyse the impact of ASEAN trade liberalization not only on the macroeconomics and agricultural industries in ASEAN member countries, but also on detailed Indonesian macroeconomic and sectoral variables as well as on income distribution in Indonesia.

A related study carried out by Oktaviani and others (2007) analysed the impact of economic policy (reducing the oil subsidy) on income distribution in Indonesia, using the Indonesian CGE model which emphasized poverty analysis. This CGE model, with an

updated database, is used in the present study to analyse the impact of ASEAN trade liberalization on Indonesian income distribution within household groups.

III. Economic environment

A. ASEAN economies

Most ASEAN economies depend on the agricultural sector as an important source of GDP. Since about 2000, the agricultural sector has contributed the highest share (52 per cent) to GDP in the Lao People's Democratic Republic, followed by Myanmar (43 per cent). The agricultural sector also contributes more than 20 per cent to GDP in other ASEAN countries (Cambodia, Philippines and Viet Nam) (ASEAN Secretariat, 2005). Indonesia has the largest population among ASEAN countries as well as an agricultural-based industry (contributing around 15 per cent to total GDP).

Table 1 compares the structure of the ASEAN economies. In Cambodia, the Lao People's Democratic Republic and Myanmar, the dominant sector is agriculture, while in the other ASEAN economies (excluding Singapore), manufacturing is the dominant sector. In Singapore, the dominant sector is services.

Table 1. Percentage shares in GDP of major economic sectors in ASEAN, by country, 2000-2004

Country	2000			2002			2003			2004		
	Agri-culture	Industry	Services	Agri-culture	Industry	Services	Agri-culture	Industry	Services	Agri-culture	Industry	Services
Brunei Darussalam	1.6	59.5	38.9	1.9	58.7	39.4	2.1	58.4	39.5	-	-	-
Cambodia	39.6	23.3	37.1	35.6	27.9	36.5	36.8	27.9	35.4	-	-	-
Indonesia	15.6	45.9	38.5	15.5	45.4	39.1	15.4	45	39.6	15.2	44.5	40.3
Lao PDR	52.1	22.7	25.2	50.2	24.6	25.1	-	-	-	-	-	-
Malaysia	8.4	44.2	47.4	8.1	41.6	50.4	8.1	42.1	49.8	7.9	42.5	49.6
Myanmar	42.9	17.3	39.7	-	-	-	-	-	-	-	-	-
Philippines	19.9	34.7	45.4	19.7	34.5	45.8	19.8	33.5	46.7	19.6	33.2	47.2
Singapore	0.1	33.8	66.1	0.1	31.3	68.6	0.1	31.1	68.8	0.1	31.6	68.3
Thailand	10.3	44.4	45.3	10	44.8	45.2	10.2	45.8	44	9.2	46.8	44
Viet Nam	23.3	35.4	41.3	21.8	37.4	40.8	21.1	38.5	40.5	-	-	-

Source: ASEAN Secretariat, 2005.

In Indonesia, around 60 per cent of the workforce is employed in the agricultural sector and lives in rural areas. The impact of trade liberalization on income distribution, especially in the rural areas, is expected to influence income distribution.

B. Trade flow profile of ASEAN members

The trade flow pattern among ASEAN member countries can be an indication of trade integration. Table 2 presents a profile of the trade flow of all products (exports-imports) among ASEAN members. Total intra-ASEAN exports are still smaller than total ASEAN exports to the world market. Total intra-ASEAN exports account for approximately US$ 81,821.5 million, a far smaller amount than that for total ASEAN exports to the world market, amounting to approximately US$ 6,897,635 million.

Table 2 also shows that both total intra-ASEAN exports and ASEAN exports to the world are dominated by Malaysia and Singapore. Malaysia exports to other ASEAN countries account for approximately US$ 25,592 million, whereas Malaysian exports to the world account for approximately US$ 125,439.2 million. The second largest exporter in ASEAN is Singapore, which accounts for approximately US$ 24,558.4 million among the ASEAN and US$ 111,288.8 million to the world. More interestingly, these two countries are not only becoming the two largest ASEAN exporters; in terms of imports Singapore appears to be the leading importer among ASEAN member countries followed by Malaysia. This fact indicates that extraregional trade still plays an important role for ASEAN members.

Table 2. Trade flow for all commodities among ASEAN countries

(Unit: US$ million)

Country	Indonesia	Malaysia	Philippines	Thailand	Viet Nam	XSE*	Singapore	Total world	Total ASEAN
Indonesia	0.0	2 167.1	828.3	1 338.2	363.1	179.2	5 213.5	68 183.6	10 089.3
Malaysia	1 547.3	0.0	1 236.7	3 157.5	673.1	433.0	18 544.4	125 439.2	25 592.0
Philippines	172.9	1 248.3	0.0	1 476.9	84.8	15.8	2 711.2	38 180.2	5 709.9
Thailand	1 230.1	2 964.4	1 191.1	0.0	1 063.8	1 188.4	4 859.8	80 006.0	12 497.6
Viet Nam	130.8	277.2	325.3	334.8	0.0	1.1	692.7	15 022.7	1 761.9
XSE*	48.3	126.8	10.2	1 028.1	5.2	1.9	391.8	8 550.9	1 612.4
Singapore	3 142.2	12 308.0	2 626.8	3 902.4	1 597.4	981.6	0.0	111 288.8	24 558.4
Total world	43 510.6	74 083.9	42 230.3	61 545.5	24 285.5	6 359.4	120 743.7	6 897 635.0	-
Total ASEAN	6 271.6	19 091.8	6 218.4	11 237.9	3 787.4	2 800.9	32 413.4	-	81 821.5

* XSE: Other ASEAN countries
Source: GTAP 6.2. database.
Note: Data are for 2003.

Singapore plays an important role as it appears from table 2 to be Indonesia's main trading partner, both in terms of exports and imports. Total Indonesian exports to Singapore account for some US$ 5,213.5 million while imports from Singapore amount to US$ 3,142.2 million. The high levels of Indonesian exports to, and imports from Singapore are mainly the result of the geographical factor and the introduction by Singapore of low trade barriers. Singapore is one of the nearest ASEAN countries to Indonesia, and has one of the highest intensity levels of trade in ASEAN.

Exports-imports and the trade balance of ASEAN member countries are based on the GTAP database (table 3). As table 3 shows, Indonesia has become an exporter country. The value of the Indonesian trade balance shows a positive trend. Indonesian intraregional and extraregional trade is now the fourth largest among ASEAN member countries behind Malaysia, Singapore and Thailand. The value of Indonesian exports (among ASEAN member countries) is US$ 10,089.3 million while its exports to the whole world total US$ 68,183.6 million. These figures are only half of both Malaysian exports and imports. On the other hand, the value of imports from the ASEAN market is approximately US$ 6,271.6 million and US$ 43,510.6 million from the world market.

**Table 3. Exports-imports and trade balance of ASEAN members in world
and ASEAN markets**

(Unit: US$ million)

Country	Export		Import		Trade balance	
	Total world	Total ASEAN	Total world	Total ASEAN	Total world	Total ASEAN
Indonesia	68 183.6	10 089.3	43 510.6	6 271.6	24 672.9	3 817.7
Malaysia	125 439.2	25 592.0	74 083.9	19 091.8	51 355.3	6 500.2
Philippines	38 180.2	5 709.9	42 230.3	6 218.4	-4 050.1	-508.6
Thailand	80 006.0	12 497.6	61 545.5	11 237.9	18 460.5	1 259.7
Viet Nam	15 022.7	1 761.9	24 285.5	3 787.4	-9 262.8	-2 025.5
XSE*	8 550.9	1 612.4	6 359.4	2 800.9	2 191.6	-1 188.5
Singapore	111 288.8	24 558.4	120 743.7	32 413.4	-9 454.9	-7 855.1

* XSE: Other ASEAN countries
Source: GTAP 6.2.
Note: Data are for 2003.

Table 3 also presents the trade balance for all ASEAN members. Interestingly, even though Indonesia's intraregional and extraregional trade still behind Malaysia, Singapore and Thailand, the Indonesian trade balance shows a surplus. In contrast, although Singapore's exports and imports are the second largest in ASEAN, its trade balance shows a deficit. Table 3 indicates that only three countries (Indonesia, Malaysia and Thailand) have a trade surplus both for intraregional ASEAN and extraregional ASEAN trade. The trade balances of Lao People's Democratic Republic, Cambodia, Myanmar and Brunei Darussalam (XSE) or other ASEAN members with the world market show surpluses while their trade balances for intraregional ASEAN trade are in deficit. In other words, XSE is an importing country group within ASEAN.

All other ASEAN member countries show a trade balance deficit. The Philippines, Viet Nam and Singapore would appear to be importer countries, both in terms of intraregional ASEAN and world trade. Interestingly, although Singapore dominates trade in the ASEAN region, it is the biggest importer with the largest trade deficit.

C. Income distribution in Indonesia

In Indonesia, the amount of on-farm land owned by farmers has decreased every year (table 4). In 1983, 44.9 per cent of agricultural land used for farming was owned by smallholders (0.5-1.99 ha). In 1993, however, the average land area owned by farmers had decreased with 48.5 per cent of farmers owning less than 0.5 ha. This trend continued and by 2003, 55 per cent of farmers owned less than 0.5 ha.

Table 4. On-farm land distribution in Indonesia, 1983, 1993 and 2003

Type of land (ha)	Land distribution					
	1983		1993		2003	
	On-farm (%)	Average area (ha)	On-farm (%)	Average area (ha)	On-farm (%)	Type of land (ha)
< 0.5	40.8	0.26	48.5	0.17	55.11	< 0.5
0.5-1.99	44.9	0.94	39.6	0.9	33.29	0.5 – 1.99
2.0-4.99	11.9	2.72	10.6	3.23	6.4	2.0 – 2.99
≥5	2.4	8.11	1.3	11.9	5.06	≥3

Source: Central Bureau of Statistics, various years.

Table 5. Poverty line, percentage and number of population below the poverty line

Year	Poverty line (Currency/capita/month)				Population below the poverty line					
	Urban		Rural		Number (million)			Percentage (%)		
	Rp	US$	Rp	US$	Urban	Rural	Total	Urban	Rural	Total
1996[a]	42 032	17.6	31 366	13.2	9.6	24.9	34.5	13.6	19.9	17.7
1998[b]	96 959	12.1	72 780	9.1	17.6	31.9	49.5	21.9	25.7	24.2
1999[c]	92 409	13.0	74 272	10.5	15.7	32.7	48.4	19.5	26.1	23.5
2000[c]	91 632	9.5	73 648	7.7	12.3	26.4	38.7	14.6	22.4	19.1
2001[c]	100 011	9.7	80 382	7.8	8.6	29.3	37.9	9.8	24.8	18.4
2002[c]	130 499	14.1	96 512	10.4	13.3	25.1	38.4	14.5	21.1	18.2
2003[c]	138 803	16.2	105 888	12.4	12.2	25.1	37.3	13.6	20.2	17.4
2004[c]	143 455	15.9	108 725	12.0	11.4	24.8	36.1	12.1	20.1	16.7
2005[c]	-	-	-	-	12.4	22.7	35.1	11.4	19.5	16
2006[d]	175 324	19.2	131 256	14.4	14.3	24.8	39.1	13.4	21.9	17.8

Source: Central Bureau of Statistics, various years.
Note:
[a] Based on poverty line CBS version 1998.
[b] Based on the December 1998 Susenas.
[c] Based on the regular Susenas.
[d] Based on August 2006 calculation.

As a developing country, Indonesia still faces poverty-related problems. The incidence of poverty in Indonesia is detailed in table 5. The percentage of the population below the poverty line in urban and rural areas increased in 1998 due, in part, to the economic crisis of 1997. The poverty line figures decreased slightly from 1999 to 2006 but were still quite high.

Table 5 also shows that the 39.1 million of people (17.75 per cent) who living below the poverty line in 2006, 24.8 million (63.4 per cent) lived in rural areas, with only 14.3 million (36.6 per cent) in urban area. The rural poor generally work in the agricultural sector (56 per cent), either as smallholder farmers or as landless laborers.

IV. Methodology

A. Methods

To measure the impact of policies, a multi-country and multi-commodity CGE model (in this case the GTAP model) was used as the main analytical tool. In order to analyse in detail the impact on the agricultural sector and income distribution in Indonesia, the GTAP model was linked with the one-country Indonesian General Equilibrium Model, which is more detailed in terms of agricultural product aggregations and household aggregations. The endogenous variables change (export and import prices and volumes) l resulting from the various simulation using the GTAP mode will be the exogenous change   in the Indonesian CGE model. The Indonesian CGE model used in this research was the updated version of the INDOF CGE model (Oktaviani, 2000).

There are several advantages of using CGE models compared to partial models. First, a CGE model is able to produce factually and accurately an economic interpretation compared with a partial model (Robinson, 1990). Third, it allows seeing an economic interaction with consistent behaviour (Rae and Sjakur, 1999). Fourth, the impacts on various aspects, such as welfare economics, terms of trade as well as the distribution of income and poverty can be explored.

In the case of multilateral trade policy changes in a number of countries, linking the multi-country GTAP model with a national model for a country potentially provides a useful approach to studying trade liberalization. The impact of trade liberalization is likely to be assessed more realistically than by using a national model alone with no formal reference to global modelling of liberalization effects. Anderson (2003) also analysed an economic assessment of agricultural trade liberalization in some low-income countries, using the GTAP model.

To analyse the impact of trade liberalization by a group of countries, all relevant policy interventions (whether export tax, export subsidies, import tax or import subsidies) in each country can be removed in the multi-country, multi-commodity model. The simulation with the global model reveals the changes in global trade and market equilibrium. Countries to be further studied with a national model can be treated as a small country or a large country as appropriate. In this regard, Indonesia, as argued below, is a small country.

1. General equilibrium model of the Indonesian economy

Long-term analyses with CGE models ideally would use dynamic models, but there are no such models available for Indonesia, at least at the level of disaggregation sought for this study. The model used for this study is a combination of INDOF (Oktaviani, 2000) and WAYANG (Wittwer, 1999), which is the recursive dynamic model. The model is the same as the model that is used by Oktaviani and others (2007), but with an updated database. These models were modified to enable focus to be placed on the evaluation of several economic variable changes, with an emphasis on the fiscal extension, macro and microeconomic variables as well as income distribution. The theoretical structure of INDOF comprises a set of (generally) non-linear equations. The equation system is organized into 17 blocks:

    (a) Demands for labour;
    (b) Demands for primary factors;
    (c) Demands for intermediate inputs;
    (d) Demands for composite primary factors and intermediate input;
    (e) Commodity composite of industry output;
    (f) Demands for investment goods;
    (g) Household demands;
    (h) Export and other final demands;
    (i) Demand for margins;
    (j) Purchaser's prices;
    (k) Market clearing equations;
    (l) Equations for indirect taxes;
    (m) GDP, both from the income and the expenditure sides;
    (n) The trade balance and other aggregates;
    (o) Rates of return and wage indexation;
    (p) Investment-capital accumulation equations; and
    (q) Debt accumulation equations.

Production is modelled by Blackorby and others (1978). In the production process, each industry can produce several commodities. Industries use both intermediate goods and factors as inputs that can be sourced domestically or imported. Factor inputs for each industry are labour, capital and land. The assumptions made in this production model include input-output separability and the multi-stage, hierarchal structure. Thus, given a level of industry activity, the decision as to what combination of products to produce is separate from, or independent of, the decision as to what combination of inputs to use. The hierarchal structure uses constant elasticity of substitution (transformation) production functions except for the combining of intermediate goods and of aggregate primary factors, a stage which uses Leontief (or fixed proportions) technology.

In this case, the household demand of the model follows the WAYANG model (Wittwer, 1999). Households take prices as given and maximize a utility function of the form hierarchically nested with up to three stages. On the top level, consumers face some alternative commodities that have a linear function such as an expenditure demand system (LES). On the second level, consumers combine some commodities from various sources (domestic and imported) based on the CES function.

The model is non-linear and can be described by specifying those equations. An individual equation in the linearized model is specified by the variables in the equation and the coefficients attached to those variables. Presenting the linearized equations and coefficient information provides an alternative way of presenting a CGE model.

The coefficient values in these linear equations depend on the non-linear equations and the initial values of the variables. The linear equations provide only local approximations of the underlying non-linear model and thus of how the economy responds to exogenous changes. Nevertheless, the new equilibrium position of the economy arising from a small exogenous change can be calculated using the linear equations. Further changes from this new position can again be described approximately by linear equations. The values of the coefficients of the latter equations will differ from the initial values for the coefficients. The linearized equations, the formulae for calculating the coefficients of those equations, constitute an operational model equivalent to the underlying non-linear model. The derivations of the linear equations are available in Dixon and others (1982) and Horridge and others (1993).

In the model, capital is assumed to be fully mobile. No supply function for factors is included in the model. Price can then be set exogenously or endogenously, since the model includes for each differentiated factor a price equation in which price is independent of quantity. The model then ensures a consistent price-quantity demanded pair of values at a price determined by the model.

In the short term, industry-differentiated capital is assumed to be fixed. The model then determines the user or rental prices of capital. In the long term, capital supply can alter in order to achieve equilibrium between rental prices in different industries, and between the current and expected future rates of return on investment.

Following the neoclassical theory, the household sector is assumed to take prices as given and to consume commodities to maximize a utility function subject to an aggregate expenditure constraint. The aggregation of households in the 2003 Indonesian Social Accounting Matrix (SAM) consists of eight types of households that are not based on factor

ownership (table 6). Since the focus is on income distribution, the sources of income of the various households are of particular interest. The source of the factor ownership matrix used in the model is Indonesia's SAM for the year 2000. The block of equations basically follows the household demands in WAYANG model (Wittwer, 1999).

Variables and coefficients often apply to sets of items. Each variable name is alphanumeric. The variables set in this research follow INDOF (Oktaviani, 2000) and WAYANG (Wittwer, 1999). The coefficients in the operational model are the "constants" in the linear approximation equations. A list of the coefficients in the linear equations as well as other database parameters is provided in Oktaviani (2000).

Table 6. Household aggregation in SAM 2003

Household category	Description
AgrRaw1	Agricultural employees – agricultural workers who do not own land
AgrBuss2	Small-scale farmers – agricultural workers with land < 0.5 ha.
AgrBuss3	Medium-scale farmers – agricultural workers with land 0.5 ~ 1 ha.
AgrBuss4	Large-scale farmers – agricultural workers with land >1 ha.
NAgLoRr1	Rural low income – non-agricultural households, comprising small-scale retail store owners, small-scale entrepreneurs, small-scale personal service providers, and clerical and manual workers in rural areas.
NAgOthRr2	Rural non-labour households, consisting of non-labour force and unclassified households in rural areas.
NAgHighRr3	Rural high income – non-agricultural households comprising managers, technicians, professionals, military officers, teachers, large-scale entrepreneurs, large-scale retail store owners, large-scale personal service providers, and skilled clerical workers in rural areas.
NAgLoUr1	Urban low-income households, comprising small-scale retail store owners, small-scale entrepreneurs, small-scale personal service providers, and clerical and manual workers in urban areas.
NAgOthUr2	Urban non-labour households, comprising non-labour force and unclassified households in urban areas.
NAgHighUr3	Urban high-income households, comprising managers, technicians, professionals, military officers, teachers, large-scale entrepreneurs, large-scale personal service providers, and skilled clerical workers in urban areas.

2. GTAP model

The GTAP model is fully described in Hertel and Tsigas (1997). The relationships in the GTAP model are summarized here by a set of relationships between various value aggregates. Full descriptions of the notation, lists of variables, parameters, the equations etc. in the standard GTAP model are available in Hertel (1997).

The GTAP model uses some assumptions based on theory. Indonesia as a region or country in GTAP is assumed to be a small country. The small country case is simpler since its exports, imports and cross-border capital flows, by definition, have no effect on the global market.

3. Linking the single country and multi-country models

As the small country case is simpler, a country can be isolated in the global model – using what Adams and others (1997) have called an "isolation closure" – by making the real

level of its imports, exports, savings, and capital goods moving into and out of the country exogenous and fixed (that is, zero change) in the global model. That is, in the face of changes elsewhere, the country retains its original domestic and international trading activities. If the country is indeed small for all commodities, these exogenous settings have little effect on the global model results. The global model determines the demand price and supply price changes for a particular country's exports and imports. For there to be no response by the economic agents in a particular country, there must be tariff changes in that country to offset the world price changes. These, too, are determined endogenously in the global model.

Trade liberalization applied in the global model entails all participating countries, other than the country of interest (in this study, Indonesia), reducing their tariffs. The result of the global simulation is essentially a hypothetical new global equilibrium in which world prices have changed, and in which tariffs have been reduced in participating countries and hypothetically altered in the country of interest. The price changes can then be treated as exogenous in the national country model.

In the national model, the domestic producers and consumers adjust to the exogenous export and import price changes. *Ceteris paribus*, the export supply volume increases (decreases) if the export price increases (decreases), and the import demand volume decreases (increases) if the import price increases (decreases). Simulations of the national model in response to the globally determined price changes show how the country's economy is affected. If the country is also to join in trade liberalization by reducing its trade barriers, then exogenous shocks to its trade barriers should be included together with world price change shocks. This global-national linkage approach to modelling trade liberalization has been used before, notably by Huff and others (1995), Adams and others (1997 and 1998), and Oktaviani (2000).

The linkage between the global and national model approach is implemented through modifying the (standard) closures of both the multi-country and the single-country models (Adams and others, 1997). The following variables need to be set as exogenous variables in GTAP in the isolation closure (they are endogenous in the standard GTAP closure).

(a) All bilateral trade flows into and out of the national economy;
(b) The flow from national savings into global savings; and
(c) The flow from global savings of real capital funds into the national economy.

The following variables are set as endogenous (previously they were set as exogenous in the GTAP standard closure):

(a) All tax rates on bilateral trade flows into and out of national economy;
(b) The slack variable in the global model equation for determination of global investment; and
(c) The slack variable in the global model equation for regional income determination.

This approach to linkage removes all feedback from the particular national economy to other regions. The approach is only appropriate in the case of a small country. If this is accepted, it is then appropriate to calculate global equilibrium, treating the existing (or close to existing) import and export quantities for the country as exogenous in the global model. In turn, in the national model, representing a small economy, the global prices can be taken as given to determine what changes will occur in the national economy. Supply and demand will change, as will exports and imports. The latter would no longer be fully consistent with the

given quantities, which were initially assumed exogenous in the global model; however, any difference would be unimportant since, as a small country, changes in exports or imports would not affect the global equilibrium.

4. Simulation

This research uses three simulations:
(a) ASEAN preferential trade liberalization. Tariffs for all agricultural products (sector 1 to sector 12) are set to zero among all ASEAN countries.
(b) Trade liberalization for all agricultural products except for sensitive[1] and the highly sensitive products.
(c) ASEAN trade liberalization (simulation 1) and increasing trade facilitation through increased efficiency by 10 per cent in the finance and business sectors.

The result of the global simulation is essentially a hypothetical new global equilibrium in which world prices have changed and in which tariffs have been reduced in participating countries and hypothetically altered in the country of interest. The price changes can then be treated as exogenous in the national country model. Simulations of the national model in response to the globally determined price changes show how the country's economy is affected.

B. Types and sources of data

This study utilized secondary data. The sources of the data included several institutions such as the Indonesian Central Bureau of Statistics, Ministry of Trade, and Ministry of Agricultural for data on production, consumption, exports, imports, and trade and investment policies. Other secondary data such as commodity performances and trade policy in other countries were obtained from the World Bank, World Trade Organization, Food and Agriculture Organization of the United Nations and other international institutions. The main source of processed data was the Global Trade Analysis Project (GTAP). In this study, version 6.2 of the GTAP database has been applied.

Table 7. Aggregation of regions

No.	New aggregation	Description	Comprising
1	ANZ	Australia, New Zealand	Australia, New Zealand
2	Idn	Indonesia	Indonesia
3	Mys	Malaysia	Malaysia
4	EAs	East Asia	China, Hong Kong, China, Republic of Korea, Japan, Taiwan Province of China, rest of East Asia
5	Phl	Philippines	The Philippines
6	Tha	Thailand	Thailand
7	Vnm	Viet Nam	Viet Nam
8	NAFTA	United States of America	Canada, United States, Mexico.
9	XSE	Other ASEAN	Rest of South-East Asia (Cambodia, Lao People's Democratic Republic, Myanmar and Brunei Darussalam)
10	Sgp	Singapore	Singapore

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[1] Member States will have flexibility in determining the ending tariff rates for highly sensitive products; e.g., Indonesia, Malaysia and the Philippines have the ending tariff rates 20 per cent (Annex 3, Protocol on the Special Arrangement for Sensitive and Highly Sensitive Products, Singapore, 30 September 1999).

No.	New aggregation	Description	Comprising
11	EU	European Union	Austria; Belgium; Denmark; Finland; France; Germany; United Kingdom; Greece; Ireland; Italy; Luxembourg; Netherlands; Portugal; Spain; Sweden
12	ROW	Rest of the world (all other regions)	Rest of Oceania, Bangladesh, India, Sri Lanka, rest of South Asia, rest of North America, Colombia, Peru, Venezuela, rest of Andean Pact, Argentina, Brazil, Chile, Uruguay, rest of South America, Central America, rest of FTAA, rest of the Caribbean, Switzerland, rest of EFTA, rest of Europe, Albania, Bulgaria, Croatia, Cyprus, Czech Republic, Hungary, Malta, Poland, Romania, Slovakia, Slovenia, Estonia, Latvia, Lithuania, Russian Federation, rest of former Soviet Union, Turkey, rest of the Middle East, Morocco, Tunisia, rest of North Africa, Botswana, South Africa, rest of South African CU, Malawi, Mozambique, Tanzania, Zambia, Zimbabwe, rest of SADC, Madagascar, Uganda, rest of sub-Saharan Africa

The GTAP database comprises 87 regions/countries and 57 sectors or commodities. The database is aggregated into 12 regions (table 7). The main consideration in selecting the regions was based on the contribution by those countries as main trading partners of Indonesia, which is more detailed in the case of the ASEAN countries.

Meanwhile, the main consideration in selecting sectors was based on the strategic commodities in the Indonesian trade sectors and particularly those in the agricultural sector. Based on these considerations, 19 sectors were selected (table 8).

Table 8. Aggregation of sectors

No.	New aggregation	Description	Comprising
1	pdr	Paddy rice	pdr pcr
2	wht	Wheat	wht
3	gro	Cereal grain including maize (corn), barley, millet and oats	gro
4	v_f	Vegetable, fruit, nut	V_f
5	Osd	Oil seeds	osd
6	c_b	Sugar cane, sugar beet	c_b sgr
7	pfb	Plant-based fibres	pfb
8	ctl	Cattle, sheep, goats, horses	ctl cmt
9	oap	Animal products including animal, and animal meat products	oap omt
10	rmk	Raw milk and dairy products	rmk mil
11	OthAgr	Other agricultural products	ocr wol frs fsh
12	vol	Vegetable oil and fats	vol
13	Food	Food products	ofd
14	BavTob	Beverages and tobacco products	B_t
15	OthPrim	Other primary sectors	coa oil gas omn
16	Mnfcs	Shoe polish and other manufactures	tex wap lea lum ppp p_c crp nmm i_s nfm fmp mvh otn ele ome omf
17	Finance	Financial services	ofi isr
18	Business	Business services	obs
19	OthServ	Services and activities NES	ely gdt wtr cns trd otp wtp atp cmn ros osg dwe

The 2003 Input-Output Table and Social Accounting Matrix are used for the Indonesian General Equilibrium Model. Import and export trade flow between ASEAN countries members for each priority sector is used to describe ASEAN trade performance.

V. Results and analysis

A. Impact of ASEAN trade liberalization on each ASEAN country

Agriculture trade liberalization policy among ASEAN members is carried out through the elimination of import tariffs on certain agricultural products. This policy is carried out step-by-step, such as postponing tariffs and decreasing the tariff scheme for sensitive and highly-sensitive products. Apart from zero tariffs, the trade liberalization policy is also aimed at improving trade facilitation in each ASEAN member, as is evidenced by the improvements in financial and business services.

The impact of trade liberalization on each ASEAN country is discussed through three policy scenarios: (a) trade liberalization for all agriculture products; (b) trade liberalization, except for sensitive and highly-sensitive products; (c) trade liberalization and increasing trade facilitation as shown by an increase in output augmenting technical change (productivity change) in finance and business sectors.

The impact of those scenarios on the macroeconomic situation of ASEAN members can be seen from the changes in macroeconomic variables such as nominal GDP, deflator GDP, real GDP, Terms of Trade (ToT) and trade balance, while the impact on the agricultural sector can be seen in output, exports and imports by ASEAN members.

1. Impact of ASEAN agricultural trade liberalization on the macroeconomic situation and agricultural sector of ASEAN countries

The impact of trade liberalization on the agriculture sector of ASEAN countries can be seen through the direction and magnitude of the changes in the macroeconomic variables such as national output (proxy by nominal GDP and real GDP), the rate of inflation (proxy by GDP deflator) and the position of trade shown by ToT and trade balance.

Table 9 presents the impact of zero agricultural tariffs among ASEAN members. Under the elimination of tariff barriers, nominal GDP of all ASEAN members except the Philippines and XSE would grow. The impact on deflator GDP, however, would vary among ASEAN members.

On the one hand, zero tariffs would increase the price GDP in Indonesia, Singapore, Thailand and Viet Nam. An increase in import value of almost all agricultural commodities in those countries can be influenced by an increase of price GDP. Even though agricultural imports are not a main factor in other sectors, they can influence the production costs and output prices of other sectors.

On the other hand, the zero tariffs would decrease deflator GDP in Malaysia, the Philippines and XSE. Real GDP, however, would increase by 0.000-0.299 per cent as a result of zero tariff implementation, both in ASEAN countries and outside ASEAN.

Trade liberalization policy in the agriculture sector also has a different effect on ToT in each ASEAN member. The effects in Malaysia, the Philippines and XSE are negative. This result is mainly influenced by a higher price increases for imported commodities than for exported commodities. The increase in imported commodity prices can lead to a decrease in the competitiveness of products that rely on intermediate imported goods.

Table 9. Impact of ASEAN trade liberalization in the agriculture sector on macroeconomy variables

Countries/ regions	Equivalent variation (US$ million)	Trade balance (US$ million)	Nominal GDP (%)	Price GDP (%)	Real GDP (%)	Term of trade (ToT) (%)
Australia, New Zealand	-7.188	1.735	-0.009	-0.010	0.000	-0.009
Indonesia	0.179	17.494	0.011	0.011	0.000	0.025
Malaysia	195.250	31.827	0.191	-0.107	0.299	-0.048
East Asia	-0.653	-31.320	0.000	0.001	0.000	0.000
Philippines	51.936	15.450	-0.383	-0.539	0.156	-0.132
Thailand	101.128	27.790	0.132	0.107	0.025	0.091
Viet Nam	47.209	-14.404	0.264	0.221	0.043	0.166
NAFTA	-12.986	-10.424	-0.001	-0.001	0.000	-0.002
XSE	3.545	-4.690	-0.029	-0.035	0.006	-0.017
Singapore	23.519	-6.594	0.039	0.036	0.003	0.017
European Union	7.246	-15.077	0.000	0.000	0.000	0.000
Rest of the world	-2.655	-11.787	-0.001	-0.001	0.000	0.000

Zero tariffs on imported goods prevailed by Indonesia, Malaysia, the Philippines and Thailand result in an increase in their trade balance. However, the trade balances for Singapore, Viet Nam and XSE decline. In the case of Singapore, the decrease is possibly due to the fact that while the value of Singaporean trade with all ASEAN members is the largest, Singapore is a net importer of agricultural products. In the case of Viet Nam and XSE, the negative result is due to their status as importer countries in the ASEAN region.

Nevertheless, in looking at the impact of agriculture trade liberalization among ASEAN member countries on their welfare, all experience positive effects. The largest positive effects are in Malaysia and Thailand, which show welfare increases of US$ 195.25 million and US$ 101.13 million, respectively. These two countries are net exporters of agricultural products and will benefit from other ASEAN countries opening up their markets to imports of agricultural products.

The impacts of agriculture trade liberalization on the sectoral economy of ASEAN member countries are shown in tables 10-12. Table 10 shows the effect of agriculture trade liberalization on sector output. Table 11 shows its effect on exports by sector and table 12 shows the impact on imports by sector.

Table 10. Impact of the ASEAN trade liberalization in the agriculture sector on agricultural output

(Unit: Percentage)

Sector	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam	XSE
pdr	0.002	3.810	-4.726	1.172	0.131	2.777	-0.057
wht	-0.002	73.504	2.511	-0.352	3.816	2.936	0.314
gro	0.000	1.746	0.435	0.134	-0.632	-0.674	0.007
V_f	0.000	0.336	0.676	3.364	-0.395	-1.080	0.041
Osd	-0.015	0.095	1.373	4.647	-1.357	24.639	0.561
C_b	0.001	3.438	-0.533	13.062	0.848	-6.819	-0.052
pfb	-0.009	0.050	1.243	-0.990	-0.784	-1.039	0.126
ctl	-0.001	0.886	0.329	1.720	-1.117	-0.328	1.653
oap	0.001	5.130	0.162	4.707	-0.533	-1.169	-0.301
rmk	-0.006	7.885	6.124	4.451	7.079	-1.165	-4.549
OthAgr	-0.007	-3.490	0.844	-0.856	1.253	-0.482	-0.176
vol	-0.022	1.450	0.516	2.328	-2.141	-26.023	-0.947

The impact of agricultural trade liberalization on outputs varies among ASEAN members. For Indonesia, the negative effects (which are very small in some cases) occur for wheat, oil seeds, plant-based fibres, cattle, sheep, goats and horses, raw milk, other agricultural commodities and vegetable oil. The impacts of agriculture trade liberalization on outputs in Malaysia, the Philippines and Singapore are positive, with output of most agricultural products showing increases. In fact, in Malaysia, wheat output shows a sharp increase. However, there is a decline in paddy rice and sugar cane in the Philippines, and wheat, plant-based fibres and other agricultural commodities in Singapore. Larger negative effects occur in Thailand and Viet Nam where most products show decreases.

Table 11 shows the effect of ASEAN agricultural trade liberalization on exports, which would vary considerable from country to country. In Indonesia, all sectors (except paddy rice, sugar cane, plant-based fibres and animal products) show export declines. The implication of this finding is that Indonesian exports are unable to compete with the same products originating from the other ASEAN members. However, the Philippines primarily benefits from ASEAN agriculture trade liberalization with sharp growth in all sectors. The largest increase in the Philippines' exports is wheat (147.64 per cent). Malaysia also shows an increase in wheat exports (91.48 per cent). Wheat exports by Malaysia, Thailand and Viet Nam also show strong growth.

Table 11. Impact of ASEAN agriculture trade liberalization on exports

(Unit: Percentage)

Sectors	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam	XSE
pdr	0.372	3.437	12.913	1.309	0.467	22.690	1.275
wht	-0.001	91.488	147.644	-0.344	22.842	6.657	0.480
gro	-0.007	-1.074	7.581	0.122	-0.036	-1.383	1.057
V_f	-0.008	2.625	3.527	4.977	0.462	-2.933	0.387
Osd	-0.009	0.526	3.198	4.675	1.485	37.055	3.098
C_b	0.090	5.155	2.710	61.054	2.103	4.864	0.440
pfb	0.003	-0.977	3.299	-0.992	-0.539	-2.230	1.632
ctl	-0.014	2.330	3.945	7.017	3.513	-7.070	34.804
oap	0.005	8.220	6.181	8.908	-0.688	-7.399	-7.899
rmk	-0.012	9.913	12.602	12.985	34.102	4.926	83.575
OthAgr	-0.026	10.196	15.571	-1.060	6.780	-0.159	-0.819
vol	-0.055	1.460	1.778	3.187	-4.157	8.616	0.476

Table 12 shows that Indonesia will become the largest importer of ASEAN products in this region. Under the first scenario, in which tariffs are eliminated for all agricultural products, Indonesia would become the main destination of exports by ASEAN member countries.

Table 12. Impact of ASEAN trade liberalization on agricultural imports

(Unit: Percentage)

Sectors	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam	XSE
pdr	0.001	-1.209	74.740	-0.212	2.846	7.249	4.037
wht	0.001	3.624	0.398	0.205	-0.826	-0.426	-0.094
gro	0.004	0.661	-0.888	0.182	0.865	0.888	-0.798
v_f	0.004	1.648	-0.594	0.266	8.968	1.423	1.402
Osd	0.012	1.196	0.089	0.232	-1.222	6.225	-0.168
c_b	0.002	2.146	11.513	7.289	1.696	23.080	6.529
pfb	0.002	2.063	-0.468	0.213	0.028	0.148	0.641
ctl	0.016	0.661	-0.632	0.546	14.768	2.176	0.895
oap	0.004	1.263	4.981	0.520	-1.459	10.323	17.692
rmk	0.009	1.974	0.352	0.926	2.448	0.041	11.616
OthAgr	0.043	14.814	3.284	-0.154	12.865	3.311	4.501
vol	0.003	2.021	10.169	1.471	21.108	18.171	4.595

2. Impact of ASEAN trade liberalization, except for sensitive and highly-sensitive products, on ASEAN country macroeconomics

The centrepiece of AFTA is the Common Effective Preferential Tariff (CEPT) Agreement, which was signed in 1992 as a preferential tariff reduction among members. The goal is to gradually introduce reductions to achieve zero per cent tariffs in 10 years for the initial signatories (2003) and by 2010 for new members such as Cambodia. The final level of import tariffs for sensitive products and highly-sensitive products will be 0-5 per cent and 20 per cent, respectively. All the agreements are covered in the Protocol on the special arrangement for sensitive and highly-sensitive products, which was declared on 30 September 1999. Commodities that were recommended as sensitive and highly-sensitive included paddy, poultry products, and beverages and tobacco.

The findings of this study show some changes in macroeconomic variables as a result of the impact of trade liberalization on all agriculture products (except for those on the sensitive and highly-sensitive list). Table 13 shows the simulation results. Malaysia will gain the greatest benefit from the implementation of trade liberalization, which is shown by the equivalent variation value of US$ 187.94 million, the largest among the ASEAN member countries. XSE gains the smallest benefit with an equivalent variation of only US$ 230,000 while Indonesia only manages to gain US$ 310,000 in this scenario.

Table 13. Impact of ASEAN trade liberalization, except for sensitive and highly-sensitive products, on macroeconomy variables

Country/ region	Equivalent variation (US$ million)	Trade balance (US$ million)	Nominal GDP (%)	Price GDP (%)	Real GDP	Terms of Trade (%)
Australia, New Zealand	-5.770	2.010	-0.010	-0.010	0.000	-0.010
Indonesia	0.310	11.180	0.010	0.010	0.000	0.020
Malaysia	187.940	26.260	0.180	-0.110	0.290	-0.050
East Asia	-3.570	-23.380	0.000	0.000	0.000	0.000
Philippines	5.130	-3.390	0.040	0.050	-0.010	0.010
Thailand	90.240	28.630	0.110	0.090	0.020	0.080
Viet Nam	12.880	-0.600	-0.010	-0.030	0.020	0.030
NAFTA	-21.200	-5.430	0.000	0.000	0.000	0.000
XSE	0.230	-6.000	-0.050	-0.050	0.000	-0.040
Singapore	18.150	-5.160	0.030	0.030	0.000	0.010
European Union	10.420	-11.640	0.000	0.000	0.000	0.000
Rest of the world	2.030	-12.480	0.000	0.000	0.000	0.000

One of the factors significantly affecting welfare improvement in Malaysia is the high trade surplus. The value of Malaysia's trade balance is some US$ 26.26 million. Indonesian welfare increases slightly but the trade balance only amounts to US$ 11.18 million. Meanwhile, the Philippines, Singapore, Viet Nam and XSE experience a negative effect on their trade balance due to trade liberalization, even with tariffs maintained on sensitive and highly sensitive products.

Under tariff elimination, with the exception of sensitive and highly-sensitive products, real GDP in most of the ASEAN members shows an increase. The exception is the Philippines. Malaysia would become the primary beneficiary of trade liberalization among the ASEAN countries. This scenario, however, does not affect Indonesian real GDP. This finding proves that trade liberalization among the ASEAN members, either for all agriculture products or excluding sensitive and highly-sensitive products, would not affect Indonesia's real GDP.

Welfare improvement can fundamentally be linked to changes in resource allocation and ToT. As in the previous scenario, elimination of tariff barriers for agricultural products, excluding sensitive and highly-sensitive products, would result in a decrease in ToT for Malaysia and XSE, primarily due to a decrease in competitiveness.

Under scenario 2, Indonesian output of some commodities experiences slight decreases of between -0.010 and -0.020 per cent, respectively (table 14) in the production of oil seeds, plant-based fibres, raw milk, other agricultural commodities and vegetable oil. On the other hand, other sectors show no change. Interestingly, output in Malaysia, Singapore and Viet Nam would not be affected. Some sectors show large increases, such as wheat in Malaysia (73.05 per cent), oil seeds in Viet Nam (26.26 per cent) and sugar cane in Singapore (13.01 per cent).

Table 14. Impact of ASEAN trade liberalization on output agriculture sector, excluding the sensitive and highly-sensitive products

(Unit: Percentage)

Sector	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam	XSE
pdr	0.000	3.610	0.010	0.250	-0.460	-0.070	0.010
wht	0.000	73.050	-0.130	0.490	4.040	2.160	0.250
gro	0.000	1.830	0.000	-0.140	-0.610	-0.130	0.050
v_f	0.000	0.650	-0.040	2.940	-0.500	-0.120	0.080
Osd	-0.010	0.170	-0.120	5.100	-1.210	26.260	0.550
c_b	0.000	3.380	-0.840	13.010	0.170	-0.060	-0.040
pfb	-0.010	0.240	-0.070	-0.360	-0.520	-0.120	0.140
ctl	0.000	0.710	0.000	0.980	-1.120	-0.050	1.660
oap	0.000	4.580	0.000	2.560	-0.630	-0.230	-0.040
rmk	-0.010	7.920	5.220	4.480	7.170	-1.270	-4.530
OthAgr	-0.010	-3.630	0.490	-0.910	1.560	0.030	-0.570
vol	-0.020	1.460	-0.330	2.310	-2.110	-25.730	-0.930

The impacts of ASEAN agriculture trade liberalization on exports, excluding sensitive and highly-sensitive products, are shown in table 15. A large number of commodities, excluding the sensitive and highly sensitive products, from Indonesia would experience declining rates as a result of trade liberalization. The sectors that would decline are oil seeds, cattle, animal products, raw milk, other agricultural products and vegetable oil. However, paddy rice, wheat, cereal grain, vegetables, fruit, nuts, sugar cane and plant-based fibres would experience increases.

Table 15. Impact of ASEAN trade liberalization on agricultural exports, excluding sensitive and highly-sensitive products

(Unit: Percentage)

Sector	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam	XSE
pdr	0.150	3.920	-0.090	0.470	-0.900	-0.400	0.520
wht	0.000	90.900	142.770	0.520	23.410	4.460	0.410
gro	0.000	-0.920	4.710	-0.170	0.030	-0.170	1.010
v_f	0.000	2.630	-0.050	4.190	-0.470	-0.400	0.410
Osd	-0.010	0.660	0.010	5.130	2.150	38.890	3.000
c_b	0.050	4.890	0.360	60.780	0.540	-0.300	0.410
pfb	0.000	-0.570	-0.090	-0.360	-0.150	-0.330	1.620
ctl	-0.020	1.600	-0.290	3.810	1.490	-1.090	34.690
oap	-0.010	7.180	-0.480	4.930	-1.030	-2.560	-8.080
rmk	-0.010	9.950	11.850	13.020	34.280	4.790	83.750
OthAgr	-0.030	9.670	12.600	-1.210	6.170	0.580	-3.850
vol	-0.040	1.460	0.080	3.180	-3.910	9.350	0.580

Exports of several commodities by the Philippines grow sharply when import tariff barriers on all agriculture products (excluding sensitive and highly-sensitive products) are eliminated. This is especially the case with wheat, which shows a significant increase of 142.77 per cent. The effects on Malaysia, Singapore, Thailand, Viet Nam and XSE are varied. In contrast, Indonesia experiences fewer benefits when tariff barriers to sensitive and highly sensitive products remain. As table 15 shows, 6 of the 12 sectors experience decreases.

Table 16. Impact of ASEAN agriculture trade liberalization on imports, excluding sensitive and highly-sensitive products

(Unit: Percentage)

Sector	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam	XSE
pdr	0.000	-0.750	-0.170	0.060	1.900	0.390	-0.770
wht	0.000	3.610	-0.070	0.140	-0.830	-0.030	-0.050
gro	0.000	0.630	0.020	0.120	0.580	0.340	-0.650
v_f	0.000	1.260	0.770	0.170	10.230	0.090	-0.480
Osd	0.010	1.140	0.000	0.170	0.110	6.630	-0.100
C_b	0.000	2.010	10.530	7.260	1.330	0.030	6.870
pfb	0.000	1.990	-0.010	0.150	0.020	0.040	0.760
ctl	0.010	0.590	0.050	0.270	10.790	0.220	0.430
oap	0.000	0.530	0.170	0.320	3.400	0.390	-0.230
rmk	0.010	1.950	0.320	0.920	2.600	0.450	14.920
OthAgr	0.040	30.640	3.300	-0.210	3.750	4.020	3.110
vol	0.000	1.830	10.760	1.460	23.630	21.090	4.600

Nevertheless, the ASEAN member countries that implement the trade liberalization agreement would experience a sharp increase in their imports from other countries. Table 16 details the impact of ASEAN agriculture trade liberalization, excluding sensitive products, on imports. The elimination of tariff barriers while some sensitive products remain at the base tariff leads to an increase in the trade flows (imported goods) from surplus countries to deficit countries. Growth in imports is expected following the elimination of tariff barriers, resulting in the prices of imported products becoming cheaper.

3. Impact of ASEAN agriculture trade liberalization and increasing trade facilitation on each ASEAN country's macroeconomies

One such constraint that is gaining in prominence is the role of trade transaction costs or the issue of trade facilitation. Trade facilitation encompasses "a wide range of areas such as government regulations and controls, business efficiency, transportation, information and communication technologies, and the financial sector" (UNECE, 2002). A number of studies have suggested that the potential gains from investment in trade facilitation measures are substantial for developing countries. A recent assessment of the impact of trade facilitation in the case of AFTA was carried out by Wilson and others (2002).

The analysis considered how much trade in the AFTA region might increase under "improved" trade facilitation by 10 per cent modeled as an increase in output augmenting technical change (productivity change) in the finance and business sectors.

Table 17. Impact of ASEAN trade liberalization and increasing trade facilitation on macroeconomy variables

Country/region	Equivalent variation (US$ million)	Trade balance (US$ million)	Quantity GDP (%)	Nominal GDP (%)	Price GDP (%)	Real GDP (%)	Terms of Trade (%)
Australia, New Zealand	-1.270	-2.880	0.000	-0.030	-0.030	0.000	0.000
Indonesia	334.160	1 309.070	1.250	0.740	-0.520	1.260	-0.250
Malaysia	1 329.610	247.180	2.860	1.660	-1.190	2.850	-0.860
East Asia	-91.850	-27.500	0.000	-0.020	-0.020	0.000	-0.010
Philippines	661.220	-175.050	1.020	0.530	-0.490	1.020	-0.150
Thailand	1 890.340	-415.500	1.660	1.700	0.040	1.660	0.000
Viet Nam	419.420	-340.900	0.750	2.170	1.420	0.750	0.380
NAFTA	16.540	256.060	0.000	-0.050	-0.050	0.000	0.000
XSE	1 304.730	-263.830	1.660	2.040	0.380	1.660	-0.010
Singapore	4 474.940	-1 157.720	4.780	6.110	1.330	4.780	0.320
European Union	297.370	550.760	0.000	-0.070	-0.060	-0.010	0.020
Rest of the world	275.370	20.320	0.000	-0.040	-0.040	0.000	0.020

Table 17 shows the impact of trade facilitation improvement. It is interesting to note that trade facilitation improvement would worsen the trade balance in most of the ASEAN member countries. Indonesia and Malaysia would be the only ASEAN member countries to show a surplus in their trade balance as a result of the effect of trade facilitation improvement. Indonesia's trade balance would experience an increase of some US$ 1,309.07 million, or more than six times the surplus trade balance experienced by Malaysia. Apart from Malaysia and Indonesia, all other ASEAN member countries would experience a deficit trade balance as a result of trade facilitation improvement. A better impact is shown in an increase in GDP (either real or nominal GDP) of all ASEAN member countries including Indonesia, which has zero change in real GDP for scenarios 1 and 2.

Although some ASEAN member countries experience a negative trade balance, all experience welfare improvement, which is shown by the positive value of equivalent variation. The strongest growth in welfare would be experienced by Singapore as indicated by its equivalent variation of US$ 4,474.94 million. Singapore's real GDP would also grow at 4.78 per cent.

The impact of agriculture trade liberalization on ToT for some ASEAN member countries would be positive (i.e., Indonesia, Malaysia, the Philippines and Thailand). The negative effect of trade liberalization on ToT of those countries would primarily be due to the weaknesses in their competitiveness, either with other ASEAN countries or outside ASEAN.

Table 18. Impact of ASEAN trade liberalization and increasing trade facilitation on output of agriculture sector

(Unit: Percentage)

Sector	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam	XSE
pdr	0.090	4.400	-4.550	-3.410	0.180	2.320	0.650
wht	-1.360	72.060	-0.060	-1.020	5.640	1.460	0.730
gro	-0.020	2.070	0.640	-0.160	-0.190	-1.490	0.340
v_f	0.040	-0.400	0.660	3.400	-0.300	-1.740	-0.240
Osd	-0.430	-1.150	0.360	4.270	-1.510	23.250	-0.760
c_b	0.110	4.360	0.320	10.230	1.200	-7.560	1.110
pfb	-0.340	-0.090	0.060	-1.710	-0.810	-3.690	0.030
ctl	0.240	9.420	0.910	-3.040	0.090	0.360	2.640
oap	0.020	6.010	0.920	-2.030	-0.590	-0.710	0.700
rmk	0.030	12.140	5.350	-1.430	7.680	-1.630	-4.370
OthAgr	-0.040	-4.510	0.960	-2.080	0.840	-1.630	-0.330
vol	-0.590	2.980	-0.170	1.080	-1.710	-27.860	-0.640

The impact of ASEAN agriculture trade liberalization and an increase in trade facilitation would increase output of the ASEAN member countries as a whole. The magnitude of the impact, however, would vary in all sectors. For example, in Indonesia, the sectors experiencing increases would be paddy rice, vegetables and fruit, sugar cane, cattle, animal products and raw milk. Malaysia shows the highest output increase in wheat (72.06 per cent).

Tables 19 and 20 show the impacts of ASEAN trade liberalization and trade facilitation improvement on exports would decrease agricultural exports from Indonesia, but would increase imports. This indicates that improvement of trade facilitation in all ASEAN countries may not improve export performance of Indonesia in agriculture.

Table 19. Impact of ASEAN trade facilitation improvement on agricultural exports

(Unit: Percentage)

Sector	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam	XSE
pdr	-0.780	1.590	5.440	-4.830	-0.430	20.250	-5.510
wht	-1.470	89.590	142.030	-0.990	27.450	5.390	1.530
gro	-0.610	-1.990	4.640	-0.160	2.100	-2.640	1.540
v_f	-1.060	2.760	1.030	4.910	-1.260	-5.190	-4.630
Osd	-0.900	1.290	2.190	4.300	-0.330	35.790	-1.350
C_b	-0.810	2.820	3.530	52.040	1.560	0.520	-3.700
pfb	-1.280	-2.340	0.500	-1.720	-0.060	-2.760	-1.690
ctl	-0.360	2.010	-0.330	-4.500	0.710	-15.580	32.450
oap	-1.800	7.420	1.080	-0.510	-3.970	-14.410	-16.570
rmk	-0.630	10.910	12.180	0.560	34.760	1.760	77.440
OthAgr	-1.180	9.560	10.700	-2.840	4.800	-1.740	-7.270
vol	-1.720	3.080	-0.480	1.570	-6.470	3.550	-5.320

Table 20. Impact of ASEAN trade liberalization and increasing trade facilitation on agricultural imports

(Unit: Percentage)

Sector	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam	XSE
pdr	0.340	-0.020	78.060	-0.260	4.470	9.500	9.390
wht	0.030	4.660	0.540	-0.280	-1.130	-0.750	0.870
gro	0.470	1.360	0.720	-0.320	-0.790	2.050	0.000
v_f	0.960	1.640	1.140	-0.200	12.350	1.930	4.750
Osd	0.580	1.890	0.630	-0.340	1.040	5.840	2.740
c_b	0.450	3.980	9.150	7.720	3.400	24.810	8.720
pfb	0.720	3.510	0.030	1.170	-0.310	1.040	2.890
ctl	0.430	4.530	1.280	3.150	11.600	4.730	6.120
oap	0.870	5.300	6.990	2.160	4.460	14.470	23.330
rmk	0.370	4.080	1.270	3.630	4.010	1.960	17.510
OthAgr	0.930	30.160	5.830	0.790	13.220	4.380	8.140
vol	0.480	1.440	11.750	0.770	25.150	23.100	7.450

B. Impact of ASEAN trade liberalization on income distribution and welfare in Indonesia

Having discussed the impact of agriculture trade liberalization by the ASEAN member countries, it is interesting to explore the impact of trade liberalization on income distribution in Indonesia. Some researchers (for example, Cororaton and others, 2005) argue that free trade could create a positive effect on the welfare of one country. To prove this argument, a scenario of tariff elimination in the ASEAN area was carried out by the authors. Table 21 presents the simulation results. Under scenario 1, when zero tariffs are applied to agriculture in all ASEAN member countries, Indonesia experiences a negative effect in terms of income.

However, the second scenario, when trade liberalization is carried out without a sensitive and highly-sensitive list schema, results in a positive impact on incomes of all households. The results show that income distribution in Indonesia, either nominal or real income, improves in all household categories. It means some sensitive and highly-sensitive products are still important for Indonesian households since these are the main food and income sources for the farmers. Protecting these products from liberalization will raise household welfare.

Table 21. Impact of ASEAN trade liberalization on income distribution in Indonesia

(Unit: Percentage)

Household category	Aggregate nominal income			Aggregate real income		
	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
AgrRaw1	-0.014	0.350	0.800	-0.003	0.366	0.516
AgrBuss2	-0.014	0.410	0.930	-0.003	0.426	0.646
AgrBuss3	-0.013	0.410	0.950	-0.002	0.426	0.666
AgrBuss4	-0.012	0.320	0.780	-0.001	0.336	0.496
NAgLoRr1	-0.014	0.280	0.690	-0.003	0.296	0.406
NAgOthRr2	-0.013	0.370	0.870	-0.002	0.386	0.586
NAgHighRr3	-0.013	0.240	0.640	-0.002	0.256	0.356
NAgLoUr1	-0.015	0.320	0.770	-0.004	0.336	0.486
NAgOthUr2	-0.014	0.290	0.730	-0.003	0.306	0.446

NAgHighUr3	-0.014	0.130	0.430	-0.004	0.146	0.146

Under scenario 3, even the impact of trade liberalization on nominal and real income would be more positive for each household category than for those in scenario 2. Nominal income in each household will rise between 0.43 and 0.95 per cent while real income will increase by between 0.15 and 0.66 per cent. Improving trade facilitation increases household income in Indonesia.

Moreover, the household welfare in most of the household categories will rise slightly because of trade liberalization among ASEAN countries. This is evident from the results for each scenario in table 22. In scenario 1, all household categories increase slightly, by, except NAgLoUr1 and NAgHighUr3 which decrease -0.004 and -0.001 per cent, respectively. Moreover, scenario 3 gives better results, ranging from 0.089 to 0.924 per cent, excluding NAgHighRr3 and NAgHighUr3. However, scenario 2 shows welfare of four household categories decreasing. This shows that liberalization in an agriculture with a sensitive list scheme will worsen household welfare in urban areas, since consumers cannot choose products that have lower prices because of the existence of trade restrictions.

Table 22. Impact of ASEAN trade liberalization on household welfare in Indonesia

(Unit: Percentage)

Household category	Scenario 1	Scenario 2	Scenario 3
AgrRaw1	0.002	0.193	0.566
AgrBuss2	0.000	0.378	0.924
AgrBuss3	0.003	0.312	0.788
AgrBuss4	0.005	0.043	0.236
NAgLoRr1	0.001	-0.081	0.089
NAgOthRr2	0.003	0.206	0.575
NAgHighRr3	0.002	-0.109	-0.047
NAgLoUr1	-0.004	0.073	0.383
NAgOthUr2	0.000	-0.012	0.186
NAgHighUr3	-0.001	-0.328	-0.451

VI. Conclusion

Extraregional exports still play an important role among ASEAN member countries. Intraregional exports in ASEAN are still less than exports to world markets. Both intraregional and extraregional exports by ASEAN member countries are dominated by Malaysia and Singapore. More interestingly, these two countries are not only becoming the two largest exporters in ASEAN, but also the biggest importers. Singapore appears to be the leading ASEAN importer.

Three scenarios of trade liberalization have been considered: (a) zero tariffs, intraregional ASEAN for agricultural products; (b) zero tariffs for agricultural products, excluding the sensitive and highly-sensitive products; and (c) ASEAN trade liberalization and the improvement of trade facilitation intraregionally for ASEAN members through an increase in productivity in the finance and business sectors. In addition, this study also

explores the impact of trade liberalization on income distribution in Indonesia. The results for ASEAN countries from the GTAP simulations are summarized below.

Most ASEAN member countries experience, overall and in aggregate, positive impacts from the elimination of tariffs. Real GDP of all ASEAN countries except Indonesia increases. Trade liberalization through zero tariffs will not affect Indonesian real GDP (an almost zero percentage change). In contrast, Malaysia will become the primary beneficiary of trade liberalization among the ASEAN countries when tariff barriers are eliminated. Malaysian real GDP will increase by 0.299 per cent. A similar positive impact from zero tariffs is also indicated by the changes in the rate of welfare in ASEAN member countries (indicated by equivalent variations).

It is important to note that even though all ASEAN member countries would experience an overall positive impact resulting from the elimination of tariff barriers, this impact would not bring much improvement to Indonesian economic performance. Although the Indonesian trade balance, nominal GDP and ToT would experience positive impacts, Indonesian real GDP and quantity GDP would not change. In addition, Indonesia would experience the smallest improvement in the welfare rate (indicated by equivalent variations). Generally, zero tariffs would worsen a wide range of Indonesian exports and would increase Indonesian imports.

Comparing zero tariffs for all agricultural products with zero tariffs excluding sensitive and highly-sensitive products, trade liberalization in the latter scenario will result in a better impact on the Indonesian economy. Malaysia would experience the greatest positive impact while in other ASEAN member countries (apart from Indonesia) the impact would be less positive than with zero tariffs on all products.

It is interesting to note that trade facilitation improvement will worsen the trade balance in the majority of ASEAN member countries. Indonesia and Malaysia are the only two ASEAN members to see an improvement in their trade balance as the result of ASEAN trade liberalization and trade facilitation improvement. Trade facilitation improvement, on the one hand, also worsens the exports of ASEAN member countries; on the other hand, it increases their exports. Nevertheless, all ASEAN member countries experience welfare improvements, demonstrated by the positive value of equivalent variations.

In addition, real GDP in all ASEAN member countries increases, with Singapore experiencing the highest growth. The impact of agricultural trade liberalization on ToT is positive in Indonesia, Malaysia, the Philippines and Thailand. The negative effect on ToT from improving trade facilitation in those countries is primarily due to weaknesses in competitiveness, either with the other ASEAN member countries or countries outside ASEAN. The impact of ASEAN agricultural trade liberalization increases output for ASEAN member countries as a whole. The magnitude of the impact, however, varies from sector to sector.

Trade liberalization may not improve income distribution in Indonesia significantly. Under scenario 1, when zero tariffs are applied to agriculture in all ASEAN member countries, Indonesia experiences no significant effects in terms of income distribution. In contrast, in scenarios 2 and 3, when trade liberalization is accompanied by protection of sensitive and highly-sensitive products and/or trade facilitation, more important and positive changes in income distribution are observed in the agricultural household categories.

Although household welfare increase slightly due to trade liberalization, it is not enough to create a positive effect on the welfare of all Indonesian households. Some sensitive and highly-sensitive products still need protecting under liberalization in order to raise household welfare, especially in the case of agricultural household categories.

References

Adams, P., M. Horridge, B. Parmente and X. G. Zhang, 1998. "Effect on China of APEC trade liberalization", report prepared for the East Asia Analytical Unit, Department of Foreign Affairs and Trade, Canberra.

Adams, P., K. M. Huff, R. McDougall, K. R., Pearson and A. A. Powell, 1997. *Medium- and Long-Run Consequences for Australia of an APEC Free-Trade Treaty: CGE Analysis using the GTAP and Monash Models*, Centre of Policy Studies and IMPACT Project. Monash University, Melbourne, Australia.

Anderson, K., 2003. "Trade liberalization, agriculture, and poverty in low-income countries", Discussion Paper No. 2003/25. World Institute for Development Economics Research, United Nations University, Helsinki.

ASEAN Secretariat, 2005. *ASEAN Statistical Yearbook 2005*. ASEAN Secretariat, Jakarta.

Austria, M. S, 2004. *The Pattern of Intra-ASEAN Trade in the Priority Goods Sectors*, REPSF Project No 03/006e. ASEAN Secretariat, Jakarta.

Behrman, J. R., J. D. Lewis and S. Lofti, 1989. "The impact of commodity price instability: Experiments with a general equilibrium model for Indonesia", in L. R. Klein and J. Marquez, (eds.), *Economics in Theory and Practice: an Eclectic Approach,* pp. 59-100. Kluwer Academic Publishers, Boston.

Blackorby, C., D. Primont and R. R. Russell, 1978. *Duality, Separability, and Functional Structure: Theory and Economic Application*. North-Holland, Amsterdam.

Chan, K. K. and J. B. Nugent, 1998. "Factor endowments, trade liberalization and the future of APEC trade patterns", paper presented at the 73rd Annual WEA International Conference, 29 June 1998, Lake Tahoe, Nevada.

Cororaton, C. B, J. Cockburn and E. Corong, 2005. Doha scenarios, trade reforms, and poverty in the Philippines: A CGE analysis", MPIA Working Papers 2005-03. Available at www.pep-net.org.

Dixon, P.B., Parmenter, B.R., Sutton, J. and Vincent, D.P., 1982. *ORANI: A Multisectoral Model of the Australian Economy*, North Holland, Amsterdam.

Hakim, D. B., 2004. "The implications of the ASEAN Free Trade Area (AFTA) on agricultural trade (a recursive dynamic general equilibrium analysis)", dissertation, Institute Fur Agrarokonomie Georg-August-Universitat Gottingen, Germany. Unpublished.

Hertel, T. W. (ed.), 1997. *Global Trade Analysis: Modeling and Applications*. Cambridge University Press, Cambridge.

Hertel, T. W. and M. E. Tsigas, 1997. "Structure of GTAP", in T. W. Hertel. (ed.), *Global Trade Analysis: Modeling and Applications*, pp. 13-73. Cambridge University Press, Cambridge.

Hertel, T. W. and A. L.Winters, 2005. "Poverty impacts of a WTO Agreement: synthesis and overview," World Bank, Washington, D.C. Available at www.wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2005/10/17/000016406_2 0051017173931/Rendered/PDF/wps3757.pdf.

Horridge, J., B. R. Parmenter and K.R. Pearson, 1993. "ORANI-F: A general equilibrium model of the Australian economy", *Economic and Financial Computing,* No. 3, pp. 71-140.

Huff, K. M., R. McDougall, K. R. Pearson and A. A. Powell, 1995. "Medium-run consequences for Australia of an APEC free trade area: CGE analyses using the GTAP and Monash models", paper presented at the Pan-Pacific Conference XII, 29 May -1 June 1995, Dunedin, Otago, New Zealand..

Innwon, P., 1995. *Regional Integration among the ASEAN Nations: A Computable General Equilibrium Model Study*. Praeger Publishers, Wesport, United States.

Khan H. A., 2005. *Poverty Impact of Trade Liberalization Policies in Computable General Equilibrium Models: Theory and Some Policy Experiments GSIS*. University of Denver, United States.

Lloyd, P. and P. Smith, 2004. *Global Economic Challenges to ASEAN Integration and Competitiveness: A Prospective Look*. REPSF Project No. 03/006a. ASEAN Secretariat, Jakarta.

McKibbin, W. J., 1996. "Quantifying APEC trade liberalization: A dynamic analysis", paper prepared for the Economic Modeling Bureau of Australia conference on Changing Patterns of Interdependence in the Asia-Pacific Region, Cairns, Australia, 28-31 August 1996.

Nguyen, T. T., 2002. "Vietnam's trade liberalization in the context of ASEAN and AFTA CAS", Discussion Paper No 36. Centre for ASEAN Studies, Centre for International Management and Development Antwerp.

Oktaviani, R., 2000. "The impact of APEC trade liberalization on Indonesian economy and agricultural sector", unpublished PhD thesis, Department of Agricultural Economics, University of Sydney, Australia.

Oktaviani, R. and R. G. Drynan, 2000. "The impact of APEC trade liberalization on the Indonesian economy and agricultural sector", paper presented at the Third Annual Conference on Global Economic Analysis 28 June 2000, Melbourne, Australia.

Oktaviani, R, D. B. Hakim, H. Siregar and Sahara, 2007. "Impact of a lower oil subsidy on Indonesian macroeconomic performance, agricultural sector and poverty incidences (a recursive dynamic computable general equilibrium analysis). Forthcoming working paper, Poverty Economics Policy Network, Laval University, Quebec, Canada.

Organisation for Economic Co-operation and Development, 2006. "South-South trade: Vital for development". Available at www.oecd.org/dataoecd/30/50/37400725.pdf.

Pasadilla, G. O., 2006. "Preferential trading agreements and agricultural liberalization in East and South-East Asia", Asia-Pacific Research and Training Network on Trade (ARTNeT) Working Paper Series, No. 11, April 2006. ESCAP, Bangkok.

Rae, C. and Sjakur, 1999. "The sectoral approach to trade liberalization: Should we try to do better?" paper presented at the Conference on Towards APEC's Second Decade: Challenges, Opportunities and Priorities, 31 May - 2 June, 1999, Auckland, New Zealand.

Robinson, S., 1990. "Analysing agricultural trade liberalization with single country computable general equilibrium models", in I. Goldin and O. Knudsen (eds.), *Agricultural Trade Liberalization, Implications for Developing Countries*, pp. 201-224. Organization for Economic Co-operation and Development, Paris.

Robinson, S. and A-S Robilliard, 2005. "The social impact of a WTO Agreement in Indonesia," Working Paper No. 3747. World Bank, Washington, D.C. Available at www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2005/ 10/06/000016406_20051006151455/Rendered/PDF/wps3747.pdf

UNECE. 2002. "Trade Facilitation: An Introduction to the Basic Concepts and Benefits."Geneva:United Nations, ECE/TRADE/289. www.unece.org.

Wilson, John S., Catherine Mann, Yuen Pau Woo,Nizar Assanied, and Inbom Choi. 2002. Trade Facilitation: A Development Perspective in the Asia Pacific Region. Asia Pacific Economic Cooperation (APEC). http://www.asiapacific.ca/analysis/pubs/apec/apec_tf_report.pdf.

Wittwer, G., 1999. *WAYANG: A General Equilibrium Model Adapted for the Indonesian Economy*, edition prepared for ACIAR Project No. 9449. CIES, University of Adelaide, Australia (in association with RSPAS, ANU, CASER, Bogor, Indonesia and CSIS, Jakarta).