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The Evaluation of Thailand's Preferential Trading Arrangements with Australia, New Zealand, Japan, China, and India – The CGE Approach

Pachara Lochindaratn[†*]

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Abstract

This paper performs the impact analysis of certain bilateral preferential trading agreements Thailand has reached with Japan, China, India, Australia, and New Zealand. Accordingly, the model utilises the GTAP 6.0 database while explicitly determining the degree of commodity market competition by sector; and labour market paradigm by skill level, in order to better reflect economic reality. Among Thai bilateral FTAs entered into force thus far, in terms of EV, JTEPA is the most while TNZCEPA turns out to be the least beneficial FTA for Thailand. Still, real gains from bilateral FTAs are trivial compared to the benefits from the groupings that include ASEAN as a whole; and unilateral trade liberalisation boosts the economy of Thailand almost as much as global free trade. On the whole, trade diversion is offset by trade creation, thus the world economy finds all of the Thailand's FTAs welfare improving, albeit extremely marginal.

[†] School of Economics, University of Nottingham, Sir Clive Granger Building, University Park, Nottingham, NG7 2RD, United Kingdom. Tel: +44 (0) 779 514 8005. Fax: +44 (0) 115 9514159. E-mail: lexpl1@nottingham.ac.uk

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1. Introduction

Thailand has become progressively open since the Industrial Promotion Act was revised in 1972. Over the last quarter century, the country keeps abreast of many other developing countries, such that the economy shifts from import-substituting to export-oriented industrialisation regimes, although the real acceleration of trade liberalisation dates back to the 1980s. In the wake of the Asian crisis in 1997, temporary import surcharges to protect vulnerable sectors were imposed, but overall tariff protection continued to decline, although certainly more slowly than in many other emerging economies such as China and India.

The current deteriorating momentum of trade liberalisation in Thailand is attributable to the lacklustre pace of the WTO's Doha Round, little progress in Association of South East Asian Nations (ASEAN) economic integration, and the backdrop of FTA initiatives in Asia and the Pacific. For that reason, Preferential Trading Arrangements (PTAs) have become prominent in Thai economic policy since 2001 under the Shinawatra administration. Thai FTA initiatives have issued thick and fast, involving many partners in East and South Asia such as China, Japan, Korea and India, among others; Australia; New Zealand; Bahrain; Peru; EFTA (European Free Trade Association); and the USA. Some are supplemented by plurilateral initiatives involving all ASEAN members. Furthermore, there is talk of the East Asia Summit (EAS) bringing together ASEAN, China, Japan and Korea, and would further subsume South Asia. Despite the government's bold take on this matter, among these initiatives, only few are carried out, as preferential tariff cuts in some sectors have ignited political controversy. In addition, FTA negotiations tend to become stagnant if Thailand's potential partners are comparatively more powerful and aggressive, as she seeks overseas market access in sectors of her comparative advantage, for which she may concede access to her own market in other sectors; otherwise the status quo of domestic protection will be defended. In consequence, so far, merely five FTAs between Thailand and her trading partners, namely Australia, New Zealand, Japan, China, and India, have come into force; while the rest of Thai FTA negotiations are stalled.

Such a fast-paced pursuit of preferential trading arrangements naturally raises questions regarding the credibility of the government's choice of negotiating partners. Overall, it is perceived that the government approached Japan – one of the established export destinations of Thailand – so as to retain market access and expand access for new product lines; and it chose Australia, New Zealand, China, and India as her negotiating partners, since they are big markets with great potential for Thai trade expansion. Thus, if a choice of a negotiating partner is to be evaluated with respect to the importance of trade with Thailand, Table 1 then broadly supports the argument that trade relations are enhanced by such groupings. Historically, Thailand's leading import sources and export destinations are Japan, the United States, EU and ASEAN (particularly Singapore and Malaysia), with roughly equal shares of 15-20% of total Thai trade. On the other hand, trade with Australia, New Zealand,

China, and India together is only 10% of total trade. However, as Table 1 shows, when Thailand became actively engaged in FTA negotiations in 2001, the import and export shares of Thai FTA partners in total Thai trade gradually increased with the exception of Japan, as that agreement has just been signed in April 2007.

<Table 1 inserted here>

However, the government may take into account some other factors when opting for an FTA partner. In a comprehensive study by the Fiscal Policy Research Institute (FPRI, 2005), 180 countries are ranked with respect to their attractiveness as FTA partners of Thailand. The index used is the weighted average of each country's attractiveness in terms of 1) relative economic size, population, and trade; 2) its leadership and role as a gateway to other countries in a particular region; 3) its abundance in natural resources; and 4) the economic freedom index indicating the extent to which the government intervenes, e.g., granting exclusive rights to some companies in domestic markets. It also takes into consideration the existing trade barriers and the degree of current investment and cooperation between them. Reportedly, India earns the highest score among the five FTAs, followed by China and Japan, which are equivalently attractive as negotiating partners, and lastly come Australia and New Zealand, ranked in the middle range among all countries. Thus, according to FPRI (2005), the concluded FTAs are regarded as sensible deals. Still, it is very important to understand the potential economic and welfare impacts of these particular FTA groupings at both regional and sectoral levels.

Accordingly, this paper is organised as follows. Section 2 highlights the general model structure, and then Section 3 explains the treatment of data the criteria for the specification of asymmetric commodity market structure and labour market paradigm. After Section 4 analyses the welfare implications of the free trading arrangements Thailand has launched with Australia, New Zealand, Japan, China and India using the CGE approach, Section 5 tests the sensitivity of the simulation results, and then Section 6 concludes.

2. General Model Structure

The flow of payments within each region is illustrated in Figure 1.

<Figure 1 inserted here>

In this static CGE model, production is subject to the availability of factor endowments in each region, namely capital, skilled labour, unskilled labour, land, and natural resources. Capital, skilled and unskilled labour are mobile across production sectors but not across regions, whereas land and natural resources are completely immobile, so that factor returns may vary by sector. Capital, land,

and natural resources are fully employed at each point of time, while there is unemployment in some regions' labour markets due to wage rigidity. Factor costs in each sector are minimised subject to the Constant Elasticity of Substitution (CES) production function, with the estimated sectoral elasticity of substitution among primary factors ranging between 0.20 to 1.68 (precisely, the parameter called $esubva_{sec}$ in the GTAP 6.0 database). Firms also demand intermediate inputs – which are the Armington composites of differentiable domestically-produced and imported goods – as fixed proportions of final outputs (Leontief production function). Firms then pay factor and production taxes as fixed proportions of factor costs and output values, respectively. For perfectly competitive sectors, the final products supplied to domestic and overseas markets are differentiated with respect to the Constant Elasticity of Transformation (CET) function, with a fixed mark-up for international transport added to each traded commodity. Note that in imperfectly competitive sectors with entry/exit barriers, the firms' residual profits are transferred to the representative household.

Each region has a representative household, which is endowed with the natural and labour resources, land, and capital stocks. The household thus receives factor incomes from production sectors. Where unemployment exists, the household also receives benefits proportional to the level of unemployment, in addition to other lump-sum transfers from the government. The household in turn pays income taxes as a fixed proportion of total incomes, then saves a fixed proportion of the residual income, and spends the rest on private good consumption in accordance with the nested CES utility function.

The government receives tax revenues from various sources and then spends them on public good consumption with respect to its CES utility function, and government transfers to the household. The rest are government savings (or deficits if negative), which are in turn handled by the regional bank. The regional bank, on the other hand, receives savings from the household, government, and the rest of the world. Foreign savings transferred from the rest of the world are fixed in real terms under the flexible exchange rate regime, and their values always equal net regional imports in nominal terms. The bank then spends all regional savings on investment final demands subject to its CES utility function.

Given the afore-mentioned general model structure, some more specific features of this model are explained as follows.

2.1 Trade: Armington and Transformation (CET) Functions

Regional economies are internationally linked through bilateral trade flows. Bilateral imports of the same good from different regions are combined into an import aggregate, which is further aggregated with domestically-produced goods into a single Armington good, ultimately purchased by production and final demand sectors. The distinction between bilateral imports of the same good from different

origins and between domestically-produced and aggregate import goods is again modelled through the nested Armington CES function, with trade elasticity ranging between 3.80 to 16.81 for the import aggregate; and similarly from 1.90 to 5.20 for the final Armington good (respectively, the parameters called $esubm_{sec}$ and $esubd_{sec}$ in the GTAP 6.0 database).

On the supply side, domestic production is either sold to the domestic market or exported to foreign markets. In this paper, producers differentiate outputs sold in domestic and overseas markets while maximising their total sales subject to the nested CET transformation function. The CET elasticity between tradable outputs supplied to domestic and foreign markets ($\sigma T^{reg}_{\text{sec}T}$) and exports oriented to various overseas destinations ($\sigma BE^{reg}_{\text{sec}T}$) are similarly specified as -2 (Bayar et al., 2006).

Figure 2 summarises the general flow of tradable commodities (*secT*) in each region.

<Figure 2 inserted here>

2.2 Household, Government, and Bank: CES Utility Function

There are three final demand sectors, namely private, public, and investment. Each sector demands tradable commodities from Armington sectors, and non-traded outputs from domestic producers. Final consumption products are substitutable under the CES utility function with the elasticity of substitution of σD^{reg} (Figure 3). The household, government, and bank share a common substitution elasticity equivalent to 1.43.[1]

<Figure 3 inserted here>

2.2.1 Household

Denote by $CBUD^{reg}$ the "real" disposable income, net of income taxes and household savings, and $PCBUD^{reg}$ the household's disposable income deflator. Given the CES distribution parameter ($\gamma HH^{reg}_{\text{sec}}$) and the substitution elasticity parameter (ρD^{reg}), the private demand for each commodity (C^{reg}_{sec}) is aggregated into the following CES household utility function:

$$CBUD^{reg} = \left[\sum_{\text{sec}} \gamma HH^{reg}_{\text{sec}} \cdot (C^{reg}_{\text{sec}})^{\rho D^{reg}} \right]^{\frac{1}{\rho D^{reg}}}, \qquad (1)$$

subject to the budget constraint:

[1] This CES elasticity is derived from the GRACE model by Aaheim and Rive (2005).

$$PCBUD^{reg} \cdot CBUD^{reg} = \sum_{\text{sec}} (1 + tc_{\text{sec}}^{reg}) \cdot PA_{\text{sec}}^{reg} \cdot C_{\text{sec}}^{reg}, \quad (2)$$

where PA_{sec}^{reg} is the sectoral consumer price of each commodity,[2] exclusive of a commodity tax rate tc_{sec}^{reg}. Since the elasticity of substitution between final goods is defined as $\sigma D^{reg} = 1/(1-\rho D^{reg})$, household utility in Equation (1) is maximised under the following household's final demand function:

$$C_{\text{sec}}^{reg} = CBUD^{reg} \cdot \left[\gamma HH_{\text{sec}}^{reg} \cdot \frac{PCBUD^{reg}}{(1 + tc_{\text{sec}}^{reg}) \cdot PA_{\text{sec}}^{reg}} \right]^{\sigma D^{reg}}, \quad (3)$$

and the zero-profit condition for this CES function is equivalent to the above-mentioned budget constraint of the household.

2.2.2 Government

Similar to the derivation of private demand function, denote by $CGBUD^{reg}$ the government's "real" disposable income net of savings and transfers to the representative household, and accordingly $PCGBUD^{reg}$ the government's disposable income deflator. Given the same elasticity of substitution between products as in the case of the household (σD^{reg}), the CES distribution parameter is newly defined as $\gamma GV_{\text{sec}}^{reg}$, and the government utility is thus optimised when:

$$CG_{\text{sec}}^{reg} = CGBUD^{reg} \cdot \left[\gamma GV_{\text{sec}}^{reg} \cdot \frac{PCGBUD^{reg}}{PA_{\text{sec}}^{reg}} \right]^{\sigma D^{reg}}, \quad (4)$$

providing that the following zero-profit condition for the government's final demand holds:

$$PCGBUD^{reg} \cdot CGBUD^{reg} = \sum_{\text{sec}} PA_{\text{sec}}^{reg} \cdot CG_{\text{sec}}^{reg}. \quad (5)$$

2.2.3 Bank

By the same token, newly define the bank's "real" money inflow as S^{reg} with the price of PS^{reg}, the CES utility-optimising investment demand with the distribution parameter $\gamma I_{\text{sec}}^{reg}$ is derived as:

$$I_{\text{sec}}^{reg} = S^{reg} \cdot \left[\gamma I_{\text{sec}}^{reg} \cdot \frac{PS^{reg}}{PA_{\text{sec}}^{reg}} \right]^{\sigma D^{reg}}, \quad (6)$$

given that the following zero-profit condition for the bank's final demand holds:

[2] The sectoral consumer price of commodity *mc* in region *reg* under monopolistic competition is henceforth defined as the function of individual consumer price of each product variety: $PA_{mc \subset \text{sec}}^{reg} = \left(NOF_{mc}^{reg} \right)^{1/(1-\sigma LV_{mc}^{reg})} \cdot pa_{mc}^{reg}$.

$$PS^{reg} \cdot S^{reg} = \sum_{\text{sec}} PA_{\text{sec}}^{reg} \cdot I_{\text{sec}}^{reg}. \quad (7)$$

2.3 International Transport

Transport cost functions as another barrier to trade. It drives a wedge between region-specific world prices of bilateral exports and imports even in the absence of import tariffs. Thus, producers may refrain from exporting to overseas market if transport margins drive up their consumer prices at export destinations to a level at which they become uncompetitive in comparison with local producers.

For that reason, transport costs are explicitly incorporated in line with the GTAP-EG model (Rutherford and Paltsev, 2000). In this model, the representative global shipping company pools a Cobb-Douglas composite of transport services from individual regions as demanded by exporters. Denote by *trsp* the subset of *sec* comprising transport service sectors, producers in region *reg* then export their services $TRSPR_{trsp}^{reg}$ to the global shipping company at the export price of PE_{trsp}^{reg}. Thus, the values of their regional exports are constant shares $\alpha TRSPR_{trsp}^{reg}$ of the global transport service $TRSPG_{trsp}$ with the price of $PTRSPG_{trsp}$:

$$PE_{trsp}^{reg} \cdot TRSPR_{trsp}^{reg} = \alpha TRSPR_{trsp}^{reg} \cdot \left(PTRSPG_{trsp} \cdot TRSPG_{trsp} \right), \text{ and} \quad (8)$$

$$TRSPG_{trsp} = \sum_{reg} TRSPR_{trsp}^{reg}. \quad (9)$$

When commodity *secT* is exported from region *regg* to region *reg*, a price premium equivalent to:

$$\sum_{trsp} PTRSPG_{trsp} \cdot \delta_{trsp,\text{sec}T}^{regg,reg}$$

is automatically paid by its exporting destination to the global transport company, thus consumers in region *reg* perceive a higher import price in world currency, newly denoted by $PWM_{\text{sec}T}^{reg,regg}$:

$$PWM_{\text{sec}T}^{reg,regg} = PWE_{\text{sec}T}^{regg,reg} + \sum_{trsp} PTRSPG_{trsp} \cdot \delta_{trsp,\text{sec}T}^{regg,reg}. \quad (10)$$

To determine Equation (10), the price premium is specified to be proportional to the parameter called $\delta_{trsp,\text{sec}T}^{reg,regg}$, which is the "real" international transport margin per unit of trade, calculated as a fixed fraction of benchmark bilateral trade data. Therefore, the following relationship also holds:

$$TRSPG_{trsp} = \sum_{reg} \sum_{regg} \sum_{\text{sec}T} \delta_{trsp,\text{sec}T}^{reg,regg} \cdot QBE_{\text{sec}T}^{reg,regg}. \quad (11)$$

Lastly, to reconcile with the GTAP 6.0 database structure, transport services supplied to the international transport sector are explicitly modelled as transport margins, thus are distinguished from other types of transport services supplied to domestic and export markets.

2.4 Commodity Market Structure: The Degree of Market Imperfection

This model reflects asymmetry in the degree of market imperfection among sectors by specifying three types of market structures:

- Perfect competition,
- Cournot oligopoly with homogeneous products and entry/exit barriers, and
- Monopolistic competition under which consumers prefer product variety and firms are free to enter and exit the market.

As such, the CGE model developed in this paper is more flexible by design, for instance, oil companies and construction firms may not compete under the same business environment; and by the same token, textile industries located in different countries may not necessarily face the same degree of market competitiveness. Accordingly, this subsection briefly reviews the three market structures and then describes how each sector is actually determined as perfectly competitive, oligopolistic, or monopolistically competitive in Subsection 2.4.2.

2.4.1 Commodity Market Structure Designs

A sector is perfectly competitive when operated under constant returns to scale, since average cost (*AC*) does not vary with the scale of production as fixed cost is, if any, exceptionally minimal.[3] Thus, they are necessarily equal to marginal cost (*MC*). Moreover, perfect competition guarantees that in equilibrium, producer price (*PZ*) converges toward the average cost level, since a large number of firms competing by producing homogeneous products in each sector are free to enter and exit the market. Therefore we obtain the following price-cost relationship under perfect competition: $PZ = AC = MC$. Since each firm has a small market share, market dominance and collusion are exceptionally difficult. Hence, firms cannot make economic profits in the long run.

On the other hand, a market is imperfectly competitive when possessing the property of increasing returns to scale, since in the presence of a sizeable fixed cost, average cost exceeds marginal cost, thus average cost declines as the production scale is enlarged.[4] This type of internal economies of scale

[3] Note that in reality, this statement is not necessarily true, since the government could give exclusive rights to a domestic company even if the sector was under constant returns to scale. Thus, for simplicity, the model presumes that the government only intervenes in the market by imposing taxes and tariffs.

[4] To be precise, it has already been explained that the difference between average and marginal costs equals fixed costs per unit of production.

encourages firms to merge and benefit from the wedge between production price and average cost. However, if firms are free to enter and exit the market, then price will converge to average costs, and the profit will eventually become zero. As firms maximise profits at the point where marginal cost equals marginal revenue (*MR*), with entry and exit barriers, we derive: $PZ > AC > MC = MR$; and without the barriers, this relativity becomes: $PZ = AC > MC = MR$.

Accordingly, in line with Willenbockel (2004), Cournot oligopolistic sectors with a restricted entry and exit of firms and monopolistically competitive sectors with a relaxed firm mobility are respectively incorporated into the current CGE model as follows.

2.4.1.1 Cournot Oligopoly with Firms' Entry and Exit Barriers (Homogeneous Products)

Cournot oligopoly is usually observed in manufacturing and service sectors, where a handful of firms can collude to limit outputs, raise prices, and increase economic profits.[5] Since oligopolistic firms producing homogeneous goods have strong market powers, the perceived elasticity of demand (EDM_{sec}^{reg}) remains low, and new firms are barred from entering the industry. For that reason, the number of firms henceforth denoted by $NOF0_{sec}^{reg}$ is fixed, whilst firms' profits ($PROFIT_{sec}^{reg}$) are endogenous under Cournot oligopoly. Thus, with production tax (tz_{sec}^{reg}), the zero-profit condition is expressed as:

$$(1-tz_{sec}^{reg})\cdot PZ_{sec}^{reg}\cdot QZ_{sec}^{reg}=\left(\sum_{fac}(1+tf_{sec}^{fac,reg})\cdot PF_{sec}^{fac,reg}\cdot F_{sec}^{fac,reg}+\sum_{secc}PA_{secc}^{reg}\cdot IO_{secc,sec}^{reg}\right)+PROFIT_{sec}^{reg}. \quad (12)$$

Hence, in Equation (12), the condition still holds for all oligopolistic sectors *sec* in region *reg* that total revenue less total cost equals sectoral profit. Since the mark-up is inversely proportionate to the perceived elasticity of demand, it should be relatively high; and with the barred entry and exit of firms, it includes sectoral fixed costs and profits per production unit. Thus, the mark-up pricing condition equates marginal revenue (i.e., price less mark-up) with marginal cost in the presence of production tax:

$$PZ_{\mathrm{sec}}^{reg}\left(1-\frac{1}{EDM_{\mathrm{sec}}^{reg}\cdot NOF0_{\mathrm{sec}}^{reg}}\right)=\sum_{fac}\frac{(1+tf_{\mathrm{sec}}^{fac,reg})\cdot PF_{\mathrm{sec}}^{fac,reg}\cdot FV_{\mathrm{sec}}^{fac,reg}}{QZ_{\mathrm{sec}}^{reg}}+\sum_{\mathrm{sec}c}PA_{\mathrm{sec}c}^{reg}\cdot io_{\mathrm{sec}c,\mathrm{sec}}^{reg}+tz_{\mathrm{sec}}^{reg}\cdot PZ_{\mathrm{sec}}^{reg}. \quad (13)$$

As for the perceived elasticity of demand for non-traded commodities ($EDM_{\mathrm{sec}TN\subset\mathrm{sec}}^{reg}$), taking the natural log of the market clearing condition where total supply equals the sum of final and intermediate demands:

[5] Although firms are inclined to collude, it is not necessarily the case that it can always be accomplished, as the colluded firms may not actually reduce their outputs to the promised level, thus each of them has an incentive to take over the market by cheating against each other.

$$QZ^{reg}_{\text{sec}TN} = C^{reg}_{\text{sec}TN} + I^{reg}_{\text{sec}TN} + CG^{reg}_{\text{sec}TN} + \sum_{\text{sec}} IO^{reg}_{\text{sec}TN,\text{sec}},$$

the derived expression is then totally differentiated to obtain the perceived elasticity of demand for non-traded sectors:

$$EDM^{reg}_{\text{sec}TN} = -\hat{Q}Z^{reg}_{\text{sec}TN} \Big/ \hat{P}Z^{reg}_{\text{sec}TN} = \left(C^{reg}_{\text{sec}TN} + I^{reg}_{\text{sec}TN} + CG^{reg}_{\text{sec}TN}\right) \Big/ \left(QZ^{reg}_{\text{sec}TN} - IO^{reg}_{\text{sec}TN,\text{sec}TN}\right). \quad (14)$$

On the other hand, the perceived elasticity of demand for tradable sectors under oligopoly ($EDM^{reg}_{\text{sec}T\subset\text{sec}}$) remains the same weighted average of the demand elasticity in own and foreign markets (respectively denoted by $EDM^{reg,reg}_{\text{sec}T\subset\text{sec}}$ and $EDM^{reg,regg}_{\text{sec}T\subset\text{sec}}$). The own-market demand elasticity is derived by log differentiating the Armington demand function for domestically-produced products to derive the following expression:

$$EDM^{reg,reg}_{\text{sec}T} = -\sigma A^{reg}_{\text{sec}T} \cdot \frac{\hat{P}A^{reg}_{\text{sec}T}}{\hat{P}D^{reg}_{\text{sec}T}} + \sigma A^{reg}_{\text{sec}T} - \frac{\hat{Q}A^{reg}_{\text{sec}T}}{\hat{P}A^{reg}_{\text{sec}T}} \cdot \frac{\hat{P}A^{reg}_{\text{sec}T}}{\hat{P}D^{reg}_{\text{sec}T}}.$$

The elasticity of Armington price to domestically-produced price ($\hat{P}A^{reg}_{\text{sec}T} / \hat{P}D^{reg}_{\text{sec}T}$) reflects the ratio of the expenditure on a domestically-produced good to total Armington expenditure. However, based on the CES demand function, the elasticity of Armington demand to its own price ($\hat{Q}A^{reg}_{\text{sec}T} / \hat{P}A^{reg}_{\text{sec}T}$) is the negative of the substitution elasticity between Armington goods in a region (-σD^{reg}), since consumers substitute their demands with other products as price increases. Hence, the perceived own-market demand elasticity is defined as:

$$EDM^{reg,reg}_{\text{sec}T} = \sigma A^{reg}_{\text{sec}T} - \left(\sigma A^{reg}_{\text{sec}T} - \sigma D^{reg}\right) \cdot \frac{PD^{reg}_{\text{sec}T} \cdot QD^{reg}_{\text{sec}T}}{PA^{reg}_{\text{sec}T} \cdot QA^{reg}_{\text{sec}T}}. \quad (15)$$

Similarly, the foreign-market demand elasticity ($EDM^{reg,regg}_{\text{sec}T\subset\text{sec}}$) is derived by log differentiating the nested Armington demand function for imports from different origins to obtain the following expression:

$$EDM^{reg,regg}_{\text{sec}T} = \sigma BM^{regg}_{\text{sec}T} - \left(\sigma BM^{regg}_{\text{sec}T} - \sigma A^{regg}_{\text{sec}T}\right) \cdot \frac{\hat{P}M^{regg}_{\text{sec}T}}{P\hat{B}M^{regg,reg}_{\text{sec}T}} - \left(\sigma A^{regg}_{\text{sec}T} + \frac{\hat{Q}A^{regg}_{\text{sec}T}}{\hat{P}A^{regg}_{\text{sec}T}}\right) \cdot \frac{\hat{P}A^{regg}_{\text{sec}T}}{P\hat{B}M^{regg,reg}_{\text{sec}T}}.$$

As such, the perceived demand elasticity in foreign markets is derived as:

$$\begin{aligned} EDM^{reg,regg}_{\text{sec}T} = \sigma BM^{regg}_{\text{sec}T} &- \left(\sigma BM^{regg}_{\text{sec}T} - \sigma A^{regg}_{\text{sec}T}\right) \cdot \frac{PBM^{regg,reg}_{\text{sec}T} \cdot QBM^{regg,reg}_{\text{sec}T}}{PM^{regg}_{\text{sec}T} \cdot QM^{regg}_{\text{sec}T}} \\ &- \left(\sigma A^{regg}_{\text{sec}T} - \sigma D^{regg}\right) \cdot \frac{PBM^{regg,reg}_{\text{sec}T} \cdot QBM^{regg,reg}_{\text{sec}T}}{PA^{regg}_{\text{sec}T} \cdot QA^{regg}_{\text{sec}T}}. \end{aligned} \quad (16)$$

Therefore, given the results from Equations (15) and (16), the perceived elasticity of demand for tradable sectors under oligopoly is defined as:

$$EDM_{\mathrm{sec}T}^{reg} = \frac{QDD_{\mathrm{sec}T}^{reg}}{QZ_{\mathrm{sec}T}^{reg}} \cdot \left(\sigma A_{\mathrm{sec}T}^{reg} - \left(\sigma A_{\mathrm{sec}T}^{reg} - \sigma D^{reg} \right) \cdot \frac{PD_{\mathrm{sec}T}^{reg} \cdot QD_{\mathrm{sec}T}^{reg}}{PA_{\mathrm{sec}T}^{reg} \cdot QA_{\mathrm{sec}T}^{reg}} \right)$$
$$+ \sum_{regg \neq reg} \frac{QBM_{\mathrm{sec}T}^{regg,reg}}{QZ_{\mathrm{sec}T}^{reg}} \cdot \left(\begin{array}{l} \sigma BM_{\mathrm{sec}T}^{regg} - \left(\sigma BM_{\mathrm{sec}T}^{regg} - \sigma A_{\mathrm{sec}T}^{regg} \right) \cdot \frac{PBM_{\mathrm{sec}T}^{regg,reg} \cdot QBM_{\mathrm{sec}T}^{regg,reg}}{PM_{\mathrm{sec}T}^{regg} \cdot QM_{\mathrm{sec}T}^{regg}} \\ - \left(\sigma A_{\mathrm{sec}T}^{regg} - \sigma D^{regg} \right) \cdot \frac{PBM_{\mathrm{sec}T}^{regg,reg} \cdot QBM_{\mathrm{sec}T}^{regg,reg}}{PA_{\mathrm{sec}T}^{regg} \cdot QA_{\mathrm{sec}T}^{regg}} \end{array} \right). \quad (17)$$

2.4.1.2 Monopolistic Competition with Free Entry and Exit of Firms (Heterogeneous Products)

Under monopolistic competition, a large number of independent firms produce commodities which are close substitutes, differentiable in terms of quality, price, and marketing strategy. As such, firms are free to enter and exit the market like under perfect competition, and the long-run profit converges to zero. Accordingly, the profit variable in Equation (12) is exogenous under monopolistic competition. Thus, in comparison to Cournot oligopoly, monopolistic competition yields more efficiency to the economy, as the mark-up is not inclusive of sectoral profit and consumer utility is increased with product variety.

This model adopts the Dixit and Stiglitz (1977)'s Love-of-Variety modelling approach by expressing sectoral demand as a CES function of individual demands homogeneous of degree one. Under monopolistic competition, the mark-up is still inversely proportionate to the perceived elasticity of demand,[6] and the mark-up pricing condition ($MR = MC$) in Equation (13) is replaced with:

$$PZ_{\mathrm{sec}}^{reg} \left(1 - \frac{1}{EDM_{\mathrm{sec}}^{reg}} \right) = \sum_{fac} \frac{\left(1 + tf_{\mathrm{sec}}^{fac,reg} \right) \cdot PF_{\mathrm{sec}}^{fac,reg} \cdot FV_{\mathrm{sec}}^{fac,reg}}{QZ_{\mathrm{sec}}^{reg}} + \sum_{\mathrm{sec}c} PA_{\mathrm{sec}c}^{reg} \cdot io_{\mathrm{sec}c,\mathrm{sec}}^{reg} + tz_{\mathrm{sec}}^{reg} \cdot PZ_{\mathrm{sec}}^{reg}. \quad (18)$$

Supposedly, as the adjustment in firm population rules out sectoral profit in the long run, the mark-up of a monopolistically competitive sector is relatively low compared to the oligopolistic one with barred entry and exit of firms. Given the standard definition of the demand function for individual variety, the perceived demand elasticity for individual variety is again derived as $EDM_{\mathrm{sec}}^{reg} = \sigma LV_{\mathrm{sec}}^{reg}$, which is the elasticity of substitution between product varieties within each sector, commonly specified as 4.[7]

[6] It is inconclusive whether the perceived demand elasticity under monopolistic competition exceeds that under Cournot oligopoly. While higher competition in the market under monopolistic competition implies the greater elasticity of demand; at the same time, the availability of product variety lowers such the elasticity.

[7] The GreenMod model (Bayar et al., 2006).

Based on the relativity of group and individual demands, the commodity market clearing condition is expressed such that the Armington group demand is a function of final and intermediate group demands:

$$QA_{\text{sec}}^{reg} = \left(NOF_{\text{sec}}^{reg}\right)^{\frac{1}{1-\sigma LV_{\text{sec}}^{reg}}} \cdot \left(C_{\text{sec}}^{reg} + I_{\text{sec}}^{reg} + CG_{\text{sec}}^{reg} + \sum_{\text{sec}c} IO_{\text{sec,sec}c}^{reg}\right). \tag{19}$$

Finally, the Armington sectoral price is then redefined as a function of the individual price of each variety:

$$PA_{\text{sec}}^{reg} = \left(NOF_{\text{sec}}^{reg}\right)^{\frac{1}{1-\sigma LV_{\text{sec}}^{reg}}} \cdot pa_{\text{sec}}^{reg}. \tag{20}$$

2.4.2 Determination of Sectoral Market Structure: The Threshold

As described above, there are three types of sectoral market structures in this model that can be distinguished by the extent of market concentration. In broad sense, the paper adopts the Herfindahl-Hirschmann Index (HHI_{sec}^{reg}) to determine the type of market structure. The measure is defined as the sum of the squared firms' market shares in percentage ($S_{\text{sec},i}^{reg}$), where *i* is the set of individual varieties in sector *sec* of region *reg* populated with NOF_{sec}^{reg} firms:

$$HHI_{\text{sec}}^{reg} = \sum_{i}^{NOF_{\text{sec}}^{reg}} \left(S_{\text{sec},i}^{reg}\right)^2. \tag{21}$$

The value of this index ranges between zero and 10,000, where the latter representing the most extreme concentration case of monopoly. The official U.S. government guideline sets the antitrust standard such that a sector with the HHI lower than 1,000 (more than 10 equal-sized firms competing) is regarded as unconcentrated, that with the HHI higher than 1,800 (fewer than 6 equal-sized firms competing) is defined as highly concentrated, and that in between is labelled as moderately concentrated. In line with this standard, the paper thus defines that in each region, sectors with the HHI under 100 (more than 100 equal-sized firms competing) are categorised as under perfect competition; those with the indices ranging between 100 and 1,000 are under monopolistic competition; and the rest with the indices greater than 1,000 are under Cournot oligopoly.[8]

[8] Accordingly, Table 2 in Subsection 3.2.2 reports on the specification of commodity market structure in compliance with the above criteria based on market concentration data from various sources.

2.5 Labour Market Paradigm: Unemployment and Wage

In general, the model simply specifies that the set of factor prices that ensure full employment by equating factor endowments with demands from production sectors are found for all but skilled and unskilled labour markets. In labour markets, wages are endogenous and negatively proportionate to the levels of unemployment that are on the other hand determined by labour demand within a region. To better reflect economic reality on labour welfare, this paper then further incorporates skill-specific and country-specific features of wage rigidity and the flexibility of unemployment to wage change.

Bontout and Jean (1998) proposed three ways to model labour market paradigms:

- *The flexible wage approach*: the fully flexible wage ensures full employment, therefore unemployment is exogenous and fixed to zero;
- *The minimum wage approach*: the nominal wage is bound to the consumer price index, thus real wage is fixed and unemployment becomes endogenous;
- *The wage bargaining approach*: labour wage is a complex consequence of bargaining between employers and workers, thus both wage and unemployment are endogenous.

Although relevant to the labour market paradigm in advanced economies, the wage bargaining approach is comparatively data intensive because it needs real data estimates on the probability to lose and find jobs, unemployment subsidies, and inter-temporal utility of employed and unemployed workers, among others. In addition, as this study focuses on the Thai economy where the labour union power is not exceptionally strong, the adoption of the bargaining approach may not be requisite.

Instead, unemployment and real wage can be simultaneously endogenised by specifying the wage curve relationship as proposed by Blanchflower and Oswald (1995). In line with Faris (2002) and Küster et al. (2007), real wage becomes a non-linear function of the level of unemployment, explicitly defined as:

$$\left(\frac{PFm^{flab,reg}}{CPI^{reg}} \Big/ \frac{PFm0^{flab,reg}}{CPI0^{reg}} \right) = \left(UNEMP^{flab,reg} / UNEMP0^{flab,reg} \right)^{\omega^{flab,reg}}, \qquad (22)$$

where $\omega^{flab,reg}$ represents the wage curve elasticity of labour *flab* (skilled and unskilled labour) in region *reg*, which is estimated to be approximately -0.1 in many countries (Blanchflower and Oswald,

2005). Accordingly, Figure 4 plots a wage curve assuming that the benchmark real wage equals unity and the benchmark unemployment is 100.[9]

<Figure 4 inserted here>

Hence, the above three approaches – namely the flexible wage, minimum wage, and wage curve approaches – are used to specify market paradigms in accordance with the characteristics of skilled and unskilled labour markets in different regions.

2.6 Equivalent Variation and Regional Welfare Price Index

The standard EV reflecting the income change induced by regional trade integration given the price at the benchmark year is adopted to measure the aggregate welfare effects of Thai FTAs. Since the utility function is in the CES functional form; the government, household, and bank price indices are expressed as follows:

$$GPI^{reg} = \left[\sum_{sec} \left(\gamma GV_{sec}^{reg} \right)^{\sigma D^{reg}} \cdot \left(PA_{sec}^{reg} \right)^{1-\sigma D^{reg}} \right]^{\frac{1}{1-\sigma D^{reg}}}; \tag{23}$$

$$HPI^{reg} = \left[\sum_{sec} \left(\gamma HH_{sec}^{reg} \right)^{\sigma D^{reg}} \cdot \left((1+tc_{sec}^{reg}) \cdot PA_{sec}^{reg} \right)^{1-\sigma D^{reg}} \right]^{\frac{1}{1-\sigma D^{reg}}}; \tag{24}$$

$$SPI^{reg} = \left[\sum_{sec} \left(\gamma I_{sec}^{reg} \right)^{\sigma D^{reg}} \cdot \left(PA_{sec}^{reg} \right)^{1-\sigma D^{reg}} \right]^{\frac{1}{1-\sigma D^{reg}}}. \tag{25}$$

Then, in line with Blake (1998), these price indices are weighted by their consumption budget shares in the Cobb-Douglas form to obtain the regional welfare price index utilised as the price deflator for the regional disposable income.

3. The Data

The model employs the GTAP database which provides the input-output data accounting for economic linkages among sectors in a region, and also bilateral trade, transport, and various protection data that characterise economic ties among regions in the 2001 reference year (Dimaranan, 2006). Version 6.0 of the database consists of data for 87 regions and 57 sectors, which are accordingly aggregated into 15 regions and 22 sectors in the current model. This section explains the aggregation of data by region and by sector, the determination of commodity market competitiveness and labour market paradigm, and finally the derivation of data for savings and elasticity parameters.

[9] Although the benchmark unemployment is calibrated to be different across regions and skill levels, the curvature of the graph in Figure 4 is marginally varied with this fixed parameter.

3.1 Regions: Aggregation Criteria

As mentioned, in this model, 87 regions in the GTAP database are aggregated into 15 groups:

1. Thailand (*THA*)
2. Australia (*AUS*)
3. New Zealand (*NZL*)
4. India (*IND*)
5. Japan (*JPN*)
6. China (*CHN*)[10]
7. North ASEAN (*NASN*)[11]
8. South ASEAN (*SASN*)[12]
9. Korea (*KOR*)[13]
10. United States (*USA*)
11. Canada (*CAN*)
12. Mexico (*MEX*)
13. United Kingdom (*UK*)
14. Rest of Europe (*XEUR*)[14]
15. Rest of World (*ROW*)[15]

Australia, New Zealand, India, Japan, and China are countries whose bilateral FTAs with Thailand are to be analysed in this paper. Regions left outside the groupings are broadly divided into ASEAN

[10] Region China (*CHN*) comprises China (chn) and Hong Kong (hkg).

[11] Region North ASEAN (*NASN*) is consisted of Singapore (sgp) and Malaysia (mys).

[12] Region South ASEAN (*SASN*) involves the rest of ASEAN, i.e., Indonesia (idn), the Philippines (phl), Vietnam (vnm), and Brunei Darussalam, Cambodia, Myanmar, and Lao PDR (xse).

[13] Region Korea (*KOR*) exclusively means South Korea (kor).

[14] Region Rest of Europe (*XEUR*) includes the rest of Europe: Austria (aut), Belgium (bel), Denmark (dnk), Finland (fin), France (fra), Germany (deu), Greece (grc), Ireland (irl), Italy (ita), Luxembourg (lux), the Netherlands (nld), Portugal (prt), Spain (esp), Sweden (swe), Switzerland (che), Rest of EFTA (xef), Rest of Europe (xer), Albania (alb), Bulgaria (bgr), Croatia (hrv), Cyprus (cyp), Czech Republic (cze), Hungary (hun), Malta (mlt), Poland (pol), Romania (rom), Slovakia (svk), Slovenia (svn), Estonia (est), Latvia (lva), Lithuania (ltu), Russian Federation (rus), and Rest of Former Soviet union (xsu).

[15] Region Rest of World includes all other regions not mentioned elsewhere.

(excluding Thailand), Korea, the North American Free Trade Agreement (NAFTA), Europe, and the rest of the world, with respect to their economic ties and trade patterns with FTA members.

Subsequently, ASEAN is further disaggregated into the North and the South, since the income disparity is clearly observed (Figure 5). As the structures of factor endowment in rich and poor regions are so unalike, there we find dissimilarity in production pattern, labour market paradigm, and FTA adjustment. Thus, ASEAN should be split with respect to the regional income level. By the same token, Mexico is taken out of the NAFTA group. On the other hand, the rest of NAFTA (comprising USA and Canada) is further disaggregated, because USA is undergoing an FTA talk with Thailand.[16] Finally, the United Kingdom is taken out of the European group, as her labour market structure is different in a sense that her regional wage is more flexible than that of the continent.

<Figure 5 inserted here>

3.2 Sectors: Aggregation Criteria and Determination of Market Structure

3.2.1 Sectoral Aggregation: The Criteria

The GTAP 6.0 database comprises 57 sectors in each region. These sectors are subsequently aggregated with respect to factor intensity and sectoral export and import shares in total trade of Thailand, since the country is placed at the focal point of this paper's analysis as a small open economy undergoing FTA talks with her trading partners. Given the characteristics of Thai production sectors, relevant sectors are bundled together if their factor intensity is clearly analogous; for example, similarly capital-intensive service sectors are aggregated as Cluster 7. As a result, nine clusters of good and service sectors are first of all created as follows:

1. Agricultural products : pdr, wht, gro, v_f, osd, c_b, pfb, ocr, ctl, oap, rmk, wol
2. Natural-resource intensive products : frs, fsh, coa, oil, gas, omn
3. Processed agricultural products : cmt, omt, vol, mil, pcr, sgr, ofd, b_t
4. Manufacturing products : tex, wap, lea, lum, ppp, p_c, crp, nmm, i_s, nfm, fmp, mvh, otn, ele, ome, omf
5. Utility, construction, and trade : ely, gdt, wtr, cns, trd

[16] However, the negotiation has been currently on hold, due to political instability in Thailand since 2007.

6. Transportation services : otp, wtp, atp
7. Private services : cmn, ofi, isr, obs, ros
8. Public services : osg
9. Dwellings : dwe[17]

Subsequently, sectoral trade share in regional trade value is used as a criterion to distinguish important tradable sectors from the above nine clusters. Denote by SQE_{sec} sector *sec*'s export share (%) in Thailand's total export value; and similarly SQM_{sec} sector *sec*'s import share (%) in Thailand's total import value, the Trade Concentration Index (TCI_{sec}) is accordingly defined as:

$$TCI_{sec} = SQE_{sec} + SQM_{sec}, \quad (26)$$

Where the two sectoral trade shares are derived from the GTAP database:

$$SQE_{\text{sec}} = \frac{QE0_{\text{sec}}^{"THA"}}{\sum_{\text{sec}c} QE0_{\text{sec}c}^{"THA"}} \cdot 100;$$

$$SQM_{\text{sec}} = \frac{QM0_{\text{sec}}^{"THA"}}{\sum_{\text{sec}c} QM0_{\text{sec}c}^{"THA"}} \cdot 100.$$

Since the partial differentiation of this concentration index with respect to export and import yields positive values:

$$\frac{\partial TCI_{\text{sec}}}{\partial QE0_{\text{sec}}^{"THA"}} = TCI_{\text{sec}} \cdot \left[1 - \frac{1}{\sum_{\text{sec}c} QE0_{\text{sec}c}^{"THA"}}\right] = TCI_{\text{sec}} \cdot \left[\frac{\sum_{\text{sec}c \neq \text{sec}} QE0_{\text{sec}c}^{"THA"}}{\sum_{\text{sec}c} QE0_{\text{sec}c}^{"THA"}}\right] > 0, \text{ and by symmetry,}$$

$$\frac{\partial TCI_{\text{sec}}}{\partial QM0_{\text{sec}}^{"THA"}} = TCI_{\text{sec}} \cdot \left[1 - \frac{1}{\sum_{\text{sec}c} QM0_{\text{sec}c}^{"THA"}}\right] = TCI_{\text{sec}} \cdot \left[\frac{\sum_{\text{sec}c \neq \text{sec}} QM0_{\text{sec}c}^{"THA"}}{\sum_{\text{sec}c} QM0_{\text{sec}c}^{"THA"}}\right] > 0,$$

we know that a sector recording a high TCI_{sec} trades more in comparison to other sectors. Such the index is a balanced measure as it equivalently takes into account the exposure of a sector to trade, both in terms of export and import activities. Accordingly, all GTAP sectors are ranked with respect to this index. Among the 15 top-ranked tradable sectors – precisely oil, ofd, tex, wap, crp, i_s, nfm, mvh, ele, ome, omf, trd, otp, atp, and obs – two transport sectors (otp and atp) are exempted from disaggregation, as none of the ongoing Thailand's FTA negotiations primarily focus on these sectors. Thus, the other 13 production sectors are disaggregated from their groups, and 57 sectors are consequently clustered into 22 aggregate sectors as follows:

[17] Dwellings are the only non-traded sector in the GTAP database.

1. Agricultural products (*AGR*)
2. Forestry, fishing, coal, gas, and other minerals (*NRS*)
3. Oil (*OIL*)
4. Meat, vegetable oil, dairy products, processed rice, sugar, beverage, and tobacco products (*PAGR*)
5. Other food products (*OFD*)
6. Manufacturing products (*MNF*)
7. Textiles (*TEX*)
8. Wearing apparels (*WAP*)
9. Chemical, Rubber, Plastic products (*CRP*)
10. Ferrous metals *(I_S*)
11. Other Metals (*NFM*)
12. Motor vehicles and parts (*MVH*)
13. Electronic equipment (*ELE*)
14. Other machinery and equipment (*OME*)
15. Other manufactures (*OMF*)
16. Electricity, Gas, Water, and Construction (*MSR*)
17. Trade (*TRD*)
18. Transportation services (*TRP*)
19. Communication, Financial services, Insurance, and other services (*CFI*)
20. Other business services (*OBS*)
21. Public services (*OSG*)
22. Dwellings (*DWE*)

3.2.2 Determination of Sectoral Market Structure

As described in Subsection 2.4.2, commodity market structures are determined by the level of the derived HHI data, except that agricultural products (*AGR*) are specified as under perfect competition

for all regions.[18] The market concentration indices for all other sectors in each country are calculated from various national and international data sources. The data for Thailand is extracted and compiled from Table 9.2 in *Year Book of Labour Statistics 2000* published by the Department of Labour Protection and Welfare, Thailand (2001). As for Australia, the Australian Bureau of Statistics (2007) website provides the Industry Concentration Statistics for the 1998/99 financial year, showing the proportion of sales, persons employed, and industry gross products that are concentrated among the 20 largest enterprise groups in each industry. Then, the "largest 20" are further subdivided by groups of four, once again in order of their sizes. Likewise, *New Zealand Official Yearbook 1996* reports in Table 21.2 the market concentration data in 1995, as collected by Statistics New Zealand. On the other hand, the most recent Indian HHI data at the SIC 3-digit level are prepared by Kambhampati and Kattuman (2003) for those medium- and large-sized firms operating in 1997.[19] Similarly, the HHI data for Japanese industries are reported in Table 13, Fukao and Ito (2001). Using market shares of top 10 firms in each industry, Xiao (2005) provided in Tables 1.4 and 1.5 the index of industry concentration for China at the 2-digit and 3-digit industry level. The market concentration indices in manufacturing sectors for Korea, Canada, and Mexico are respectively derived from *OECD Economic Surveys* for the 1997, 2001, and 1980 fiscal years.[20] For the USA, the HHI data of manufacturing sectors and the concentration ratios classifying service industries by the fraction of output accounted for by the largest 4, 8, 20, and 50 firms, are taken from the 2002 Economic Census organised by the U.S. Census Bureau (2007) using the North American Industry Classification System (NAICS). Last but not least, the concentration ratios for UK industries in 2004 are excerpted from Appendix 1 in the Office for National Statistics (2006), of which estimates are derived by calculating for the percentage of gross value added contributed by the top 5 and top 15 leading businesses in each industry.

As mentioned, instead of the HHI, some authorities routinely publish the concentration ratios $CR(j)^{reg}_{\text{sec}}$ signifying the sum of market shares of the largest j firms operating in industry *sec* of region *reg*. Assuming that the first j firms record just about the same size of market shares, the market share of each of these largest j firms is hence derived as $S^{reg}_{\text{sec},i\le j} = CR(j)^{reg}_{\text{sec}} \big/ j$, provided that $S^{reg}_{\text{sec},i} \ge S^{reg}_{\text{sec},(i+1)}$ always holds. Therefore, the HHIs are accordingly approximated as:

$$HHI^{reg}_{\text{sec}} = \frac{\left(CR(j)^{reg}_{\text{sec}}\right)^2}{j} + \frac{\left(CR(k)^{reg}_{\text{sec}} - CR(j)^{reg}_{\text{sec}}\right)^2}{(k-j)} + \frac{\left(CR(l)^{reg}_{\text{sec}} - CR(k)^{reg}_{\text{sec}}\right)^2}{(l-k)} + \ldots + \frac{\left(100 - CR(z)^{reg}_{\text{sec}}\right)^2}{(1{,}000 - z)} \qquad (27)$$

[18] Agricultural sectors are commonly regarded as perfectly competitive in applied CGE models, including the Michigan model of World Production and Trade.

[19] Although not explicitly reported in Kambhampati and Kattuman (2003), the actual data file is thankfully received from the first author.

[20] To be precise, data of market concentration in individual countries are extracted from Table 5.2 in *OECD Economic Surveys: Korea* (2004a); Table 2.2 in *OECD Economic Surveys: Canada* (2004b); and Table 41 in *OECD Economic Surveys: Mexico* (1991/92).

where there assumed to be 1,000 firms competing in each sector, and {*j*, *k*, *l*,…,*z*} is the set of numbers of the largest firms, of which the concentration ratios are randomly reported.

As for the four aggregate regions consisting of numerous countries, i.e. North ASEAN (*NASN*), South ASEAN (*SASN*), Rest of Europe (*XEUR*), and Rest of World (*ROW*), it is virtually impractical to compile the market concentration data for each and every production sector. On the premise that these regions are not at the heart of this study as much as Thailand and her FTA counterparts, the paper thus approximates that regions in the same range of wealth level (as illustrated in Figure 5) tend to have a certain proximity in antitrust standard and competition policy. Therefore, the sectoral market structures of North ASEAN replicate those of Mexico, as both are categorised as upper middle income regions. On the other hand, geographic, political, and economic structures of South ASEAN as a lower middle income region is in keeping with those of Thailand; while Rest of Europe adopts the HHI data from the UK; and the market concentration index for Rest of World is the simple average of the HHI data from other lower middle income countries (Thailand and China). Table 2 thus reports the designated commodity market structure given the above criteria.

<Table 2 inserted here>

Lastly, the hypothetical number of firms is calibrated in line with the ATHENA model,[21] in that the inverse of the HHI represents the number of hypothetical, equal-sized firms in each sector. Such the feature is already described in the general model structure section in that Cournot oligopolistic sectors are populated with homogeneous firms; and even though monopolistically competitive firms produce heterogeneous products, the model assumes that they are of equal production scale.

3.3 Factors: Specification of Labour Market Structure

Among the four primary factors – namely capital, labour, land, and natural resources – labour is split into two groups by skill level in conformity with the GTAP classification. As described in section 2.5, the current model further allows the flexibility of real wage and unemployment, or the lack of it, to be varied by region. This is based on the argument that the sensitivity to a policy change may vary with the degree of wage rigidity; for example, the real economic effect may be more pronounced when wage does not satisfactorily adjust to an external shock. For that reason, the paper carefully account for the following characteristics of the skilled and unskilled labour markets in different aggregate regions (Table 3).

<Table 3 inserted here>

[21] Section 3.3 in de Brujin (2006).

Basically, this paper presumes that real wage is inversely associated with the unemployment rate, thus both variables are endogenous in the majority of regions. However, it is perceived that in some upper-middle and high income regions, the local governments may actively pursue policies that encourage either a flexible wage that entails a relatively low and stable unemployment, or a rigid minimum wage that inevitably brings about a relatively high and fluctuating unemployment. Thus, in this model, the former group of regions consists of the USA, New Zealand, Australia, Canada, and North ASEAN, while Rest of Europe famously belongs to the latter one. To reflect the economic reality in the UK labour market, on the other hand, is split by skill level, so that skilled labour has flexible wage similar to the majority of non-European rich countries, while unskilled labour in the UK receives high unemployment benefits similar to Rest of Europe, such that wages become rigid and unemployment rate remains relatively high.

3.4 Savings

Since the monetary flows among the household, government, and investment bank, as illustrated in Figure 1, are not reported in the above simplified version of SAM, this subsection explains the data source and calibration for the monetary sector in each region.

Regional savings are collected from the representative household, government, and the rest of the world. Since the foreign saving data are available in the GTAP database, and household savings can be calculated as total household incomes less the sum of private demands and income taxes, only government savings are to be quoted from external sources. Also, since the government spends its tax revenues on public demands, government savings, and transfers to the household; once government savings are known, the government transfers can be derived as the residuals of the first two variables, and the regional SAM will be balanced as a consequence.

Since the SAM format is complies with the SNA 1993 standard, the government saving data titled, “Government Finance Deficit or Surplus, National Currency (IMF Estimates),” are derived from the United Nations Statistics Division (UNSD, 2007) online resource and subsequently converted to the world currency (US$) using the exchange rates in matching years. Table 4 thus reports benchmark regional savings consisting of household, government, and foreign savings by region.

<Table 4 inserted here>

4. FTA Simulations

There are public concerns over the outcomes of concluded Thai FTAs. Commonly regarded as a second-best policy to improve regional and global welfare, economists and policy makers alike

anticipate inferior gains from narrower economic integration. Besides, when all the FTA deals Thailand has separately agreed upon eventually enter into force, the messiness arising from asymmetry in the agreements on rules of origin and customs procedures, among others, may incur non-negligible economic costs to the economy. Therefore, this section scrutinises the expected outcomes of forming the "actual" FTAs (TAFTA, TNZCEPA, JTEPA, ASEAN-China and Thailand-India) in comparison to the "counterfactual" ones where larger free trade zones with complete sectoral coverage are formed. At last, the "counterfactual" simulation results of Thailand's unilateral trade liberalisation; and those of global trade liberalisation are briefly compared with the above outcomes.

As for the methodology, trade liberalisation in agricultural and manufacturing sectors is simulated by removing tariffs in accordance with the actual commitments. While all of these sectors are liberalised under TAFTA and TNZCEPA, there are exclusion lists for highly sensitive products under JTEPA, ASEAN-China and Thailand-India. Tariffs on these products are either partly removed or kept at the benchmark Most-Favoured-Nation (MFN) rates. Since the HS 6-digit product lines are aggregated into 22 sectors within each region, tariff removal from each product line in an aggregated sector is weighted by its share in sectoral imports. On the other hand, since import tariff on service does not exist, the intrinsic barriers to enter and exit Cournot oligopolistic sectors are instead removed as the FTAs are launched. Therefore, when applicable, Cournot service sectors are liberalised by fixing sectoral profits while endogenising the number of firms. Simulation results are then reported in the following three subsections.

4.1 Thai FTAs with Australia and New Zealand

TAFTA and TNZCEPA are analysed together in this subsection since not only the details of the two trade agreements but also the production patterns of Australia and New Zealand are principally analogous.

Anticipating that bilateral economic groupings ultimately lead to broader integration, Thailand's alliance with The Australia New Zealand Closer Economic Relations Trade Agreement (ANZCERTA), henceforth "THAILAND+2;" and ASEAN's partnership with ANZCERTA, hereafter "ASEAN+2," are further simulated and compared with the actual TAFTA and TNZCEPA.

Table 5 shows the regional welfare effects – measured in terms of EV – from Thailand forming FTAs with Australia (TAFTA); New Zealand (TNZCEPA); ANZCERTA (THAILAND+2); and also when ASEAN forms an FTA with ANZCERTA (ASEAN+2). It appears that TAFTA and TNZCEPA hardly yield any significant impact on global income as the variation is nearly zero per cent in all scenarios; nevertheless, trade diversion dominates the overall welfare outcome as the estimation of world EV losses from TAFTA and TNZCEPA are 40.54 and 38.23 million US dollars, respectively.

<Table 5 inserted here>

There is no controversy that larger economic groupings yield higher regional welfare gains to Thailand (*THA*). However, under TAFTA, Thailand gains 18% less than under TNZCEPA, perhaps because Australia (*AUS*) has an absolute advantage over Thailand due to her distinctly larger production scale in many tradable sectors. For the same reason, Australia gains more from TAFTA than New Zealand does from TNZCEPA, since Australia's lower unit costs facilitate more exports to Thailand after the trade arrangement. As a consequence, Australia expects highest welfare gains than Thailand and New Zealand, even under THAILAND+2 and ASEAN+2.

Countries not involved in any of the groupings are mostly worse off, although the degree of trade diversion depends on the strength of the ex-ante economic ties with FTA members. With this respect, Japan (*JPN*), China (*CHN*), The United States (*USA*), and Europe (*UK* and *XEUR*) perceive comparatively negative effects as they have established good trade relationship with some member countries. Quite the reverse, several non-member regions slightly gain from the groupings, for instance, Mexico (*MEX*) from TAFTA and Canada (*CAN*) from ASEAN+2. Not only these countries do not trade much with Australia, New Zealand and ASEAN, but they also have strong trade ties with the United States. Hence, as the second-hand FTA effect, the U.S. trade with TAFTA and ASEAN+2 members is re-directed towards Mexico and Canada due to the existence of the NAFTA alliance.

<Figure 6 inserted here>

Figure 6 reports on the percentage growth in nominal GDP, where North and South ASEAN (*NASN* and *SASN*) are jointly referred to as "Rest of ASEAN," whilst all other regions not included in any of the above FTA negotiations are aggregated into one region identified as "Others." Once again, the economic growth in non-member regions is barely altered, whereas member economies grow to a greater extent as the group is enlarged. Particularly, the difference in New Zealand's GDP growth rates under TNZCEPA and THAILAND+2 is remarkable, since the country can evade the strong trade diversion effect once her major trading partner, Australia, is included in the trade-liberalising regime.

<Table 6 inserted here>

Table 6 then demonstrates the variation in trade indicators for Thailand. Under all FTA scenarios, trade creation dominates trade diversion in that fewer imports from non-members are offset by those from FTA counterparts, not only because Thai imports from non-members are substituted with those produced within the FTA zones, but also because preferential trade liberalisation has created trade among member countries that would not have taken place, were it not for the reduced trade barriers. Since trade creation under TAFTA is considerably stronger than under TNZCEPA, Australia benefits

more from the FTA with Thailand than New Zealand does in absolute terms. However, it is remarkable that the proportional variation in Thai imports from New Zealand under TNZCEPA exceeds that from Australia under TAFTA, because Thai trade with New Zealand is relatively low before the FTA signing. Consequently, TNZCEPA is estimated to increase New Zealand's exports to Thailand by 48.99%.

<Table 7 inserted here>

Table 7 then summarises the variation in labour welfare of member countries under the four regimes, where the change in real wage implicitly reflects deviation of labour demand from the ex-ante level. Since Thailand (*THA*) and South ASEAN (*SASN*) are relatively unskilled-labour abundant, the real wage of skilled labour unambiguously drops while that of the unskilled is augmented once the two countries partner with higher income and more skilled-labour abundant regions like Australia (*AUS*), New Zealand (*NZL*) and North ASEAN (*NASN*). On the other hand, real wages of both types of labour in *AUS, NZL* and *NASN* are likewise improved since the unskilled labour in these regions is in absolute terms more productive than that in *THA* and *SASN*. Thus, their exports of unskilled-labour intensive products by and large increase after the signings. As a consequence, the ratio of unskilled to skilled labour income has improved in all scenarios. Given that labour markets in Thailand and South ASEAN are subject to the wage curve relationship between the real wage and unemployment rate, while Australia, New Zealand, and North ASEAN have flexible real wages and rigid unemployment; on average, real wages in the former group adjust by a smaller degree compared to the latter.

4.1.1 TAFTA

Next, the regional and sectoral welfare changes after the formation of an FTA between Thailand and Australia (TAFTA) are measured in great details.

<Table 8 inserted here>

In Table 8, the estimated real GDP growth suggests that Thailand and Australia slightly gain while non-members are mostly unaffected by TAFTA. Other changes in real variables including final demands and trade flows also indicate that TAFTA boosts regional production and trade, which consequently improves the terms of trade in member countries. Thailand's real GDP growth is estimated to be higher than Australia's, reflecting that Thailand has higher trade barriers before the signing and that her economy is rather small relative to her counterpart. Hence, the tariff revenue loss in Thailand reduces public demand by 0.96%, much higher than the 0.08% decrease perceived by the Australian Government. Although the variation is marginal in absolute terms, New Zealand is more negatively affected by TAFTA than "Others," due to her reliance on the Australian economy.

Subsequently, sectoral adjustments under TAFTA are reported in Table 9 for Thailand and in Table 10 for Australia. In Table 9, Thailand gains in most manufacturing sectors. Particularly, we observe outstanding output and trade growth in processed agricultural products (*PAGR* and *OFD*), textiles and wearing apparels (*TEX* and *WAP*), chemical, rubber and plastic products (*CRP*), metal products (*I_S* and *NFM*), machinery and equipments (*OME*), and other manufacturing products (*OMF*). On the other hand, in Table 10, Australia's agricultural products (*AGR*), motor vehicles and parts (*MVH*), electronic equipments (*ELE*), and similar to Thailand, sectors *PAGR*, *OFD*, *CRP*, *I_S*, and *OMF*, also benefit from TAFTA. These five sectors are allowed to expand in both countries due to the Armington function that distinguishes products by origins. In particular, Thailand observes strong expansion in sector *OME*, while Australia has a comparative advantage in sector *OFD*. Lastly, TAFTA induces contraction in dwelling (*DWE*), the only non-traded sector, as resources are bid away by producers in tradable sectors.

<Tables 9 and 10 inserted here>

Finally, Figure 7 plots the percentage change in number of firms against output per firm in Australian imperfectly competitive sectors under TAFTA.[22] Domestic sectors such as forestry, fishery, coal, gas, and mineral (*NRS*), oil (*OIL*) and communication, financial and insurance services (*CFI*) – which are in contraction according to Table 10 – are registered in the third quadrant where both population of firms and output per firm decrease. The recession in this cluster of production is attributable to the ex-ante inefficacy due to imperfect competition, especially since their benchmark numbers of firms are among the fewest in Australia, and also because they were relatively protected sectors before TAFTA. On the other hand, a fraction of firms operating in sectors comparatively incompetent at the international level – namely transport (*TRP*), electricity, gas, water, and construction (*MSR*), some manufacturing products (*MNF*) and machinery and equipments (*OME*) – then leave the competition while surviving firms shift production into higher gear to benefit from the scale economies. The last group comprise sectors endowed with international competitiveness – specifically, processed agricultural products (*PAGR* and *OFD*), ferrous metals (*I_S*), chemical, rubber, plastic products (*CRP*) and electronic equipments (*ELE*). These sectors are estimated to grow both in terms of outputs per firm and number of firms.

<Figure 7 inserted here>

[22] The results for Thailand are not reported here, because the estimated HHIs define that all Thai production sectors are under perfect competition.

4.1.2 TNZCEPA

The FTA between Thailand and New Zealand (TNZCEPA) is analysed in this subsection. Regional indicators in Table 11 show that Thailand and New Zealand marginally gain from this preferential trade integration.

<Table 11 inserted here>

In both countries, real GDPs only grow by 0.02%, whilst private and investment demands likewise increase by less than 0.04%. Thailand's public demand contracts to a greater extent as her ex-ante trade barriers are substantial especially in agricultural sectors. Trade between the two countries expands by less than one quarter per cent, while the terms of trade get improved by merely 0.04% and 0.01% in Thailand and New Zealand, respectively.

Tables 12 and 13 subsequently report on sectoral adjustments in Thailand and New Zealand.

<Tables 12 and 13 inserted here>

Overall, TNZCEPA facilitate expansion in Thailand's production and exportation of processed food products (*OFD*), textiles (*TEX*), chemical, rubber, plastic products (*CRP*), metal products (*I_S* and *NFM*), and machinery and equipments (*OME*); while New Zealand benefits from expansion particularly in agricultural produces (*AGR*), processed agricultural products (*PAGR* and *OFD*), and wearing apparels (*WAP*). The results resemble those under TAFTA, since New Zealand's economic structure and factor endowment are essentially analogous to Australia. Nonetheless, some Thai sectors adjust to TAFTA and TNZCEPA in a dissimilar manner. For instance, sector *PAGR* in Thailand contracts by 0.18% under TNZCEPA, whereas the 0.09% expansion in sectoral output is previously observed under TAFTA. This unlikeness at the same time sheds light on the concern over the spaghetti bowl effect of multiple bilateral FTAs entering into force at a different point of time, making it hard for domestic producers to decide whether to expand production after the signing of TAFTA, given the anticipation over TNZCEPA or other FTAs that may entail contraction later on.

On the other hand, the majority of service sectors in Thailand slightly gain from TNZCEPA despite the fact that they operate under perfect competition, thus there is no oligopolistic firm mobility constraint to be removed. The welfare gains in service sectors are thus simply attributable to the tariff elimination in agricultural and manufacturing sectors that biases production away from service sectors.

Last but not least, Figure 8 then focuses on the production scale of firms under imperfect competition in New Zealand.

<Figure 8 inserted here>

Commodities those intensively use natural resources as primary factors (*NRS* and *OIL*), as well as processed agricultural products (*PAGR*), are manufactured under oligopoly in New Zealand (Table 2). Therefore, firm population remains unaffected, while output per firm adjusts with respect to own competitiveness at the global level. Since we observe from Table 13 that sectors *NRS* and *OIL* are in recession after TNZCEPA, the demand drop causes output per firm to fall by 0.06% and 0.08%, respectively. In contrast, individual firms in sector *PAGR* expand production by 0.26% on average, once again consistent with this sector's sectoral output growth perceived in Table 13.

Since the rest of New Zealand's imperfectly competitive sectors are under monopolistic competition and nearly everyone of them are worse off after TNZCEPA, they are mostly plotted in the third or fourth quadrants where incompetent firms quit and the ones that survive either expand and grow more productive under the augmented pressure of international competition, or alternatively decrease the level of output due to severe contraction (*I_S* and *NFM*).

4.1.3 THAILAND+2 FTA

The THAILAND+2 FTA scenario supposes that TAFTA, TNZCEPA, and ANZCERTA enters into force at the same time. Table 14 suggests that Thailand and New Zealand noticeably perceive higher growth in real GDP, private and investment demands than Australia, supposedly because the better access to Australian markets granted to Thailand and New Zealand is larger than that conceded to Australia in return. On the whole, the grouping's impact on the world economy is close to zero. This implies that even though THAILAND+2 is more beneficial to member regions than the standalone TAFTA or TNZCEPA, the policy influence on each region is nonetheless trivial because of the lack of trade establishment between Thailand and the two countries prior to the point of FTA signings.

<Table 14 inserted here>

Table 15 then compares variation in sectoral production and trade across member regions. Thailand most benefits from the expansion in machinery and equipments (*OME*), then secondarily from chemical, rubber, plastic products (*CRP*), textiles (*TEX*), ferrous metals (*I_S*), and wearing apparels (*WAP*). Thus, generally speaking, the direction of Thailand's sectoral adjustments to THAILAND+2 is in keeping with the previous simulation results under TAFTA and TNZCEPA scenarios with the enhanced degree of positive change.

<Table 15 inserted here>

For Australia, the source of output growth comes from processed agricultural and food products (*PAGR* and *OFD*), metal products (*I_S* and *NFM*), motor vehicles and parts (*MVH*), and electronic equipments (*ELE*), thus again similar to the results under TAFTA. In comparison to other member countries, Australian exports of agricultural produces (*AGR*), processed agricultural products (*PAGR*), non-ferrous metals (*NFM*), and other manufactures (*OMF*), noticeably expand after THAILAND+2, which signifies the comparative advantage of Australia in these commodities.

Since New Zealand has strong economic ties with Australia, the simulation results for this country a bit differ from those under TNZCEPA. Although wearing apparels (*WAP*) and some food products (*OFD*) are still dominant sources of gains, once Australia is taken into consideration, agricultural produces (*AGR*) and most processed agricultural products (*PAGR*) are subject to contraction both in terms of production and exportation. Yet again, the non-traded sector, dwellings (*DWE*), is also faced with contraction since production resources are biased away as tradable sectors are liberalised.

The proportional changes plotted in Figure 9 for Australia's imperfectly competitive sectors resemble those in Figure 7 for the TAFTA analysis, except that forestry, fishery, coal, gas, mineral (*NRS*) was positioned on the left hand side, immediately below the x axis. Under THAILAND+2, output per firm in this sector unambiguously grows while the variation in the number of firms is similar to TAFTA. Supposedly, as the third country (New Zealand) gains access to the grouping, the order of comparative advantages in sector *NRS* among the three countries results in sectoral expansion in Australia, due to the fact that Australia has a clear comparative advantage in this sector over New Zealand.

<Figure 9 inserted here>

Finally, Figure 10 illustrates the percentage changes in production scale of New Zealand's imperfectly competitive sectors under THAILAND+2. The results are basically disparate from Figure 8 (TNZCEPA), in which most sectors are located around the origin. In Figure 10, we observe more positive results on the whole as the plots are shifted toward the right hand side of the diagram. Especially, compared to the previous case when Australia is not involved in the agreement, sectoral and individual firm's outputs of oil (*OIL*), ferrous metals (*I_S*), chemical, rubber, plastic products (*CRP*) and motor vehicles and parts (*MVH*) have prominently increased, despite that firm population in the latter three are augmented at the same time. This actually implies the comparative advantage of New Zealand in these sectors over Australia. In reverse, sector *PAGR* finds the involvement of Australia strongly disadvantageous, as observed in the degrees of contraction in output per firm (Figure 9) and sectoral output (Table 15).

<Figure 10 inserted here>

4.2 Thai FTAs with Japan, China, and India

For the next step, JTEPA, ASEAN-China and Thailand-India FTAs are analysed together in this subsection. Although we do not observe apparent proximity in the economic structures of Japan, China and India, Thai FTAs with these three nations are analogous in terms of the negotiating approaches that result in a limited coverage of commitments. Moreover, as they are all major economic figures is Asia, the comparative study of the economic effects of Thai FTAs with these nations can be of an interest to policy makers. To take things further, the obtained results are contrasted with those simulated under "ASEAN+3," where ASEAN as a whole forms an ideal FTA with Japan, China, and India.

<Table 16 inserted here>

Table 16 reports on the EV results from the four FTA scenarios. Outstandingly, Thailand (*THA*) derives more than four times higher welfare gains from the bilateral FTA with Japan (*JPN*) than she does under the ASEAN+CHINA regime. Even under the ideal ASEAN+3, Thailand's gains are merely 30% more than under JTEPA. This result highlights the fact that Japan has been Thailand's largest trading partner in Asia and the Pacific region. Japan, on the other hand, gains 3,795.80 million US dollars from the agreement, accounting for 0.09% of the regional income in 2001. Overall, JTEPA increases the world income by 3,169.11 million US dollars or 0.01%, which is much larger than the results under TAFTA or TNZCEPA in Table 5.

The results indicate that member countries enjoy substantial gains under ASEAN+CHINA, especially China (*CHN*) whose income is augmented by 2,526.81 million US dollars. However, the trade diversion effects on non-members such as Europe (*UK* and *XEUR*), Korea (*KOR*) and the United States (*USA*) are significant enough to counterbalance the positive impacts on member regions, resulting in a trivial improvement in world welfare.

Not surprisingly, Thailand perceives minor gains from the bilateral FTA with India (*IND*); whereas India and the world find the agreement even slightly welfare worsening. The primary reason for the deteriorated regional welfare is because Indian industries have been well protected at the border. Despite the fact that THAILAND+INDIA facilitates real benefits through optimal resource re-allocation that causes efficient shifts in the patterns of production and trade; at the same time, the tariff revenue loss significantly reduces the government income to the degree that eventually offsets real gains and decreases welfare.

Assuming that ASEAN (*THA*, *NASN*, and *SASN*) successfully forms a single FTA with Japan, China and India (ASEAN+3), all members will be unequivocally better off; while non-members such as Korea, the United States and Rest of Europe find the deal unfavourable. In contrast, the negative

impacts on Australia (*AUS*) and New Zealand (*NZL*) are relatively small compared to other non-members, because the trade relationship between ASEAN+3 members and the two nations are not extensive. Moreover, under certain FTA scenarios, non-members such as New Zealand, Canada (*CAN*) and Mexico (*MEX*) even marginally gain as trade with their major trading partners like Australia and the United States – also not included in the groupings – is increased after the union. In essence, such the aspect of the above results accentuates the characteristic usefulness of the general equilibrium approach in that this type of secondary trade diversion effect on non-member economies would have been missed out otherwise.

Then, Figure 11 plots the growth in nominal GDP under the four FTA scenarios, where North and South ASEAN (*NASN* and *SASN*) are again aggregated as "Rest of ASEAN," and all other non-members are together labelled as "Others." The overall results are consistent with those in Table 16, except that the gross nominal output change in India after THAILAND+INDIA is positive but close to zero (0.02%). This again underlines the above argument that the loss in tariff revenues is the main source of overall negative EV for India.

<Figure 11 inserted here>

Table 17 subsequently shows nominal and real changes in trade indicators of member regions. In all cases, trade creation undoubtedly dominates trade diversion, and the gains grow in absolute terms as the groupings are enlarged to ASEAN+3.

<Table 17 inserted here>

Under JTEPA, bilateral trade between Thailand and Japan is reciprocally boosted by approximately 25% of the base volume. Considering that Thailand's ex-ante import from Japan does not significantly differ from Japan's imports from Thailand (GTAP 6.0 database), the scope of elimination of trade barriers in the two countries should be essentially the same, despite the fact that Japanese trade barriers on major Thai agricultural exports are not removed after JTEPA. On the contrary, under ASEAN+CHINA, Thailand and South ASEAN perceive greater trade impacts than China and North ASEAN, since the former two's initial border protection is more substantial, especially given the fact that Singapore – as part of North ASEAN – imposes virtually zero tariffs on many product lines.

By the same token, trade between Thailand and India are almost doubled under THAILAND+INDIA, implying their relatively trivial trade relationship and substantial trade barriers before the arrangement. This point is also valid under ASEAN+3, as the percentage growth in India's intra-group trade indicator is remarkably higher than that perceived in other member countries.

<Table 18 inserted here>

Finally, Table 18 summarises the labour welfare variation in member regions. Since real wages in the unskilled and skilled labour markets of Thailand (*THA*), India (*IND*), Japan (*JPN*), China (*CHN*), and South ASEAN (*SASN*) are negatively associated with unemployment rates, their percentage changes are always in opposite signs. On the other hand, real wages in North ASEAN (*NASN*) are fully flexible at the same time as unemployment rates are exogenised, thus the real wage adjustment is more pronounced for the type of labour intensively used to produce commodities with comparative advantages, given that unemployed labour is voluntary hence does not decline with the increased labour demand. For that reason, North ASEAN's return rate to unskilled labour is well enhanced under ASEAN+CHINA and ASEAN+3.

Thailand, under all scenarios, finds improvement in the real wage of unskilled labour. The ex-post unskilled wage peaks under ASEAN+3, due to the strong demands for unskilled-labour intensive products from overseas. Since the unskilled wage variation is also considerably high under JTEPA, it is read that such demands mainly come from Japan, a relatively skilled-labour abundant economy. In contrast, skilled labour in Thailand is worse off under all types of FTAs; hence Thailand's unskilled labour income unequivocally improves more in proportion to the skilled labour one.

Analogous to Thailand, unskilled labour in regions such as India, China and South ASEAN finds the regional groupings more advantageous than the skilled one; while Japan is the only country whose skilled labour gains more from FTA formations than the unskilled, as Japan's ratio of unskilled to skilled labour income uniquely deteriorates in Table 18.

4.2.1 JTEPA

Simulation results from the economic partnership between Thailand and Japan (JTEPA) are explained in Table 19. Overall, JTEPA improves the real GDP growth of the Thai and Japanese economies by 0.42% and 0.11%, respectively. The percentage changes in all other macroeconomic variables similarly suggest that Thailand, as a smaller economy, perceives stronger positive impacts than Japan, given the same magnitude of change in bilateral imports (Table 17). Under JTEPA, regional trade is facilitated and the terms of trade are improved in both countries. Private and investment demands are then enhanced as national incomes are increased, although the reduction in public demand is unavoidable. Lastly, among those outside the grouping, the real GDP of Korea is most negatively affected by JTEPA. Subsequently, Table 20 shows Thailand's sectoral adjustments to JTEPA, while Table 21 reports on the corresponding results for Japan. Remarkably, in Thailand, processed agricultural products (*PAGR*) benefits the most from the bilateral partnership as its outputs and exports grow by 29.58% and 85.17%, respectively. Similarly, agricultural produces (*AGR*) enjoy the 3.08% growth in output. Japan, on the other hand, expands her production in most manufacturing sectors especially as motor vehicles and parts (*MVH*) benefit from the respective 1.10% and 1.81%

output and export growth rates. Similarly, textiles (*TEX*), chemical, rubber, plastic products (*CRP*), metal products (*I_S* and *NFM*), and machinery and equipments (*OME*) also clearly gain from JTEPA as their exports to Thailand are increased.

<Tables 19, 20, and 21 inserted here>

Figure 12 then plots the changes in production scales of imperfectly competitive sectors in Japan. Since all of them are under monopolistic competition according to Table 2, firm population is commonly endogenous. In most of these sectors, numbers of firms and outputs per firm are simultaneously increased with the augmentation in sectoral demands as observed in Table 21. Not surprisingly, sector *MVH* thus finds the most outstanding increases in these two indicators due to its strong output expansion. On the other hand, since sector *PAGR* in Japan has a comparative disadvantage over Thai exports, less efficient producers adjust to the new trade regime by merging with others or exiting the market, while the surviving ones manage to increase their outputs in order to make use of the increasing returns to scale to achieve higher productivity.

<Figure 12 inserted here>

4.2.2 ASEAN+CHINA

This subsection explains the welfare results of the FTA formation between China and ASEAN. Firstly, Table 22 shows that the positive impacts on real GDP and final demands are strongest in North ASEAN; while Thailand and South ASEAN enjoy relatively high growth of regional trade in comparison to other members.

Given the fact that the size of North ASEAN's GDP is almost half of South ASEAN's, the consumer effect in North ASEAN is probably strong enough to magnify the effect of the relatively small trade change into a large impact on real GDP. Thailand and South ASEAN, on the other hand, observe sizeable trade expansions because they used to impose comparatively high trade barriers before the union. For that reason, their considerable tax revenue losses cause huge reduction in public demands, in comparison to the welfare gains from the increased private and investment demands.

<Table 22 inserted here>

The general FTA impact on China is moderate since China is a large economy and her trade barriers are not so substantial thanks to the international competitiveness that has turned China into one of the major exporting countries nowadays. In fact, as China becomes an indispensable economic figure in Asia given the market size and growth, ASEAN are keen on strengthening their economic ties with the country, notwithstanding that the patterns of their factor endowments and comparative advantages

are not evidently disparate. This point is well illustrated in Tables 23 to 25, where outputs of sectors such as wearing apparels (*WAP*), metal products (*I_S* and *NFM*), motor vehicles and parts (*MVH*), machinery and equipments (*OME*), and electricity, gas, water, and construction services (*MSR*) are commonly increased in all member regions. In addition, there is somewhat similarity in the comparative advantage after the formation of ASEAN+CHINA, as Thailand becomes more specialised in chemical, rubber, and plastic products (*CRP*); North ASEAN in processed agricultural and food products (*PAGR* and *OFD*), textiles (*TEX*), and sector *CRP*; South ASEAN in sectors *OME*, *CRP* and electronic equipments (*ELE*); and China in sectors *TEX* and *ELE*. Such similar shifts in production patterns in member regions are due to the Armington function that allows intra-industry trade among regions; hence the real gains from ASEAN+CHINA are non-zeroes in spite of the above-mentioned proximity.

<Tables 23, 24 and 25 inserted here>

Lastly, Figure 13 shows the adjustments of imperfectly competitive firms in North ASEAN.[23] Sectors plotted in the first quadrant are better off since they are competent at the international level; while those in the fourth quadrant are faced with contraction as their resources are bid away to produce more of the former group of products. Sectors *PAGR* and *OFD*, on the other hand, are located on the X axis since they are under Cournot oligopoly. The escalation in their outputs per firm is more pronounced than would have been under monopolistic competition, as firm mobility is prohibited and the incumbent firms are allowed to reap more profits from the increased production activities.

<Figure 13 inserted here>

4.2.3 THAILAND+INDIA

In sum, Table 26 shows that the bilateral FTA between Thailand and India has weak impacts on regional and global welfare. The growth of main regional indicators including the terms of trade in Thailand and India is predominantly less than 1%; at the same time as non-members being unaffected by the FTA on the whole. In harmony with the outcome in Table 17, India's regional export has increased by a greater proportion than Thailand's, thus we see finer improvement in her terms of trade. Nonetheless, as India is a much larger economy than Thailand, the percentage changes in real GDP and final demands are fairly smaller.

<Table 26 inserted here>

[23] The results are only reported for North ASEAN, because sectors in Thailand and South ASEAN are all under perfect competition; also, in China, only sectors *OIL* and *MVH* are under monopolistic competition.

Next, Table 27 illustrates sectoral results for Thailand and India. In Thailand, most manufacturing sectors find the agreement beneficial. While sectors *CRP*, *I_*S, *MVH*, and *OME* moderately expand their exports by 0.92% to 2.40%, sector *NFM* (non-ferrous metals) greatly benefits from THAILAND+INDIA as its output and export are augmented by 10.41% and 10.86%, respectively. India, on the other hand, predominantly gains from the respective 4.07% and 16.84% growth in output and export of commodity *OFD* (food products).

<Table 27 inserted here>

Figure 14 then shows the output adjustments by individual firms in India. Except for the perfectly competitive agricultural sector (*AGR*), all Indian sectors are highly protected under Cournot oligopoly with the firm mobility constraint. As such, the firm-level results in this figure once again reflects the sectoral output changes in India previously reported in Table 27, as to the distinctive magnitude of gain sector *OFD* enjoys under THAILAND+INDIA.

<Figure 14 inserted here>

4.3 Broader Economic Integration

To shed more light on the prospects of Thailand's economic integration options, this subsection then additionally simulates an FTA formation among ASEAN and Australia, New Zealand, Japan, China, and India (ASEAN+5); Thailand's unilateral trade liberalisation; and global trade liberalisation. As such, the real GDP growth rates observed in these scenarios are contrasted with those from the previous scenarios. Specifically, Figures 15 to 23 illustrates how each region is affected by various scopes of economic liberalisation.

<Figures 15 to 23 inserted here>

Evidently, the growth in real GDP is highest under global trade liberalisation. Regions generally attain more economic benefits from joining a larger free trade zone; whereas the regions left behind suffer to a greater extent not only as the trade zone expands, but also when their major trading counterparts join the grouping. Moreover, the magnitude of FTA benefit tends to vary with the ex-ante level of bilateral trade among members and also with the size of initial trade barrier. Combined together, these welfare variation determinants result in Thailand gaining most from global free trade, and secondarily from unilateral trade liberalisation. Although Thailand clearly reaps more benefits from FTAs that involve ASEAN; among the four FTAs Thailand has bilaterally launched with Australia, New Zealand, Japan and India, the economic partnership with Japan (in spite of some sensitive agricultural products being excluded from the negotiations) yields highest growth to the Thai economy, approximately 21 times higher than the lowest growth observed in the FTA between Thailand and New Zealand (TNZCEPA).

In comparison to other regions, Australia and New Zealand gain least from global free trade and ASEAN+5, which underlines the fact that the two countries have relatively low trade barriers from the beginning. On the contrary, India barely gains from THAILAND+INDIA while her 3.03% real GDP growth rate is highest among all regions under global trade liberalisation and rather substantial under ASEAN+3 and ASEAN+5. This highlights both weak economic linkages between Thailand and India and the Indian prohibitive barriers to trade as most sectors are under Cournot oligopoly. Furthermore, it is derived from Figures 19 and 20 that the real GDP growth in Japan is more accelerated than in China as the two together switch from the ASEAN+3 to ASEAN+5 regime. Hence, Japan has established stronger trade ties with Australia and New Zealand than China. In addition, as China gains almost three times more under global trade liberalisation than ASEAN+5, it can be interpreted that a number of Chinese major trading partners still remain outside the ASEAN+5 grouping.

In Figure 21, besides the results that North ASEAN substantially gains from the ASEAN-plus FTAs and global trade liberalisation, the region is hardly affected by most of the Thai bilateral FTAs except for the 0.06% decline after JTEPA, and the 0.24% rise after Thailand unilaterally liberalises trade in goods and services. Therefore, it is safe to say that the North ASEAN economy considerably depends on trade with Japan and Thailand. In fact, although Thailand's trade with ASEAN accounts for approximately 20% of total trade (Table 1), most of which is explained by trade with North ASEAN. In contrast, Figure 22 shows that South ASEAN just moderately gains from ASEAN FTAs and global free trade because South ASEAN is less dependent to trade than the North as reflected by the ratio of trade to GDP (GTAP 6.0 database). As for the trade pattern, it is observed in Figure 22 that ASEAN+CHINA, ASEAN+3 and ASEAN+5 result in almost identical real GDP growth for South ASEAN, thus the relative importance of South ASEAN's trade with China is exemplified.

Lastly, Figure 23 illustrates the growth effects on the world as a whole. Not surprisingly, the world economy grows by 0.96%, significantly more than the 0.12% growth in real GDP under ASEAN+5, the second largest economic integration. ASEAN+3 comes third as the world real GDP grows by 0.10%, while the rest of scenarios centred around Thailand and ASEAN result in positive but less than 0.02% world growth rates.

5. Sensitivity Tests

A limited number of sensitivity tests are conducted in this section for the purpose of shedding light on the degree to which the above FTA simulation results are responsive to specific parameters and model structures. Below, the EV results of ASEAN+5 under various specifications are measured in million US dollar and as percentage of ex-ante income.

5.1 Elasticity of Substitution between Final Demands (σD)

The household, government, and bank share the same elasticity of substitution between final consumption of goods and services (σD). The sensitivity of welfare results of ASEAN+5 to this elasticity is shown in Table 28.

<Table 28 inserted here>

It is strongly perceived in Table 28 that the elasticity of substitution between consumption of final goods for the household, government, and bank can alter the results by a large margin. Overall, more elastic substitution between consumption goods improves welfare in most regions. For instance, the world EV is almost doubled and those of India and the United States even turn positive as the elasticity is tripled. Supposedly, given higher elasticity, individuals are allowed to adjust their consumption behaviours in a more flexible manner to certain changes in regional trade policy. Yet, this cross-sectoral elasticity is not likely to be as high as in the counterfactual cases considering that trade elasticities that represent the substitutability between domestically-produced and overseas products is estimated to be merely around 2.

5.2 Elasticity of Transformation between Products Supplied to Different Market Destinations (σT and σBE)

Table 29 reports on the sensitivity of EV results to the elasticities of transformation between products supplied to domestic and overseas markets (σT), and further between those exported to different market destinations (σBE).

<Table 29 inserted here>

In this table, both transformation elasticities are doubled and tripled as ASEAN, Australia, New Zealand, India, China, and Japan come together and form the ASEAN+5 FTA. Overall, as the elasticities become higher, the regional welfare effects are more exaggerated in a way that positive EVs become more positive while the negative ones are exacerbated. As a result, the world EV is balanced as 0.09% of the benchmark income across the three elasticity values. Therefore, regions that benefit from the integration basically gain more with higher elasticities because they can accordingly shift more exports towards the market destinations with relatively lower trade barriers. At the same time, regions that already perceive welfare losses under ASEAN+5 will be further worse off as trade is additionally shifted away from their markets. Although the extent to which these transformation elasticities change the EV results is not as extreme as in the case of the elasticity of substitution between final demands in Subsection 5.1, a careful derivation of these elasticities is required for an accurate estimation of FTA impacts on regional economies.

5.3 Asymmetry of Firm Population in Each Sector across Regions

In this model, the exogenously-estimated HHI determines whether a sector in each region is under perfect competition, monopolistic competition or Cournot oligopoly. As such, the number of firms is defined as the inverse of the above index, allowing the degree of market imperfection to vary by sector and region. Hence, it might be of an interest to scrutinise the sensitivity of ASEAN+5 results to the symmetry of firm population or the lack of it. In Table 30, the welfare variation given the asymmetric number of firms by sector and region is compared with the symmetric case in which all sectors are deliberately and evenly populated by 27 firms, which is essentially the simple average of the number of firms in all imperfectly competitive sectors in the world economy.

In Table 30, the EV results are reasonably robust to the initial firm population. However, regions endowed with many imperfectly competitive sectors, especially the Cournot oligopolistic ones, are comparatively more affected. To be specific, in India, the regional welfare change noticeably turns positive as the majority of Indian industries are under Cournot oligopoly (Table 2). Thus, the initial number of firm is one of the main determinants of the magnitude of adjustment in Cournot oligopolistic sectors. However, the overall effect of the symmetry in firm population is fairly negligible in this model.

<Table 30 inserted here>

5.4 Specification of Market Structure

The sensitivity of the ASEAN+5 simulation results to commodity market structures is examined in this subsection. It aims at certifying that the detailed market structure determination which allows the degree of market imperfection to differ across sectors and regions is vital when estimating the real impacts of Thai FTAs on regional and world economies. Accordingly, the benchmark EV results are compared with those when all sectors are under 1) perfect competition; 2) monopolistic competition; and 3) Cournot oligopoly. Note that as a perfectly competitive sector is altered into an imperfect competitive one, the number of firms calibrated as the inverse of the HHI is relatively large. Also, in the monopolistic competitive case, the elasticity of substitution between product varieties within each sector is consistently specified as 4.

<Table 31 inserted here>

The EV results in Table 31 are greatly responsive to the specification of commodity market structure. The world welfare reaps highest benefits under monopolistic competition, firstly because of the economies of scale, and secondly since firms are allowed to enter and exit the market freely under

monopolistic competition, as opposed to the prohibitive firm mobility assumption under Cournot oligopoly.

Sectoral adjustment across regions results in random and complex aggregate welfare effects. To illustrate, although Thai production sectors are already perfectly competitive in the benchmark case, as other regions uniformly become perfectly competitive, the Thai EV is consequently reduced by 18.41%. Similarly, although most of the Indian industries are under Cournot oligopoly in the benchmark scenario, as the whole world also shifts into Cournot oligopoly, the Indian EV is augmented from -194.22 million US dollars to 383.33 million US dollars. In addition, drastic changes in the aggregate welfare levels of regions endowed with various types of market structures are commonly observed. For this reason, the sensitivity results rationalise the detailed specification of commodity market structure in this model.

5.5 Specification of Labour Market Structure

Another feature of the current CGE model is the detailed specification of labour market paradigm, precisely the endogeneity of real wage and the unemployment rate. Table 32 hence contrasts the benchmark EV results with the cases when, for all labour markets, real wage is fully flexible while unemployment is rigid (the flexible wage approach); real wage is rigid while unemployment is endogenous (the minimum wage approach); and both real wage and unemployment are flexible and associated with each other (the wage curve approach).

<Table 32 inserted here>

It is observed from Table 32 that the specification of real wage and unemployment influences regional EV outcomes to a considerable extent. In general, under the endogenous real wage and rigid unemployment, the real effects are softened due to full wage flexibility that prevents unemployed labour from providing more or less services to production sectors, thus regional EVs are smallest among the three settings. Quite the opposite, when real wage is rigid while unemployment is endogenous, the real effects are accentuated thus the EV results are most strongly pronounced. Not surprisingly, labour markets under the wage curve approach, under which both variables are endogenous, yield in-between welfare results for each region and for the world as a whole.

Contrary to the results in Subsection 5.4, the modification of labour market structure abroad does not have significant spill-over effects on a region's EV. For instance, although the association of real wage and unemployment in Thailand, India, Japan and China is initially subject to the wage curve relationship; once labour markets in all other regions similarly become under the wage curve relationship, we find that the EVs of the four are altered by a small margin. In other words, the effects

are more or less region specific, because labour is not mobile across border, thus other regions can only be indirectly affected through trade flow adjustments.

6. Conclusion

The above static multi-region and multi-sector CGE model is carefully structured with respect to the specification of factor and sectoral market structures. The flexibility of real wage and unemployment varies by region and by labour type, and the degree of market imperfection in each sector is determined by the corresponding HHI exogenously estimated.

By and large, TAFTA, TNZCEPA, JTEPA, ASEAN+CHINA and THAILAND+INDIA tend to have trifling effects on the global economy, while moderately improving welfare of member regions. FTAs universally improve the terms of trade, and trade creation commonly dominates trade diversion, with an exception that the EV of India under THAILAND+INDIA is reported to be slightly negative, probably due to the excessive tariff revenue loss as India's domestic industries have been greatly protected; and also because of the trade-diversion effect, as India's bilateral imports from Thailand are not attained at lowest costs.

A larger economic integration definitely yields higher welfare gains to member countries, and the benefits are drastically enhanced as their major trading partners join the grouping. On the other hand, the magnitude of negative impacts on countries which are excluded from a certain regional grouping depends upon their economic ties with member countries. More to the point, some non-members are even better off, when their major trading counterparts are similarly left outside the trading bloc. For that reason, although by a small margin, Mexico resultantly benefits from TAFTA, ASEAN+CHINA and THAILAND+INDIA, and Canada enjoys the positive spill-over effect from ASEAN+CHINA.

At the sectoral level, FTAs usually entail contraction in dwellings (*DWE*), the only non-traded sector, since production resources are more required by exporting sectors (the re-allocation effect) and commodity demands are shifted towards importing goods as they become more cheaply available after the union (the consumer effect). Among sectors under imperfect competition, Cournot oligopolistic firms perceive stronger impacts than the monopolistically competitive ones, especially since the model specifies that firm population is not variable under oligopoly. Furthermore, among sectors under monopolistic competition, sectors with comparative advantages find incumbent firms enlarging their production scales whilst more firms join the competition. Conversely, sectors that are not strongly competitive adjust to the new trade regime by reducing the numbers of firms at the same time as raising firms' outputs in order to make use of the increasing returns to scale. Lastly, incompetent sectors find reduction in both outputs per firm and numbers of firms.

Taken as a whole, among all the actually concluded Thai FTAs under consideration, with respect to the standard EV measure, Thailand benefits the most from JTEPA, ASEAN+CHINA, THAILAND+INDIA, TAFTA and TNZCEPA, respectively. As Australia is much larger and more competitive than Thailand, the country enjoys greater trade creation under TAFTA, since the simulation results has revealed that her bilateral exports to Thailand expand to a greater extent than her parallel imports from the country in absolute terms. Therefore, Australia's EV is reported to be distinctively higher than Thailand's. At the sectoral level, Thailand observes the strongest expansion in the production of machinery and equipments (*OME*), while Australia has the most comparative advantage in food products (*OFD*).

On the other hand, under TNZCEPA, New Zealand and Thailand enjoy almost the same diminutive levels of EVs and real GDP growth rates. In Thailand, production expansion is most observed in chemical, rubber and plastic products (*CRP*), while New Zealand particularly benefits from exporting commodity *OFD*. Overall, the ex-post production pattern is remarkably analogous to TAFTA, due to the proximity in economic structures of Australia and New Zealand.

Under JTEPA, Thailand strongly increases production of processed agricultural products (*PAGR*), while Japan benefits from most manufacturing sectors, especially motor vehicles and parts (*MVH*). Notwithstanding that the absolute values of Japanese imports have increased by a larger degree than exports, her EV is significantly larger than Thailand's due to the strong consumer effect that boosts the utility of the representative household and also enables the bank to invest at cheaper costs.

Subsequently, under ASEAN+CHINA, despite somewhat similar shifts in production and trade patterns of member regions, Thailand has the most comparative advantage in sector *CRP*, North ASEAN in sector *PAGR*, South ASEAN in sector *OME*, and China in electronic equipments (*ELE*). Among the four members, China and North ASEAN reap considerably high EVs, while South ASEAN and Thailand are reasonably better off with the FTA. Lastly, Thailand gains more than India under THAILAND+INDIA both in absolute and proportional terms, with a great comparative advantage in non-ferrous metals (*NFM*). India, on the other hand, focuses on the expansion of sector *OFD*.

Concerning the sensitivity analysis, it is clearly observed that elasticity parameters considerably alter policy implications. While the cross-sector substitution elasticity among final demands (σD) unanimously yields positive changes to all regions, the transformation elasticities (σT and σBE) exaggerate regional welfare outcomes in that FTA members further gain and non-members additionally lose from the integration. The sensitivity tests further show that simulation results are robust to the benchmark firm population. Notwithstanding, particular attention should be paid to the specification of commodity market structure (the degree of market competitiveness) and labour

market paradigm (the flexibility of real wage and unemployment), since we have found that the welfare results are varied with these settings in a significant way.

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8. Appendix

Table 1: Merchandise Bilateral Trade between Thailand and Her FTA Partners, 2001-2006

Country	2001-02		2003-04		2005-06	
	Trade flows (million baht)	**Share in total trade**	**Trade flows (million baht)**	**Share in total trade**	**Trade flows (million baht)**	**Share in total trade**
Exports						
Australia	130,725	2.25%	188,585	2.62%	292,242	3.12%
New Zealand	16,904	0.29%	24,105	0.34%	40,765	0.44%
Japan	866,431	14.94%	1,013,277	14.10%	1,228,257	13.12%
China	279,337	4.82%	521,237	7.25%	811,868	8.67%
India	39,057	0.67%	63,028	0.88%	129,382	1.38%
ASEAN	1,136,867	19.61%	1,533,530	21.33%	2,001,633	21.38%
Rest of World	3,328,852	57.41%	3,844,763	53.48%	4,857,481	51.89%
Total exports	**5,798,173**	**100%**	**7,188,525**	**100%**	**9,361,628**	**100%**
Imports						
Australia	124,579	2.26%	154,397	2.22%	260,784	2.71%
New Zealand	17,464	0.32%	18,302	0.26%	22,224	0.23%
Japan	1,252,633	22.68%	1,657,017	23.88%	2,025,705	21.04%
China	376,767	6.82%	580,733	8.37%	964,696	10.02%
India	63,221	1.14%	82,176	1.18%	112,612	1.17%
ASEAN	913,224	16.53%	1,162,443	16.75%	1,767,556	18.36%
Rest of World	2,775,964	50.25%	3,284,878	47.33%	4,472,015	46.46%
Total imports	**5,523,854**	**100%**	**6,939,947**	**100%**	**9,625,593**	**100%**

Source: Compiled by author from Customs Department of Thailand (2007).

Table 2: The Degree of Sectoral Market Competition by Region

Region \ Sector	*AGR*	*NRS*	*OIL*	*PAGR*	*OFD*	*MNF*	*TEX*	*WAP*	*CRP*	*I_S*	*NFM*	*MVH*	*ELE*	*OME*	*OMF*	*MSR*	*TRD*	*TRP*	*CFI*	*OBS*	*OSG*	*DWE*
Thailand	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
Australia	PC	MC	MC	MC	MC	MC	PC	PC	MC	MC	PC	PC	MC	MC	PC	MC	PC	MC	CO	PC	PC	PC
New Zealand	PC	CO	CO	CO	PC	MC	PC	PC	MC	MC	MC	MC	MC	PC	MC	MC	MC	MC	MC	MC	MC	MC
India	PC	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO	CO
Japan	PC	PC	PC	MC	PC	MC	MC	PC	MC	MC	MC	MC	MC	MC	MC	MC	PC	MC	MC	MC	MC	PC
China	PC	PC	MC	PC	PC	PC	PC	PC	PC	PC	PC	MC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
North ASEAN	PC	MC	MC	CO	CO	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC
South ASEAN	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
Korea	PC	MC	MC	MC	PC	MC	PC	PC	MC	MC	MC	MC	MC	PC	MC	MC	MC	MC	MC	MC	MC	MC
USA	PC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	CO	MC	MC	PC	MC	PC	PC	PC	PC	PC	PC
Canada	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC
Mexico	PC	MC	MC	CO	CO	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC
United Kingdom	PC	MC	MC	MC	MC	MC	MC	PC	MC	MC	PC	MC	MC	MC	MC	MC	PC	MC	MC	PC	PC	PC
Rest of Europe	PC	MC	MC	MC	MC	MC	MC	PC	MC	MC	PC	MC	MC	MC	MC	MC	PC	MC	MC	PC	PC	PC
Rest of World	PC	PC	MC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC	PC

Source: Compiled by author from various sources (see Subsection 3.2.2). Note: "PC" stands for perfectly competitive sectors (HHI < 100); "MC" accounts for monopolistic competitive sectors (100 ≤ HHI < 1,000); and "CO" represents Cournot Oligopolistic sectors (HHI ≥ 1,000). India as the only country in the low income group has the most imperfectly competitive market among all regions. Thus, it might be the case that countries with lowest income level have loose antitrust regulation. Thailand and China belong to the lower middle income group and coincidentally have similar market structures which are almost all perfectly competitive, while most markets in upper middle and high income countries are under monopolistic competition.

Table 3: Specification of Skilled and Unskilled Labour Market Paradigm by Region

Labour market	The flexible wage approach	The minimum wage approach	The wage curve approach
Skilled labour	USA New Zealand Australia Canada UK North ASEAN	Rest of Europe	Japan Korea Mexico Thailand South ASEAN China Rest of World India
Unskilled labour	USA New Zealand Australia Canada North ASEAN	Rest of Europe UK	Japan Korea Mexico Thailand South ASEAN China Rest of World India

Note: As defined in Figure 5, regions reported in 1) purple, 2) blue, 3) green, and 4) red are those respectively falling into the 1) high, 2) upper middle, 3) lower middle, and 4) low income categories.

Table 4: Regional Savings Decomposed by Sources (in Billion US$)

Region	Government savings	Household savings	Foreign savings	Regional Savings
Thailand	0.48	43.14	-20.48	23.15
Australia	-4.48	84.68	-5.33	74.87
New Zealand	-0.17	13.70	-3.68	9.84
India	-21.58	129.37	-1.64	106.15
Japan	-65.86	1,148.88	-53.99	1,029.02
China	-34.91	599.27	-108.39	455.97
North ASEAN	-2.75	87.41	-42.72	41.95
South ASEAN	-148.37	234.94	-17.45	69.12
Korea	-6.32	134.33	-20.96	107.05
USA	-318.05	1,918.05	390.64	1,990.64
Canada	9.20	162.74	-31.39	140.55
Mexico	-5.74	146.93	-19.43	121.75
United Kingdom	0.47	188.84	49.62	238.93
Rest of Europe	-123.64	1,768.22	-82.85	1,561.73
Rest of World	-203.85	846.69	-31.95	610.89

Source: Government savings from UNSD database; foreign savings from GTAP 6.0 database; and household savings calculated by author as the residuals of household incomes and expenditures.

Table 5: Regional Welfare Gains after the FTA Formation with Australia and New Zealand (EV in Million US$ and as Percentage of the 2001 Regional Income)

Region	TAFTA		TNZCEPA		THAILAND+2		ASEAN+2	
	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)
							FTA member candidates	
THA	**6.81**	**0.01%**	**8.31**	**0.01%**	**14.64**	**0.02%**	**111.54**	**0.12%**
AUS	**97.38**	**0.03%**	-1.72	-0.00%	**118.03**	**0.03%**	**224.71**	**0.06%**
NZL	-2.73	-0.01%	**8.31**	**0.02%**	**98.57**	**0.21%**	**101.67**	**0.22%**
NASN	-0.35	-0.00%	1.31	0.00%	-3.57	-0.00%	**1,411.30**	**1.10%**
SASN	-3.48	-0.00%	-1.59	-0.00%	-12.32	-0.00%	**1,321.62**	**0.42%**
							Non-members	
IND	-2.83	-0.00%	-0.57	-0.00%	-5.02	-0.00%	-99.13	-0.02%
JPN	-30.43	-0.00%	-3.01	-0.00%	-54.25	-0.00%	-524.10	-0.01%
CHN	-11.76	-0.00%	-1.44	-0.00%	-37.55	-0.00%	-335.94	-0.03%
KOR	-5.45	-0.00%	-3.46	-0.00%	-16.43	-0.00%	-176.42	-0.05%
USA	-11.25	-0.00%	-1.10	-0.00%	-25.95	-0.00%	-233.50	-0.00%
CAN	-0.39	-0.00%	-1.57	-0.00%	-6.42	-0.00%	1.77	0.00%
MEX	0.10	0.00%	-1.82	-0.00%	-6.74	-0.00%	-1.73	-0.00%
UK	-8.27	-0.00%	-5.68	-0.00%	-28.00	-0.00%	-94.61	-0.01%
XEUR	-53.94	-0.00%	-25.13	-0.00%	-135.78	-0.00%	-1,856.00	-0.02%
ROW	-13.94	-0.00%	-9.07	-0.00%	-40.22	-0.00%	-97.02	-0.00%
World	-40.54	-0.00%	-38.23	-0.00%	-141.00	-0.00%	-245.83	-0.00%

Source: Simulated by author. Note: Numbers in bold letters indicate welfare changes in member countries of each FTA grouping.

Table 6: Welfare Changes for Trade Indicators in Thailand after FTA Formation with Australia and New Zealand

Welfare changes	TAFTA	TNZCEPA	THAILAND+2	ASEAN+2
				Million US$
Trade creation	361.20	134.37	478.53	3,952.34
Trade diversion	-72.75	-53.65	-111.93	-1,073.78
				% change
Bilateral imports from FTA partners	19.72%	48.99%	23.09%	23.20%
Bilateral imports from non-partners	-0.10%	-0.07%	-0.15%	-1.78%
Bilateral exports to FTA partners	12.70%	5.93%	11.66%	13.68%
Bilateral exports to non-partners	0.07%	0.08%	0.16%	0.35%

Source: Simulated by author. Note: Trade creation is defined as the increase in imports from member countries; trade diversion is the increase in imports from countries outside FTA zones.

Table 7: Percentage Changes in Labour Welfare of Member Countries after the FTA Formation with Australia and New Zealand

		Real wage of unskilled labour	Real wage of skilled labour	Ratio of unskilled to skilled labour income
TAFTA	*THA*	0.05%	-0.11%	0.34%
	AUS	0.06%	0.03%	0.03%
TNZCEPA	*THA*	0.02%	-0.04%	0.11%
	NZL	0.04%	-0.01%	0.04%
THAILAND+2	*THA*	0.07%	-0.14%	0.45%
	AUS	0.09%	0.03%	0.06%
	NZL	0.34%	0.27%	0.07%
ASEAN+2	*THA*	0.40%	-1.36%	3.92%
	AUS	0.21%	0.08%	0.13%
	NZL	0.37%	0.29%	0.08%
	NASN	1.39%	0.47%	0.92%
	SASN	0.39%	-0.23%	1.31%

Table 8: Percentage Changes for Various Regional Indicators under TAFTA

Region	Real GDP	Private demand	Investment demand	Public demand	Regional import	Regional export	Terms of trade
							FTA members
THA	0.08%	0.11%	0.16%	-0.96%	0.30%	0.31%	0.13%
AUS	0.02%	0.06%	0.07%	-0.08%	0.22%	0.14%	0.11%
							Non-members
NZL	-0.00%	-0.00%	-0.01%	-0.00%	-0.03%	-0.01%	-0.00%
Others	-0.00%	-0.00%	-0.00%	-0.00%	-0.00%	-0.00%	-0.00%

Table 9: Percentage Changes for Various Sectoral Indicators in Thailand under TAFTA

Sector	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import
AGR	-0.04%	-0.08%	-0.04%	-0.12%	0.17%	2.10%
NRS	0.01%	0.04%	0.07%	0.01%	-0.13%	0.34%
OIL	0.01%	0.03%	0.07%	0.00%	1.42%	0.07%
PAGR	0.09%	0.22%	0.40%	0.04%	0.24%	2.68%
OFD	0.16%	0.29%	0.48%	0.11%	0.36%	0.96%
MNF	0.06%	0.20%	0.41%	0.00%	0.12%	0.28%
TEX	0.36%	0.49%	0.69%	0.29%	0.54%	0.14%
WAP	0.24%	0.35%	0.55%	0.14%	0.41%	0.41%
CRP	0.36%	0.49%	0.70%	0.29%	0.48%	0.18%
I_S	0.31%	0.44%	0.64%	0.23%	0.53%	0.43%
NFM	0.12%	0.25%	0.45%	0.04%	0.16%	0.13%
MVH	0.02%	0.15%	0.36%	-0.05%	0.44%	0.83%
ELE	-0.12%	0.04%	0.24%	-0.17%	-0.11%	0.00%
OME	1.51%	1.65%	1.85%	1.44%	1.60%	0.50%
OMF	0.11%	0.24%	0.44%	0.03%	0.17%	0.25%
MSR	0.06%	0.21%	0.43%	-0.01%	-0.07%	0.15%
TRD	0.03%	0.25%	0.53%	-0.02%	-0.15%	0.20%
TRP	-0.05%	0.13%	0.40%	-0.14%	-0.17%	0.08%
CFI	-0.01%	0.10%	0.30%	-0.11%	-0.06%	0.04%
OBS	-0.12%	-0.01%	0.19%	-0.21%	-0.13%	-0.02%
OSG	-0.87%	-0.96%	-0.75%	-1.16%	-0.54%	-0.63%
DWE	-0.13%	0.04%	*n/a**	-0.16%	*n/a***	*n/a***

*Note: * Sector DWE does not demand for skilled labour in the benchmark year, thus the CES production function for this sector treat this factor demand as non-existing ; **Output from Sector DWE is non-traded.*

Table 10: Percentage Changes for Various Sectoral Indicators in Australia under TAFTA

Sector	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import
AGR	0.15%	0.19%	0.19%	0.19%	0.28%	0.31%
NRS	-0.04%	-0.05%	-0.04%	-0.05%	-0.09%	0.19%
OIL	-0.04%	-0.05%	-0.05%	-0.05%	-0.06%	0.06%
PAGR	0.13%	0.11%	0.13%	0.11%	0.25%	0.21%
OFD	0.59%	0.56%	0.58%	0.56%	2.23%	0.44%
MNF	0.00%	-0.03%	-0.00%	-0.03%	0.15%	0.23%
TEX	-0.35%	-0.35%	-0.31%	-0.35%	-0.22%	0.50%
WAP	-0.13%	-0.14%	-0.10%	-0.14%	0.10%	0.61%
CRP	0.10%	0.06%	0.08%	0.06%	0.48%	0.20%
I_S	0.14%	0.11%	0.13%	0.11%	0.68%	0.33%
NFM	-0.05%	-0.05%	-0.01%	-0.05%	-0.05%	0.18%
MVH	0.47%	0.46%	0.50%	0.46%	1.17%	0.17%
ELE	0.33%	0.28%	0.31%	0.28%	0.62%	0.08%
OME	-0.10%	-0.14%	-0.12%	-0.14%	0.15%	0.36%
OMF	0.09%	0.08%	0.12%	0.08%	0.43%	0.30%
MSR	0.02%	-0.00%	0.03%	0.00%	-0.10%	0.12%
TRD	0.01%	-0.00%	0.05%	0.00%	-0.12%	0.13%
TRP	-0.03%	-0.05%	-0.01%	-0.05%	-0.34%	0.13%
CFI	-0.02%	-0.03%	0.00%	-0.03%	-0.39%	0.13%
OBS	-0.00%	-0.02%	0.02%	-0.01%	-0.13%	0.13%
OSG	-0.07%	-0.09%	-0.05%	-0.09%	-0.17%	0.08%
DWE	-0.02%	-0.03%	*n/a**	-0.02%	*n/a***	*n/a***

*Note: * Sector DWE does not demand for skilled labour in the benchmark year, thus the CES production function for this sector treat this factor demand as non-existing ; **Output from Sector DWE is non-traded.*

Table 11: Percentage Changes for Various Regional Indicators under TNZCEPA

Region	Real GDP	Private demand	Invest-ment demand	Public demand	Regional import	Regional export	Terms of trade
							FTA members
THA	0.02%	0.04%	0.02%	-0.32%	0.09%	0.10%	0.04%
NZL	0.02%	0.02%	0.04%	-0.05%	0.23%	0.11%	0.01%
							Non-members
Others	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 12: Percentage Changes for Various Sectoral Indicators in Thailand under TNZCEPA

Sector	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import
AGR	-0.01%	-0.01%	0.00%	-0.02%	0.11%	0.01%
NRS	0.02%	0.04%	0.05%	0.03%	0.02%	0.08%
OIL	0.02%	0.05%	0.06%	0.03%	-0.00%	0.03%
PAGR	-0.18%	-0.14%	-0.08%	-0.20%	0.00%	5.49%
OFD	0.11%	0.15%	0.21%	0.09%	0.23%	0.54%
MNF	0.03%	0.08%	0.15%	0.01%	0.06%	0.02%
TEX	0.10%	0.14%	0.21%	0.07%	0.13%	-0.02%
WAP	0.05%	0.08%	0.15%	0.02%	0.10%	0.57%
CRP	0.17%	0.21%	0.28%	0.15%	0.19%	0.01%
I_S	0.11%	0.15%	0.22%	0.08%	0.12%	0.05%
NFM	0.09%	0.13%	0.19%	0.06%	0.08%	0.06%
MVH	0.04%	0.09%	0.15%	0.02%	0.15%	-0.03%
ELE	0.05%	0.10%	0.17%	0.03%	0.05%	0.03%
OME	0.15%	0.20%	0.26%	0.13%	0.16%	0.04%
OMF	0.07%	0.11%	0.17%	0.04%	0.09%	-0.04%
MSR	0.02%	0.07%	0.14%	-0.00%	0.03%	-0.01%
TRD	0.02%	0.09%	0.18%	0.00%	0.03%	-0.01%
TRP	0.02%	0.08%	0.16%	-0.02%	0.08%	-0.03%
CFI	0.02%	0.05%	0.12%	-0.01%	0.09%	-0.07%
OBS	0.00%	0.04%	0.10%	-0.03%	0.06%	-0.07%
OSG	-0.29%	-0.31%	-0.25%	-0.38%	-0.11%	-0.28%
DWE	-0.04%	0.02%	*n/a**	-0.05%	*n/a***	*n/a***

*Note: * Sector DWE does not demand for skilled labour in the benchmark year, thus the CES production function for this sector treat this factor demand as non-existing ; **Output from Sector DWE is non-traded.*

Table 13: Percentage Changes for Various Sectoral Indicators in New Zealand under TNZCEPA

Sector	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import
AGR	0.17%	0.19%	0.20%	0.20%	-0.01%	0.52%
NRS	-0.06%	-0.08%	-0.07%	-0.08%	-1.44%	0.49%
OIL	-0.08%	-0.13%	-0.12%	-0.13%	0.21%	-0.13%
PAGR	0.26%	0.21%	0.25%	0.23%	0.41%	0.34%
OFD	2.88%	2.86%	2.91%	2.88%	3.85%	-0.01%
MNF	-0.14%	-0.16%	-0.12%	-0.14%	-0.19%	0.22%
TEX	-0.26%	-0.27%	-0.21%	-0.25%	-0.31%	0.25%
WAP	0.18%	0.17%	0.22%	0.19%	0.60%	0.41%
CRP	-0.15%	-0.16%	-0.13%	-0.15%	-0.23%	0.32%
I_S	-0.38%	-0.38%	-0.35%	-0.37%	-0.45%	0.20%
NFM	-0.66%	-0.67%	-0.65%	-0.66%	-0.74%	0.26%
MVH	-0.16%	-0.20%	-0.19%	-0.19%	-0.22%	0.25%
ELE	-0.21%	-0.23%	-0.19%	-0.21%	-0.20%	0.22%
OME	-0.43%	-0.45%	-0.39%	-0.42%	-0.45%	0.23%
OMF	-0.23%	-0.25%	-0.22%	-0.24%	-0.36%	0.32%
MSR	-0.03%	-0.05%	-0.01%	-0.03%	-0.22%	0.18%
TRD	0.01%	-0.01%	0.04%	0.01%	-0.18%	0.20%
TRP	-0.12%	-0.13%	-0.09%	-0.12%	-0.55%	0.18%
CFI	-0.02%	-0.04%	0.00%	-0.02%	-0.21%	0.20%
OBS	-0.01%	-0.03%	0.01%	-0.01%	-0.20%	0.20%
OSG	-0.04%	-0.07%	-0.02%	-0.05%	-0.22%	0.16%
DWE	-0.00%	-0.02%	*n/a**	-0.00%	*n/a***	*n/a***

*Note: * Sector DWE does not demand for skilled labour in the benchmark year, thus the CES production function for this sector treat this factor demand as non-existing ; **Output from Sector DWE is non-traded.*

Table 14: Percentage Changes for Various Regional Indicators under THAILAND+2

Region	Real GDP	Private demand	Investment demand	Public demand	Regional import	Regional export	Terms of trade	Real exchange rate
								FTA members
THA	0.10%	0.15%	0.18%	-1.27%	0.39%	0.40%	0.17%	0.08%
AUS	0.03%	0.10%	0.11%	-0.22%	0.35%	0.33%	0.28%	0.01%
NZL	0.09%	0.15%	0.39%	-0.10%	0.91%	0.26%	0.01%	-0.63%
								Non-members
Others	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 15: Percentage Changes for Various Sectoral Indicators in Member Countries under THAILAND+2

Sector	Output			Export			Import		
	THA	***AUS***	***NZL***	***THA***	***AUS***	***NZL***	***THA***	***AUS***	***NZL***
AGR	-0.05%	0.17%	-0.63%	0.28%	0.35%	-1.02%	2.12%	0.10%	0.58%
NRS	0.03%	0.03%	-0.62%	-0.10%	-0.02%	-3.82%	0.41%	0.11%	0.94%
OIL	0.02%	-0.05%	0.51%	1.39%	0.09%	17.81%	0.10%	0.24%	1.88%
PAGR	-0.06%	0.13%	-0.66%	0.27%	0.44%	-1.09%	7.79%	3.75%	2.26%
OFD	0.25%	0.61%	2.60%	0.57%	2.32%	3.58%	1.49%	0.76%	0.28%
MNF	0.09%	0.02%	0.31%	0.18%	0.35%	1.17%	0.30%	0.42%	0.85%
TEX	0.44%	-0.75%	8.96%	0.64%	-0.12%	16.90%	0.11%	1.11%	1.75%
WAP	0.27%	-0.45%	14.34%	0.49%	0.63%	30.36%	0.97%	2.04%	-0.84%
CRP	0.52%	0.13%	0.86%	0.65%	0.70%	1.72%	0.19%	0.32%	0.66%
I_S	0.40%	0.20%	0.77%	0.63%	0.86%	2.08%	0.48%	0.68%	0.69%
NFM	0.20%	0.25%	-1.08%	0.25%	0.28%	-1.32%	0.19%	0.19%	1.62%
MVH	0.07%	0.66%	0.77%	0.59%	1.56%	2.61%	0.81%	0.12%	1.03%
ELE	-0.06%	0.73%	-0.88%	-0.06%	1.18%	-1.37%	0.03%	-0.00%	1.13%
OME	1.63%	0.04%	2.98%	1.73%	0.45%	4.16%	0.54%	0.41%	0.69%
OMF	0.18%	0.19%	0.19%	0.26%	0.69%	0.48%	0.21%	0.32%	1.06%
MSR	0.08%	0.04%	0.11%	-0.04%	0.01%	-0.82%	0.14%	0.05%	0.97%
TRD	0.04%	0.03%	0.10%	-0.12%	-0.02%	-0.86%	0.19%	0.06%	1.05%
TRP	-0.03%	0.01%	-0.69%	-0.08%	-0.08%	-2.72%	0.05%	0.04%	0.81%
CFI	0.00%	-0.01%	-0.22%	0.03%	-0.15%	-1.23%	-0.03%	0.05%	1.06%
OBS	-0.12%	0.01%	-0.12%	-0.08%	-0.04%	-1.11%	-0.09%	0.06%	1.02%
OSG	-1.14%	-0.16%	-0.13%	-0.65%	-0.15%	-1.17%	-0.89%	-0.07%	1.02%
DWE	-0.17%	-0.05%	-0.09%	*n/a***	*n/a***	*n/a***	*n/a***	*n/a***	*n/a***

*Note: **Output from Sector DWE is non-traded.*

Table 16: Regional Welfare Gains after FTA Formation with Japan, China, and India (EV in Million US$ and as Percentage of 2001 Regional Income)

Region		JTEPA	ASEAN+CHINA		THAILAND+INDIA			ASEAN+3
	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)
								FTA member candidates
THA	**1,685.49**	**1.73%**	**393.76**	**0.40%**	**311.70**	**0.32%**	**2,144.50**	**2.20%**
IND	-21.40	-0.00%	-160.04	-0.03%	**-142.32**	**-0.03%**	**58.04**	**0.01%**
JPN	**3,795.80**	**0.09%**	-1,252.06	-0.03%	-21.59	-0.00%	**19,727.70**	**0.48%**
CHN	-361.95	-0.03%	**2,526.81**	**0.21%**	-12.62	-0.00%	**3,694.99**	**0.30%**
NASN	-172.59	-0.13%	**2,265.59**	**1.77%**	-5.18	-0.00%	**2,298.79**	**1.80%**
SASN	-148.54	-0.05%	**1,556.67**	**0.49%**	-15.43	-0.00%	**1,673.98**	**0.53%**
								Non-members
AUS	-70.61	-0.02%	-54.23	-0.02%	-4.81	-0.00%	-110.37	-0.03%
NZL	1.46	0.00%	-3.78	-0.01%	-1.06	-0.00%	0.29	0.00%
KOR	-106.10	-0.03%	-561.00	-0.14%	-10.19	-0.00%	-1,577.55	-0.40%
USA	-350.14	-0.00%	-440.72	-0.00%	-34.44	-0.00%	-921.23	-0.01%
CAN	-6.73	-0.00%	13.59	0.00%	-1.41	-0.00%	71.29	0.01%
MEX	-0.39	-0.00%	2.51	0.00%	2.15	0.00%	-19.25	-0.00%
UK	-83.45	-0.01%	-134.33	-0.01%	-16.15	-0.00%	-336.22	-0.02%
XEUR	-714.69	-0.01%	-3,570.05	-0.05%	-154.20	-0.00%	-5,678.18	-0.07%
ROW	-277.04	-0.01%	-381.54	-0.01%	-81.57	-0.00%	-949.09	-0.03%
World	3,169.11	0.01%	201.18	0.00%	-187.12	-0.00%	20,077.68	0.06%

Source: Simulated by author. Note: Numbers in bold letters indicate welfare changes in member countries of each FTA grouping.

Table 17: Welfare Changes for Trade Indicators in Member Countries after FTA Formation with Japan, China, and India

FTA	Region	Million US$		% change in real volumes			
		Trade creation	Trade diversion	Imports from FTA partners	Imports from non-members	Exports to FTA partners	Exports to non-members
JTEPA	*THA*	4,207.15	-796.87	25.35%	-1.37%	25.70%	-3.72%
	JPN	5,781.69	-998.55	25.70%	-0.25%	25.35%	0.13%
ASEAN +CHINA	*THA*	5,141.62	-692.20	24.93%	-1.37%	19.90%	-1.65%
	CHN	15,035.67	-4,123.88	10.87%	-1.34%	7.48%	0.31%
	NASN	5,169.59	3,178.88	5.45%	1.75%	13.45%	-2.89%
	SASN	8,357.78	-1,662.37	22.39%	-1.70%	15.61%	0.59%
THAILAND+ INDIA	*THA*	846.45	-283.98	92.57%	-0.35%	78.64%	-0.10%
	IND	654.24	-104.09	78.64%	-0.13%	92.57%	-0.46%
ASEAN+3	*THA*	8,967.24	-819.42	23.09%	-2.40%	18.15%	-4.53%
	IND	15,017.72	-3,860.72	78.10%	-7.01%	47.23%	14.71%
	JPN	19,372.86	4,792.81	10.31%	0.96%	17.19%	-2.11%
	CHN	32,880.71	-7,498.71	14.44%	-3.08%	10.04%	0.84%
	NASN	8,362.55	3,330.80	5.66%	2.20%	13.52%	-4.98%
	SASN	10,362.20	-1,271.98	15.65%	-1.88%	11.63%	-0.41%

Source: Simulated by author. Note: Trade creation is defined as the increase in imports from member countries; trade diversion is the increase in imports from countries outside FTA zones.

Table 18: Percentage Changes for Labour Welfare Indicators in Member Countries after FTA Formation with Japan, China, and India

		Unemploy-ment rate of unskilled labour	Unemploy-ment rate of skilled labour	Real wage of unskilled labour	Real wage of skilled labour	Ratio of unskilled to skilled labour income
JTEPA	*THA*	-7.84%	7.61%	0.82%	-0.73%	3.32%
	JPN	-0.74%	-0.79%	0.07%	0.08%	-0.01%
ASEAN +CHINA	*THA*	-5.92%	17.35%	0.61%	-1.59%	4.93%
	CHN	-2.97%	-0.58%	0.30%	0.06%	0.51%
	NASN	*n/a**	*n/a**	2.24%	0.87%	1.36%
	SASN	-5.35%	4.34%	0.55%	-0.42%	2.07%
THAILAND +INDIA	*THA*	-2.10%	0.41%	0.21%	-0.04%	0.53%
	IND	-0.08%	0.42%	0.01%	-0.04%	0.11%
ASEAN+3	*THA*	-13.52%	25.88%	1.46%	-2.28%	8.50%
	IND	-5.30%	4.56%	0.55%	-0.45%	2.11%
	JPN	-3.33%	-3.39%	0.34%	0.35%	-0.01%
	CHN	-6.09%	0.37%	0.63%	-0.04%	1.39%
	NASN	*n/a**	*n/a**	2.20%	0.06%	2.14%
	SASN	-5.74%	9.31%	0.59%	-0.89%	3.21%

*Note: *North ASEAN's skilled and unskilled labour markets have fully flexible wages and rigid unemployment rates.*

Table 19: Percentage Changes for Regional Indicators under JTEPA

Region	Real GDP	Private demand	Investment demand	Public demand	Regional import	Regional export	Terms of trade
							FTA members
THA	0.42%	2.40%	5.34%	-6.26%	3.84%	1.37%	1.64%
JPN	0.11%	0.14%	0.14%	-0.04%	0.68%	0.84%	0.38%
							Non-members
AUS	-0.02%	-0.03%	0.00%	-0.01%	-0.05%	-0.05%	0.00%
NZL	-0.01%	0.00%	0.01%	0.00%	-0.06%	-0.05%	0.00%
CHN	-0.01%	-0.02%	-0.01%	-0.06%	-0.06%	-0.02%	0.01%
NASN	-0.06%	-0.08%	-0.19%	-0.09%	-0.12%	-0.06%	0.02%
SASN	-0.02%	-0.02%	-0.05%	-0.11%	-0.12%	-0.07%	0.01%
KOR	-0.02%	-0.02%	-0.02%	-0.05%	-0.03%	-0.02%	0.00%
Others	0.00%	0.00%	0.00%	-0.01%	-0.02%	-0.01%	0.00%

Table 20: Percentage Changes for Sectoral Indicators in Thailand under JTEPA

Sector	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import
AGR	3.08%	6.78%	7.18%	6.64%	-12.04%	28.72%
NRS	-0.45%	-0.57%	-0.26%	-0.68%	-0.82%	1.25%
OIL	-0.75%	-1.47%	-1.17%	-1.58%	0.08%	-1.38%
PAGR	29.58%	30.08%	32.36%	29.27%	85.17%	0.95%
OFD	-1.13%	-0.71%	1.02%	-1.33%	-0.78%	4.76%
MNF	-1.34%	-0.89%	1.06%	-1.59%	-1.53%	7.31%
TEX	-5.33%	-4.97%	-3.10%	-5.64%	-6.49%	6.34%
WAP	-0.86%	-0.54%	1.43%	-1.23%	-2.09%	7.88%
CRP	-11.30%	-10.96%	-9.20%	-11.58%	-11.40%	2.88%
I_S	-5.45%	-5.08%	-3.21%	-5.75%	-2.46%	1.70%
NFM	-2.10%	-1.74%	0.20%	-2.43%	-1.86%	-1.17%
MVH	-2.80%	-2.42%	-0.49%	-3.10%	-0.87%	29.12%
ELE	-1.86%	-1.39%	0.56%	-2.08%	-1.79%	0.23%
OME	1.83%	2.24%	4.26%	1.53%	2.19%	4.26%
OMF	-1.55%	-1.16%	0.79%	-1.85%	-2.14%	3.81%
MSR	1.26%	1.72%	3.89%	0.95%	-0.28%	2.03%
TRD	0.11%	0.85%	3.51%	-0.09%	-2.02%	2.37%
TRP	0.29%	0.81%	3.47%	-0.13%	-1.46%	1.47%
CFI	-0.05%	0.15%	2.13%	-0.55%	-1.52%	1.62%
OBS	-1.01%	-0.83%	1.13%	-1.52%	-2.17%	1.28%
OSG	-5.57%	-6.50%	-4.66%	-7.15%	-4.52%	-3.03%
DWE	0.54%	1.13%	*n/a**	0.43%	*n/a***	*n/a***

*Note: * Sector DWE does not demand for skilled labour in the benchmark year, thus the CES production function for this sector treat this factor demand as non-existing ; **Output from Sector DWE is non-traded.*

Table 21: Percentage Changes for Sectoral Indicators in Japan under JTEPA

Sector	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import
AGR	-0.35%	-0.42%	-0.43%	-0.44%	0.80%	-0.77%
NRS	0.03%	0.05%	0.05%	0.04%	0.10%	0.25%
OIL	-0.02%	-0.03%	-0.03%	-0.04%	-0.12%	0.14%
PAGR	-1.34%	-1.45%	-1.46%	-1.50%	0.58%	19.55%
OFD	0.12%	0.15%	0.14%	0.08%	4.92%	0.64%
MNF	0.14%	0.13%	0.13%	0.08%	0.89%	0.05%
TEX	0.50%	0.45%	0.45%	0.40%	1.18%	-0.03%
WAP	0.11%	0.14%	0.13%	0.06%	1.18%	0.21%
CRP	0.34%	0.31%	0.31%	0.26%	1.02%	-0.27%
I_S	0.45%	0.38%	0.38%	0.34%	1.29%	0.00%
NFM	0.43%	0.40%	0.40%	0.36%	0.92%	0.10%
MVH	1.10%	0.90%	0.90%	0.84%	1.81%	-0.15%
ELE	0.21%	0.19%	0.19%	0.15%	0.25%	0.05%
OME	0.54%	0.51%	0.51%	0.46%	0.80%	0.02%
OMF	0.13%	0.11%	0.11%	0.06%	0.41%	0.04%
MSR	0.06%	0.07%	0.07%	0.01%	-0.02%	0.10%
TRD	0.05%	0.08%	0.07%	-0.03%	-0.02%	0.09%
TRP	0.03%	0.05%	0.04%	-0.03%	-0.23%	0.11%
CFI	0.02%	0.05%	0.04%	-0.02%	-0.09%	0.12%
OBS	0.07%	0.09%	0.08%	0.02%	-0.03%	0.12%
OSG	0.01%	0.01%	0.01%	-0.05%	-0.08%	0.07%
DWE	-0.08%	0.00%	*n/a**	-0.08%	*n/a***	*n/a***

*Note: * Sector DWE does not demand for skilled labour in the benchmark year, thus the CES production function for this sector treat this factor demand as non-existing ; **Output from Sector DWE is non-traded.*

Table 22: Percentage Changes for Various Regional Indicators under ASEAN+CHINA

Region	Real GDP	Private demand	Invest-ment demand	Public demand	Regional import	Regional export	Terms of trade	Real exchange rate
								FTA members
THA	0.82%	1.79%	4.06%	-12.35%	5.15%	3.77%	1.62%	-1.44%
CHN	0.26%	0.50%	0.65%	-2.13%	1.90%	1.68%	0.88%	-0.08%
NASN	1.76%	2.05%	5.47%	-6.23%	3.12%	2.28%	0.24%	-1.93%
SASN	0.66%	0.75%	2.31%	-5.89%	4.43%	3.95%	1.81%	0.24%
								Non-members
AUS	-0.01%	-0.03%	-0.02%	0.01%	-0.03%	-0.04%	-0.04%	-0.23%
NZL	-0.04%	-0.02%	-0.04%	0.00%	-0.36%	-0.24%	-0.01%	0.00%
IND	-0.02%	-0.02%	-0.02%	-0.08%	-0.16%	-0.09%	-0.01%	-0.24%
JPN	-0.02%	-0.02%	-0.02%	-0.07%	-0.15%	-0.05%	0.00%	-0.17%
KOR	-0.08%	-0.10%	-0.12%	-0.38%	-0.23%	-0.11%	-0.01%	-0.10%
Others	-0.02%	-0.01%	-0.02%	-0.05%	-0.05%	-0.06%	-0.02%	-0.25%

Table 23: Percentage Changes for Various Sectoral Indicators in Thailand under ASEAN+CHINA

Sector	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import
AGR	1.31%	2.81%	3.36%	2.43%	11.53%	11.39%
NRS	-0.31%	-0.22%	0.23%	-0.53%	0.26%	5.17%
OIL	-0.58%	-1.01%	-0.57%	-1.32%	-1.00%	0.68%
PAGR	-2.43%	-1.27%	1.20%	-2.99%	-1.72%	43.31%
OFD	-3.49%	-2.26%	0.19%	-3.96%	-2.55%	10.05%
MNF	0.59%	1.98%	4.86%	-0.01%	2.01%	6.60%
TEX	-1.08%	0.10%	2.93%	-1.85%	1.34%	12.28%
WAP	0.17%	1.22%	4.08%	-0.75%	-0.81%	35.71%
CRP	18.10%	19.57%	22.94%	17.23%	24.94%	4.70%
I_S	2.69%	3.94%	6.87%	1.91%	5.71%	2.84%
NFM	2.91%	4.14%	7.08%	2.11%	3.33%	0.92%
MVH	2.12%	3.39%	6.31%	1.37%	6.11%	7.02%
ELE	4.24%	5.76%	8.75%	3.70%	4.62%	4.82%
OME	4.17%	5.51%	8.49%	3.45%	4.87%	5.25%
OMF	-3.71%	-2.53%	0.23%	-4.43%	-4.45%	5.45%
MSR	1.57%	3.03%	6.18%	0.86%	-1.31%	3.59%
TRD	0.41%	2.60%	6.48%	-0.06%	-3.03%	3.93%
TRP	-0.97%	0.67%	4.48%	-1.94%	-5.02%	2.44%
CFI	-0.43%	0.52%	3.35%	-1.45%	-2.77%	2.45%
OBS	-2.23%	-1.33%	1.46%	-3.25%	-3.42%	0.72%
OSG	-11.14%	-12.29%	-9.82%	-14.00%	-8.63%	-6.72%
DWE	-0.78%	0.87%	*n/a**	-1.09%	*n/a***	*n/a***

*Note: * Sector DWE does not demand for skilled labour in the benchmark year, thus the CES production function for this sector treat this factor demand as non-existing ; **Output from Sector DWE is non-traded*

Table 24: Percentage Changes for Various Sectoral Indicators in North and South ASEAN (Excluding Thailand) under ASEAN+CHINA

Sector	NASN						SASN					
	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import
AGR	-0.26%	-0.53%	-0.21%	-0.57%	-0.43%	20.35%	0.06%	0.14%	0.37%	-0.11%	5.11%	1.62%
NRS	-0.54%	-0.79%	-0.56%	-0.81%	-3.88%	8.88%	0.12%	0.32%	0.52%	0.11%	-0.20%	5.58%
OIL	-0.82%	-1.30%	-1.09%	-1.33%	-1.83%	3.12%	-0.27%	-0.22%	-0.03%	-0.43%	-0.06%	-0.04%
PAGR	33.63%	30.10%	31.93%	29.87%	51.35%	20.03%	-2.05%	-1.19%	-0.11%	-2.35%	6.92%	57.02%
OFD	7.88%	6.32%	7.65%	6.16%	9.67%	6.01%	1.55%	2.35%	3.48%	1.16%	5.15%	3.41%
MNF	2.01%	0.50%	1.23%	0.41%	2.56%	4.13%	-0.34%	0.48%	1.72%	-0.84%	1.91%	8.08%
TEX	25.73%	20.99%	21.61%	20.91%	28.22%	6.55%	2.62%	3.51%	4.79%	2.14%	5.69%	5.08%
WAP	11.46%	8.34%	9.25%	8.22%	12.01%	5.18%	2.82%	3.53%	4.81%	2.17%	3.50%	10.07%
CRP	10.96%	9.27%	10.34%	9.14%	12.92%	2.94%	5.28%	6.12%	7.43%	4.72%	12.82%	2.02%
I_S	6.70%	3.98%	4.37%	3.92%	7.43%	5.86%	2.05%	3.02%	4.29%	1.67%	4.70%	2.00%
NFM	3.00%	0.94%	1.32%	0.89%	3.09%	3.90%	2.60%	3.46%	4.74%	2.10%	2.64%	3.54%
MVH	4.27%	2.77%	3.79%	2.65%	8.55%	2.82%	2.13%	2.93%	4.20%	1.58%	19.21%	3.19%
ELE	-2.45%	-4.05%	-3.42%	-4.13%	-2.43%	0.17%	4.57%	5.55%	6.86%	4.16%	4.65%	2.72%
OME	18.18%	15.29%	16.07%	15.19%	19.51%	4.34%	7.45%	8.23%	9.57%	6.81%	9.21%	3.17%
OMF	2.58%	0.69%	1.40%	0.60%	2.97%	4.00%	0.20%	1.05%	2.30%	-0.28%	1.24%	5.37%
MSR	2.49%	1.68%	2.88%	1.54%	-0.63%	4.26%	1.50%	2.31%	3.67%	0.85%	1.26%	0.85%
TRD	-0.08%	-0.52%	1.12%	-0.71%	-3.53%	4.94%	0.53%	1.85%	3.53%	0.07%	-0.19%	0.87%
TRP	-2.30%	-2.83%	-1.34%	-3.01%	-8.91%	3.09%	0.53%	1.73%	3.40%	-0.06%	0.46%	0.28%
CFI	-0.04%	-0.45%	0.71%	-0.59%	-3.79%	4.65%	-0.17%	0.48%	1.72%	-0.84%	-0.10%	-0.14%
OBS	-5.75%	-6.10%	-4.97%	-6.23%	-7.35%	2.69%	-0.00%	0.75%	1.99%	-0.58%	-0.01%	-0.21%
OSG	-3.23%	-4.11%	-2.93%	-4.25%	-4.82%	0.49%	-4.53%	-5.03%	-3.85%	-6.28%	-2.60%	-3.64%
DWE	-1.10%	-1.01%	*n/a**	-1.18%	*n/a***	*n/a***	-1.14%	-0.05%	*n/a**	-1.36%	*n/a***	*n/a***

*Note: * Sector DWE does not demand for skilled labour in the benchmark year, thus the CES production function for this sector treat this factor demand as non-existing ; **Output from Sector DWE is non-traded.*

Table 25: Percentage Changes for Various Sectoral Indicators in China under ASEAN+CHINA

Sector	Output	Unskilled labour demand	Skilled labour demand	Capital demand	Export	Import
AGR	0.12%	0.19%	0.25%	0.11%	1.22%	1.70%
NRS	0.16%	0.24%	0.29%	0.18%	0.52%	0.55%
OIL	0.24%	0.26%	0.29%	0.20%	-0.36%	1.01%
PAGR	0.29%	0.51%	0.79%	0.14%	9.78%	8.88%
OFD	0.17%	0.35%	0.62%	-0.03%	1.07%	1.48%
MNF	0.47%	0.63%	0.94%	0.21%	1.72%	1.27%
TEX	1.03%	1.22%	1.53%	0.80%	3.46%	2.53%
WAP	1.36%	1.48%	1.80%	1.06%	2.39%	9.16%
CRP	-0.99%	-0.80%	-0.50%	-1.22%	0.52%	4.68%
I_S	0.48%	0.61%	0.92%	0.19%	1.68%	0.46%
NFM	0.50%	0.65%	0.96%	0.23%	1.37%	0.68%
MVH	0.55%	0.25%	0.35%	0.12%	2.49%	0.27%
ELE	2.81%	3.02%	3.33%	2.59%	3.68%	1.79%
OME	0.41%	0.59%	0.90%	0.17%	1.42%	1.98%
OMF	0.50%	0.77%	1.08%	0.35%	0.73%	1.10%
MSR	0.36%	0.50%	0.83%	0.04%	0.41%	0.16%
TRD	0.22%	0.42%	0.83%	-0.14%	0.30%	0.06%
TRP	0.12%	0.37%	0.78%	-0.19%	-0.08%	0.08%
CFI	0.09%	0.26%	0.56%	-0.16%	0.12%	-0.02%
OBS	-0.07%	0.11%	0.42%	-0.31%	0.07%	-0.32%
OSG	-1.71%	-1.80%	-1.50%	-2.21%	-1.09%	-1.32%
DWE	-0.13%	0.23%	*n/a**	-0.19%	*n/a***	*n/a***

*Note: * Sector DWE does not demand for skilled labour in the benchmark year, thus the CES production function for this sector treat this factor demand as non-existing ; **Output from Sector DWE is non-traded.*

Table 26: Percentage Changes for Various Regional Indicators under THAILAND+INDIA

Region	Real GDP	Private demand	Invest-ment demand	Public demand	Regional import	Regional export	Terms of trade
							FTA members
THA	0.15%	0.43%	0.65%	-1.27%	0.81%	0.52%	0.20%
IND	0.03%	0.01%	0.11%	-0.31%	0.59%	0.82%	0.42%
							Non-members
Others	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 27: Percentage Changes for Various Sectoral Indicators in Member Countries under THAILAND+INDIA

Sector	Thailand			India		
	Output	Export	Import	Output	Export	Import
AGR	0.16%	0.32%	0.76%	0.03%	-0.15%	1.04%
NRS	-0.08%	0.14%	2.79%	0.03%	0.90%	0.36%
OIL	-0.09%	-0.15%	0.08%	-0.05%	-0.37%	0.06%
PAGR	0.17%	0.52%	1.28%	0.05%	0.16%	1.19%
OFD	-0.32%	1.13%	8.77%	4.07%	16.84%	1.59%
MNF	0.07%	0.20%	0.92%	0.03%	0.49%	0.59%
TEX	0.15%	0.89%	1.35%	-0.11%	-0.14%	3.14%
WAP	-0.12%	-0.05%	21.15%	0.10%	0.15%	3.24%
CRP	1.17%	1.71%	0.60%	-0.03%	1.14%	0.97%
I_S	0.63%	1.97%	0.72%	0.15%	2.67%	0.76%
NFM	10.41%	10.86%	0.75%	-0.15%	1.72%	0.33%
MVH	0.89%	2.40%	0.44%	0.02%	1.69%	3.74%
ELE	0.01%	0.02%	0.24%	-0.18%	0.67%	1.32%
OME	0.87%	0.92%	0.66%	0.01%	0.60%	0.72%
OMF	0.25%	0.38%	0.55%	-0.32%	-0.40%	0.32%
MSR	0.33%	-0.01%	0.47%	-0.01%	-0.46%	0.13%
TRD	0.04%	-0.42%	0.51%	0.04%	-0.49%	0.19%
TRP	-0.17%	-0.61%	0.29%	0.05%	-0.35%	0.16%
CFI	0.04%	-0.14%	0.21%	-0.03%	-0.46%	0.14%
OBS	-0.21%	-0.36%	0.12%	-0.20%	-0.44%	0.12%
OSG	-1.14%	-0.86%	-0.68%	-0.24%	-0.38%	-0.03%
DWE	-0.12%	*n/a***	*n/a***	-0.03%	*n/a***	*n/a***

*Note: **Output from Sector DWE is non-traded.*

Table 28: Sensitivity of EV Results under ASEAN+5 to the Elasticity of Substitution between Final Demands of Household, Government, and Bank (Benchmark Value: σDreg = 1.43)

Region	Benchmark values		Double benchmark values		Triple benchmark values	
	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)
THA	1,809.03	1.86%	1,864.07	1.92%	1,974.82	2.03%
IND	3,686.81	1.04%	4,561.90	1.29%	5,563.19	1.57%
JPN	139.23	0.30%	144.05	0.31%	158.03	0.34%
CHN	-194.22	-0.04%	3,486.55	0.73%	2,316.95	0.49%
NASN	25,486.44	0.62%	32,918.76	0.81%	42,477.69	1.04%
SASN	4,182.72	0.34%	5,615.56	0.46%	6,950.54	0.57%
AUS	2,325.61	1.82%	2,091.09	1.63%	1,772.31	1.38%
NZL	1,598.73	0.50%	1,781.85	0.56%	2,039.64	0.64%
KOR	-1,831.36	-0.46%	-1,656.67	-0.42%	-1,552.22	-0.39%
USA	-1,263.11	-0.01%	-831.75	-0.01%	96.03	0.00%
CAN	13.62	0.00%	50.95	0.01%	120.74	0.02%
MEX	-60.20	-0.01%	-79.68	-0.01%	-82.11	-0.01%
UK	-560.91	-0.04%	-566.17	-0.04%	-486.43	-0.03%
XEUR	-7,392.31	-0.10%	-8,280.77	-0.11%	-8,843.64	-0.12%
ROW	-1,352.45	-0.04%	-839.20	-0.03%	-20.38	-0.00%
World	26,587.60	0.09%	40,260.56	0.13%	52,485.16	0.17%

Table 29: Sensitivity of EV Results under ASEAN+5 to the Transformation Elasticity between Products Supplied to Different Market Destinations (Benchmark Values: σT = -2; σBE = -2)

Region	Benchmark values		Double benchmark values		Triple benchmark values	
	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)
THA	1,809.03	1.86%	2,364.71	2.43%	2,648.86	2.72%
IND	3,686.81	1.04%	3,827.07	1.08%	3,849.43	1.09%
JPN	139.23	0.30%	170.01	0.36%	179.61	0.38%
CHN	-194.22	-0.04%	-268.10	-0.06%	-364.10	-0.08%
NASN	25,486.44	0.62%	30,478.39	0.75%	33,153.13	0.81%
SASN	4,182.72	0.34%	3,705.20	0.30%	3,364.26	0.27%
AUS	2,325.61	1.82%	3,248.77	2.54%	3,671.97	2.87%
NZL	1,598.73	0.50%	1,526.40	0.48%	1,480.47	0.47%
KOR	-1,831.36	-0.46%	-2,258.31	-0.57%	-2,436.31	-0.62%
USA	-1,263.11	-0.01%	-1,891.59	-0.02%	-2,166.14	-0.02%
CAN	13.62	0.00%	10.68	0.00%	15.74	0.00%
MEX	-60.20	-0.01%	-49.52	-0.01%	-44.46	-0.01%
UK	-560.91	-0.04%	-817.39	-0.06%	-938.05	-0.06%
XEUR	-7,392.31	-0.10%	-10,047.91	-0.13%	-11,356.83	-0.15%
ROW	-1,352.45	-0.04%	-1,874.56	-0.06%	-2,051.60	-0.06%
World	26,587.60	0.09%	28,123.84	0.09%	29,005.98	0.09%

Table 30: Sensitivity of EV Results under ASEAN+5 to the Symmetry of Firm Population in Each Sector across Regions (Benchmark: Asymmetric Number (#) of Firms)

Region	Benchmark: asymmetric # of firms		Symmetric # of firms = 27	
	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)
THA	1,809.03	1.86%	1,807.18	1.86%
IND	3,686.81	1.04%	3,762.76	1.06%
JPN	139.23	0.30%	128.96	0.28%
CHN	-194.22	-0.04%	974.06	0.20%
NASN	25,486.44	0.62%	25,516.46	0.63%
SASN	4,182.72	0.34%	4,176.78	0.34%
AUS	2,325.61	1.82%	2,072.39	1.62%
NZL	1,598.73	0.50%	1,586.77	0.50%
KOR	-1,831.36	-0.46%	-1,819.51	-0.46%
USA	-1,263.11	-0.01%	-1,230.48	-0.01%
CAN	13.62	0.00%	12.81	0.00%
MEX	-60.20	-0.01%	-53.47	-0.01%
UK	-560.91	-0.04%	-576.49	-0.04%
XEUR	-7,392.31	-0.10%	-7,605.06	-0.10%
ROW	-1,352.45	-0.04%	-1,446.38	-0.05%
World	26,587.60	0.09%	27,306.78	0.09%

Table 31: Sensitivity of EV Results under ASEAN+5 to the Specification of Commodity Market Structure (Benchmark: Asymmetric Market Structure)

Region	Benchmark: asymmetric market structure		Perfect competition		Monopolistic competition		Cournot oligopoly	
	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)
THA	1,809.03	1.86%	1,475.95	1.52%	2,153.01	2.21%	3,489.39	3.59%
IND	3,686.81	1.04%	3,101.03	0.88%	3,346.11	0.95%	3,194.24	0.90%
JPN	139.23	0.30%	213.05	0.45%	254.14	0.54%	214.68	0.46%
CHN	-194.22	-0.04%	-48.77	-0.01%	1,363.89	0.29%	383.33	0.08%
NASN	25,486.44	0.62%	19,157.57	0.47%	24,874.52	0.61%	34,722.18	0.85%
SASN	4,182.72	0.34%	3,791.64	0.31%	11,838.65	0.97%	2,218.66	0.18%
AUS	2,325.61	1.82%	2,313.08	1.81%	4,287.37	3.35%	3,407.42	2.66%
NZL	1,598.73	0.50%	1,049.41	0.33%	2,236.29	0.71%	1,214.21	0.38%
KOR	-1,831.36	-0.46%	-1,561.18	-0.39%	-1,958.14	-0.50%	-2,356.36	-0.60%
USA	-1,263.11	-0.01%	-1,073.39	-0.01%	-1,072.61	-0.01%	-1,958.94	-0.02%
CAN	13.62	0.00%	20.41	0.00%	-1.02	-0.00%	25.09	0.00%
MEX	-60.20	-0.01%	-38.65	-0.01%	-51.92	-0.01%	17.56	0.00%
UK	-560.91	-0.04%	-523.49	-0.04%	-679.33	-0.05%	-899.40	-0.06%
XEUR	-7,392.31	-0.10%	-4,623.15	-0.06%	-8,153.55	-0.11%	-7,468.78	-0.10%
ROW	-1,352.45	-0.04%	-1,794.85	-0.06%	-2,037.75	-0.06%	-2,799.47	-0.09%
World	26,587.60	0.09%	21,458.66	0.07%	36,399.66	0.12%	33,403.81	0.11%

Table 32: Sensitivity of EV Results under ASEAN+5 to the Specification of Labour Market Structure (Benchmark: Asymmetric Labour Market Structure)

Region	Benchmark: asymmetric labour market structure		The flexible wage approach		The minimum wage approach		The wage curve approach	
	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)	EV (million US$)	EV (% of 2001 income)
THA	1,809.03	1.86%	1,678.59	1.73%	2,170.00	2.23%	1,819.72	1.87%
IND	3,686.81	1.04%	3,661.67	1.03%	11,231.46	3.17%	5,516.83	1.56%
JPN	139.23	0.30%	137.30	0.29%	497.61	1.06%	240.62	0.51%
CHN	-194.22	-0.04%	-995.96	-0.21%	674.13	0.14%	-194.78	-0.04%
NASN	25,486.44	0.62%	12,448.67	0.31%	77,729.95	1.90%	25,526.54	0.63%
SASN	4,182.72	0.34%	491.95	0.04%	11,586.69	0.95%	4,234.80	0.35%
AUS	2,325.61	1.82%	2,296.94	1.79%	5,599.32	4.37%	3,357.14	2.62%
NZL	1,598.73	0.50%	1,283.69	0.40%	2,320.03	0.73%	1,628.44	0.51%
KOR	-1,831.36	-0.46%	-1,267.20	-0.32%	-3,011.99	-0.76%	-1,826.22	-0.46%
USA	-1,263.11	-0.01%	-1,340.24	-0.01%	-3,362.91	-0.03%	-1,941.69	-0.02%
CAN	13.62	0.00%	1.98	0.00%	-8.31	-0.00%	-2.49	-0.00%
MEX	-60.20	-0.01%	-45.12	-0.01%	-91.13	-0.02%	-57.11	-0.01%
UK	-560.91	-0.04%	-191.17	-0.01%	-925.52	-0.06%	-361.14	-0.02%
XEUR	-7,392.31	-0.10%	-1,935.47	-0.03%	-7,110.83	-0.09%	-3,463.70	-0.05%
ROW	-1,352.45	-0.04%	-812.81	-0.03%	-1,753.65	-0.06%	-1,216.34	-0.04%
World	26,587.60	0.09%	15,412.81	0.05%	95,544.86	0.31%	33,260.62	0.11%

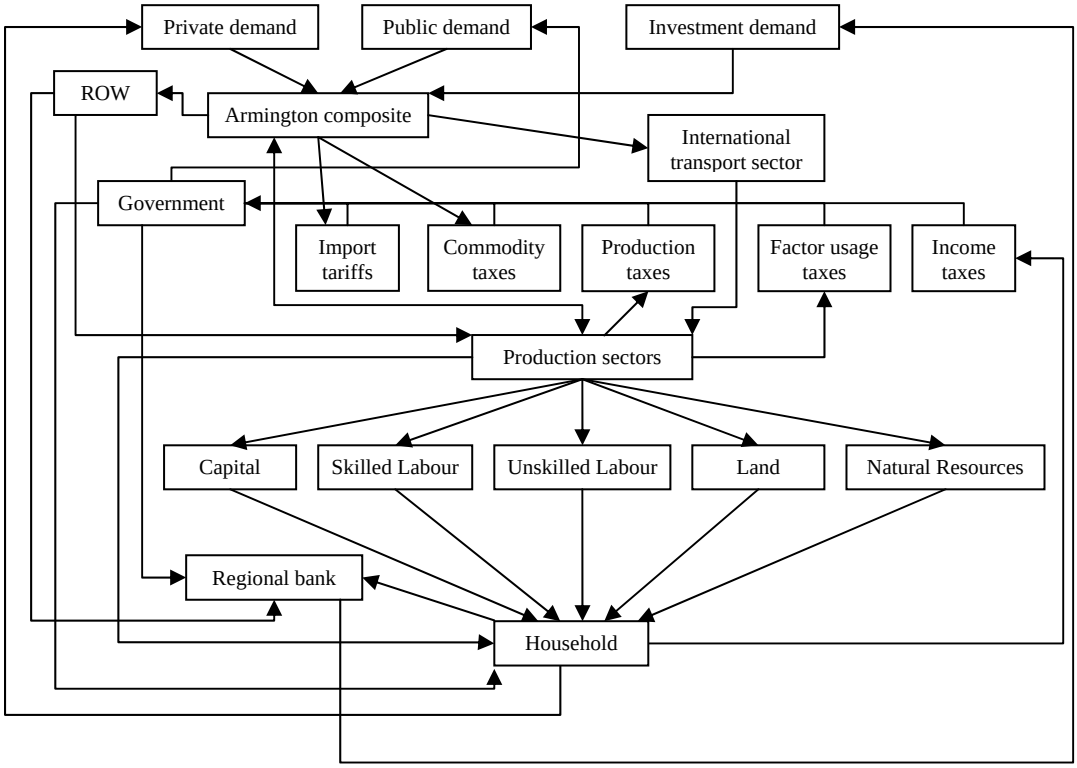


Figure 1: Flow of payments in the model

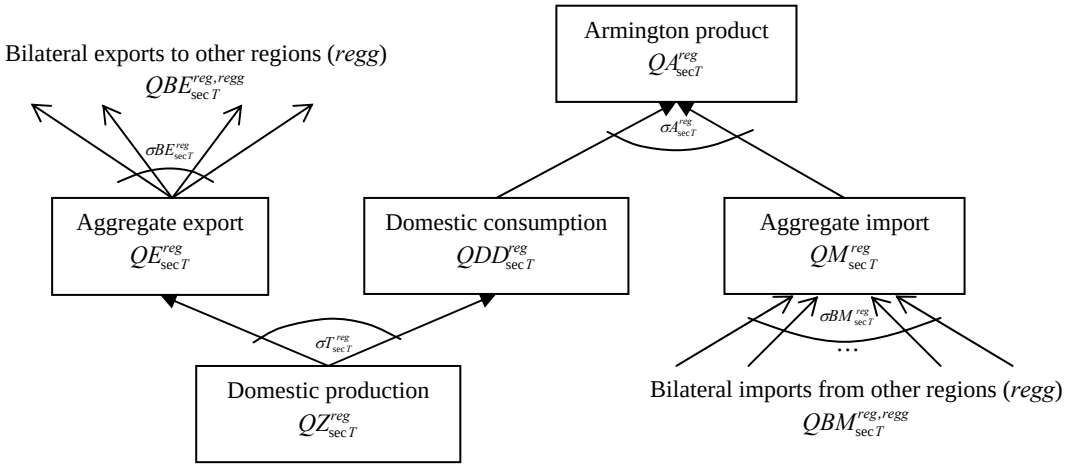


Figure 2: CET distribution and Armington aggregation in region *reg*'s tradable sectors

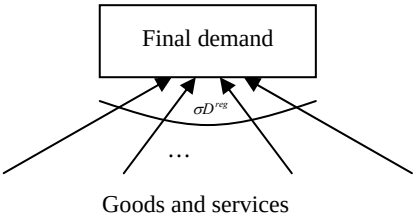


Figure 3: Final demand aggregation for household, government, and bank

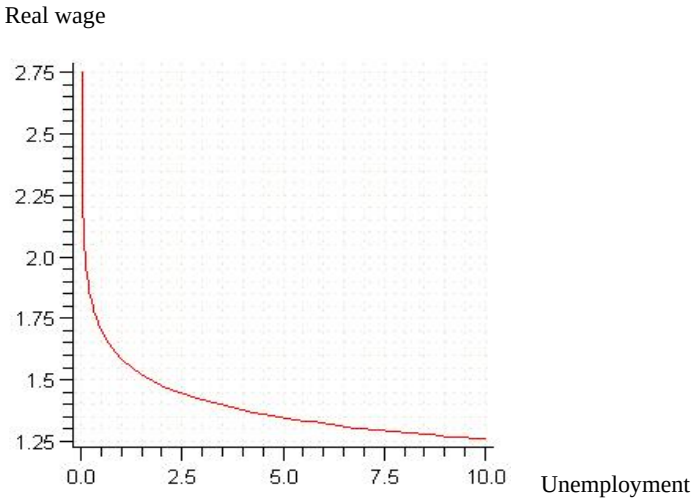
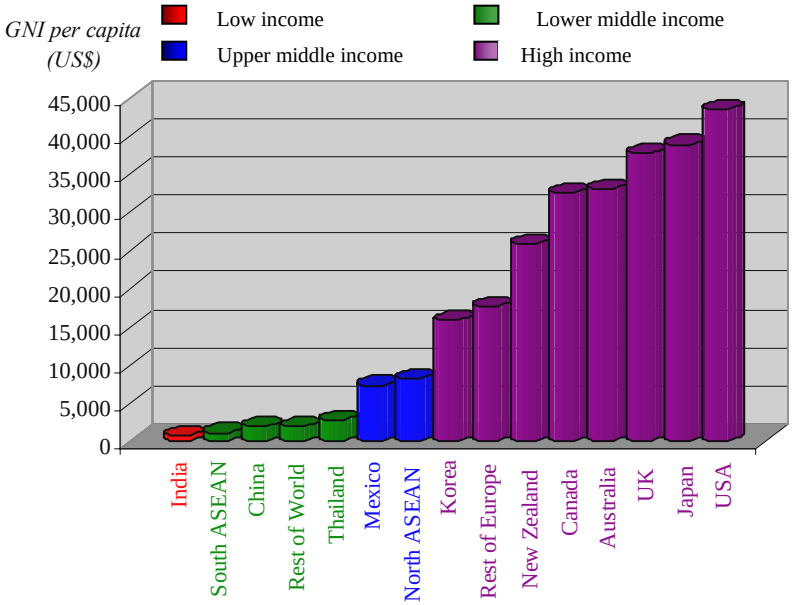


Figure 4: Wage curve relationship between real wage and unemployment

Figure 5: Gross National Income (GNI) per Capita and Income Category by Region



Source: Compiled by author from World Development Indicators, World Bank (2007). Note: The compilation of GNI per capita is based on the Atlas Method; and income categorisation is consistent with the definition by World Bank.

Figure 6: Percentage Changes in Nominal GDP after the FTA with Australia and New Zealand

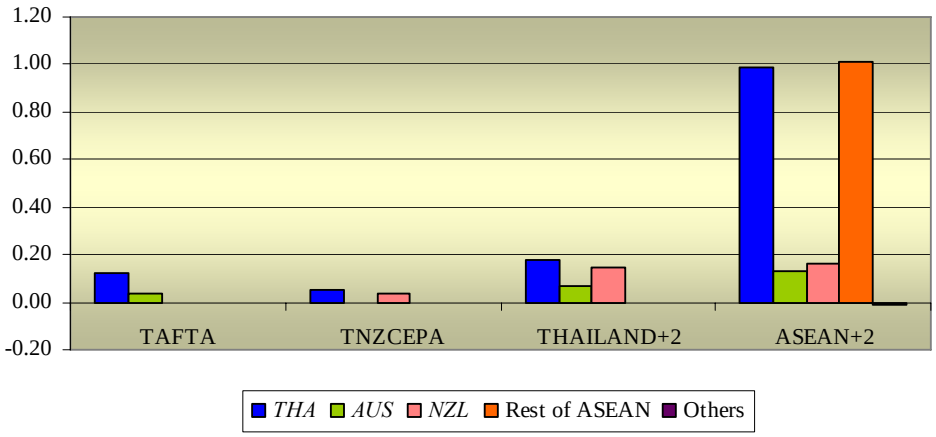


Figure 7: Percentage Changes in Number of Firms and Output per Firm of Imperfectly Competitive Sectors in Australia under TAFTA

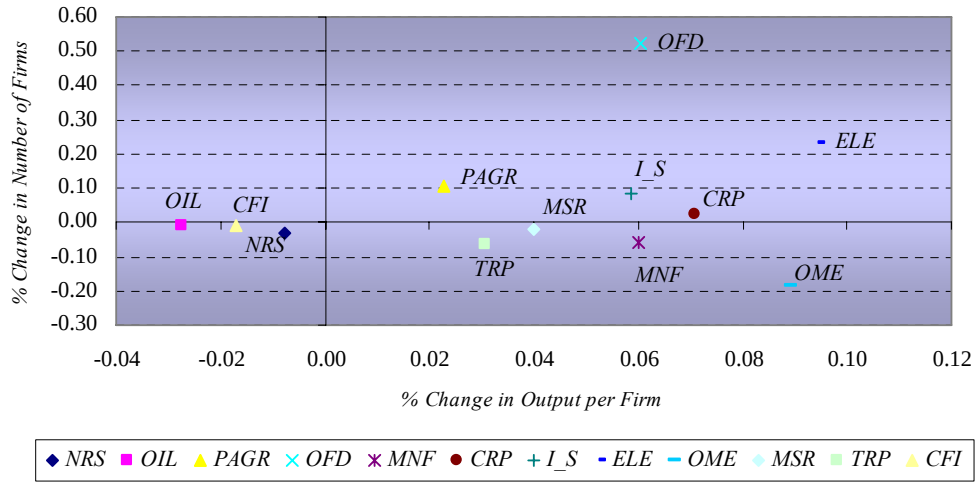


Figure 8: Percentage Changes in Number of Firms and Output per Firm of Imperfectly Competitive Sectors in New Zealand under TNZCEPA

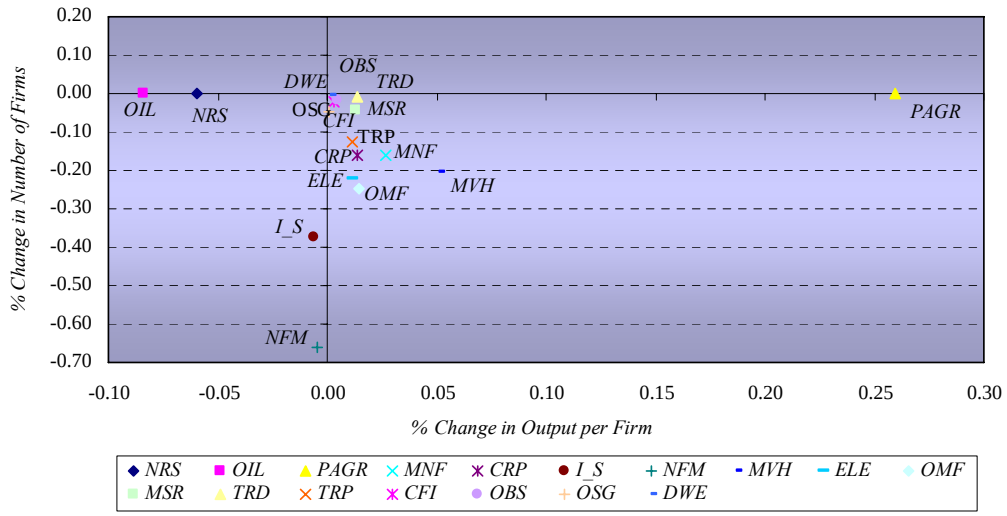


Figure 9: Percentage Changes in Number of Firms and Output per Firm of Imperfectly Competitive Sectors in Australia under THAILAND+2

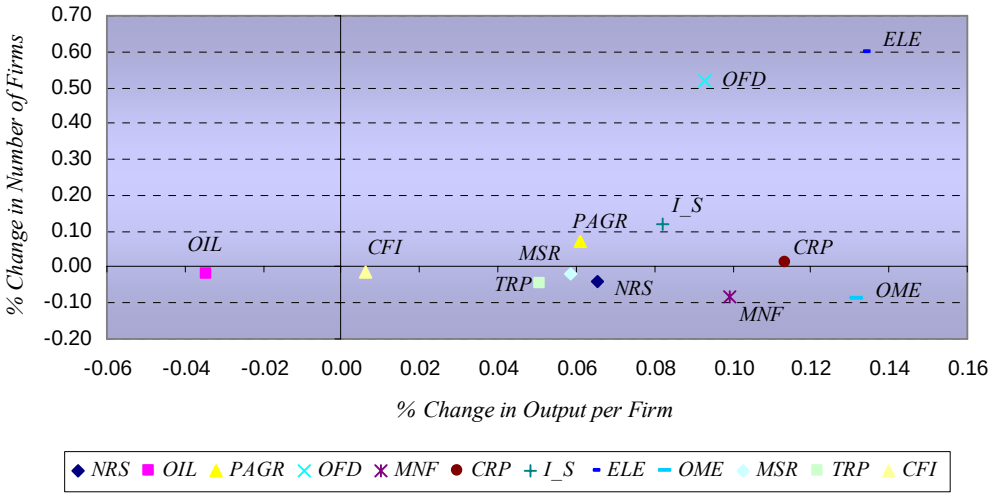


Figure 10: Percentage Changes in Number of Firms and Output per Firm of Imperfectly Competitive Sectors in New Zealand under THAILAND+2

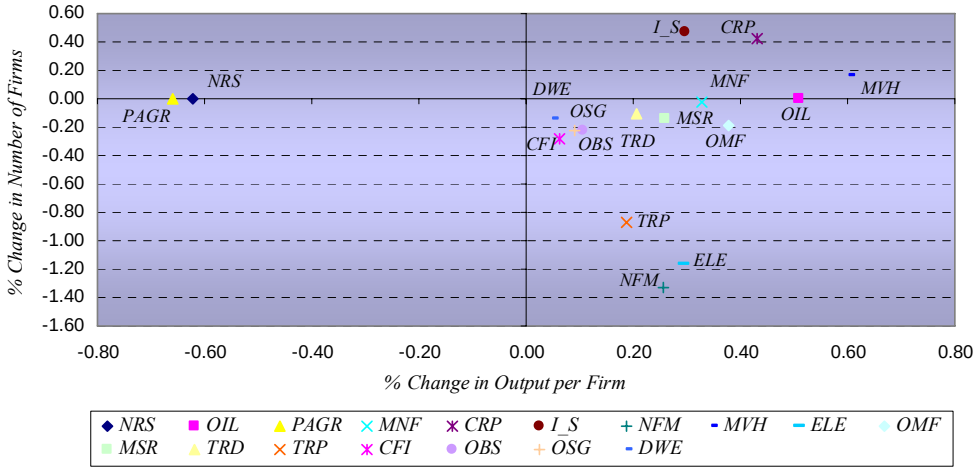


Figure 11: Percentage Changes in Nominal GDP after the FTA with Japan, China, and India

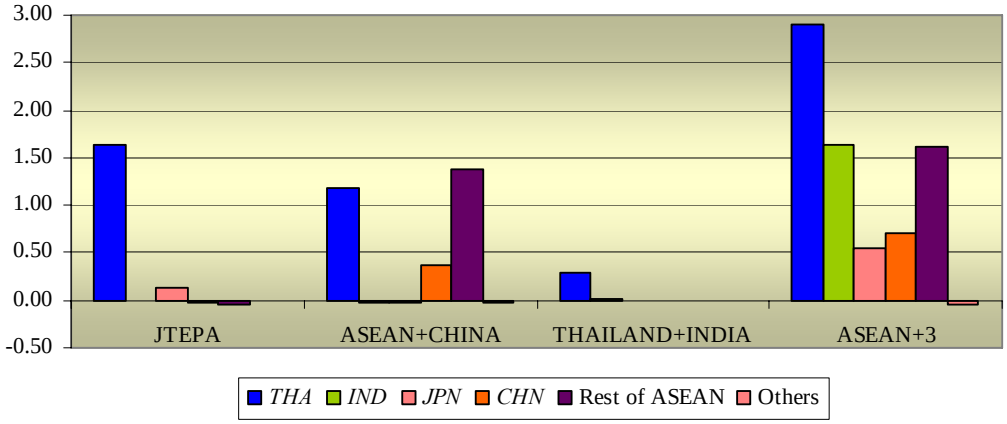


Figure 12: Percentage Changes in Number of Firms and Output per Firm of Imperfectly Competitive Sectors in Japan under JTEPA

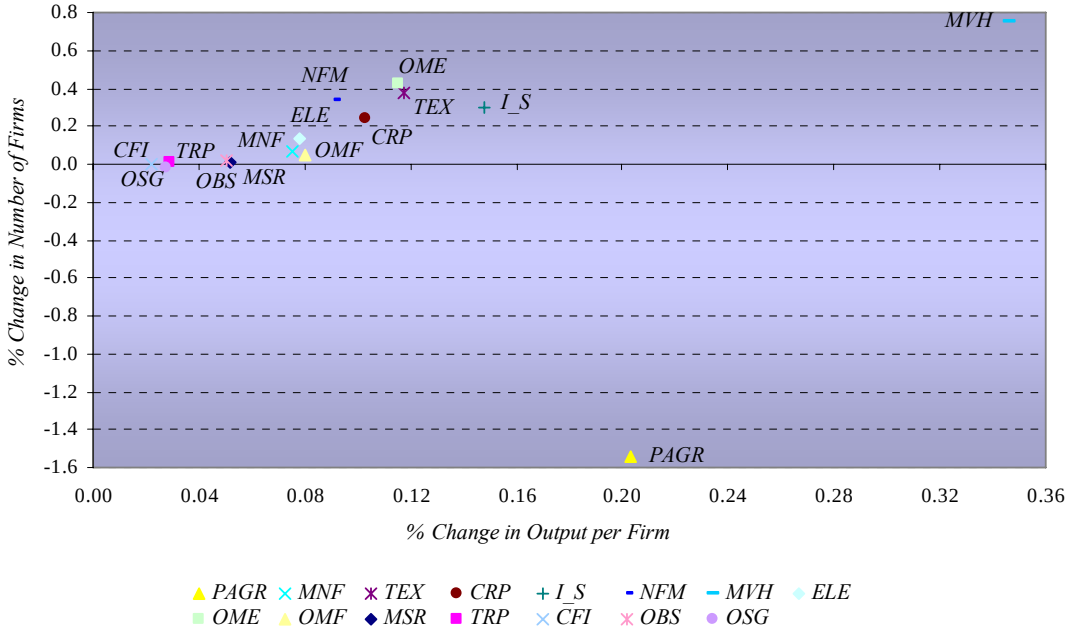


Figure 13: Percentage Changes in Number of Firms and Output per Firm of Imperfectly Competitive Sectors in North ASEAN under ASEAN+CHINA FTA

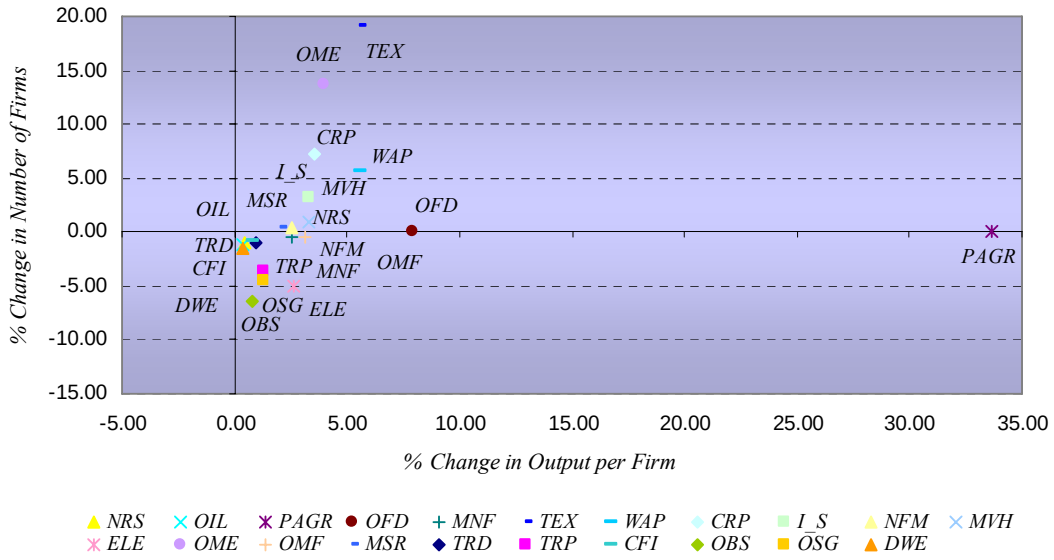


Figure 14: Percentage Changes in Number of Firms and Output per Firm of Imperfectly Competitive Sectors in India under THAILAND+INDIA FTA

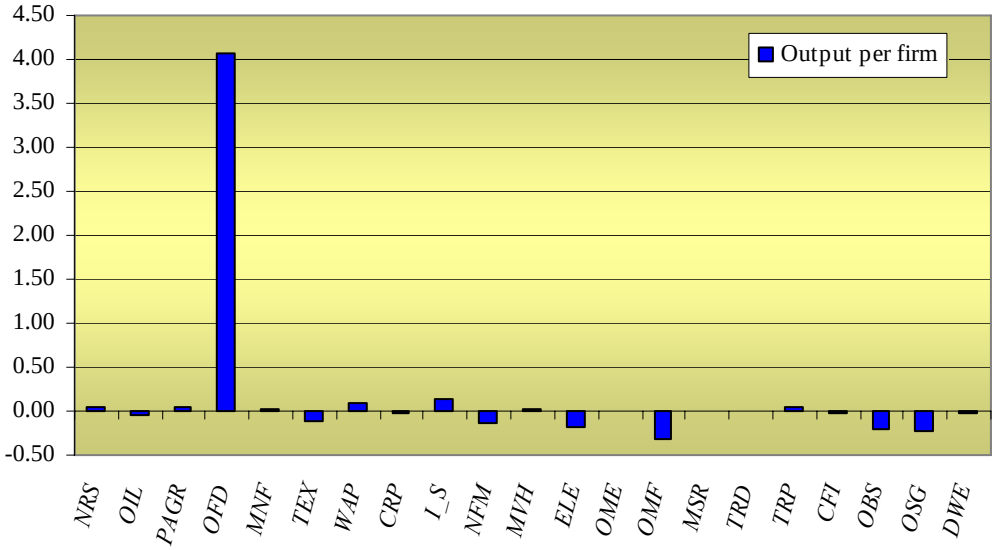


Figure 15: Real GDP growth under various FTA scenarios: THAILAND

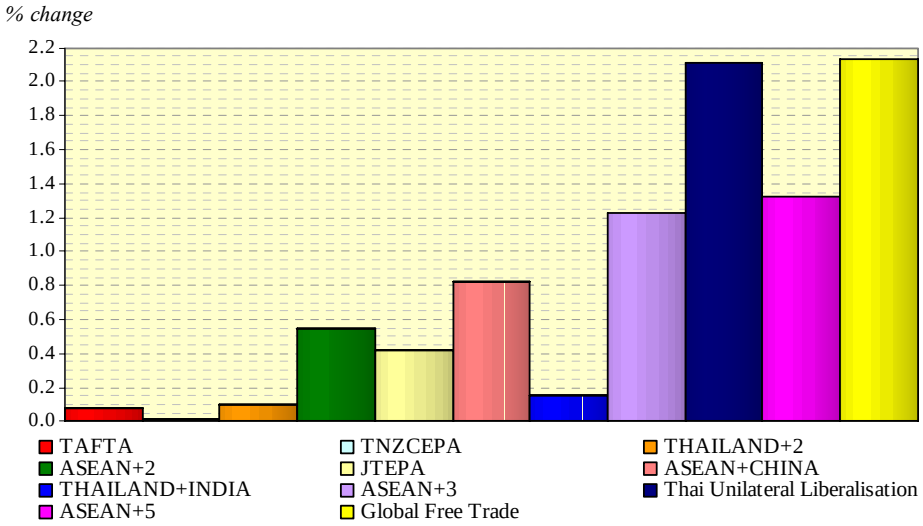


Figure 16: Real GDP growth under various FTA scenarios: AUSTRALIA

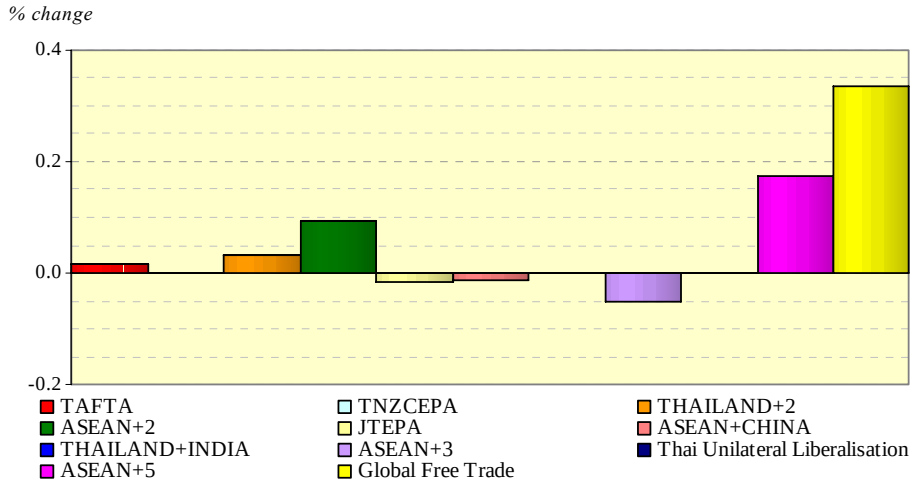


Figure 17: Real GDP growth under various FTA scenarios: NEW ZEALAND

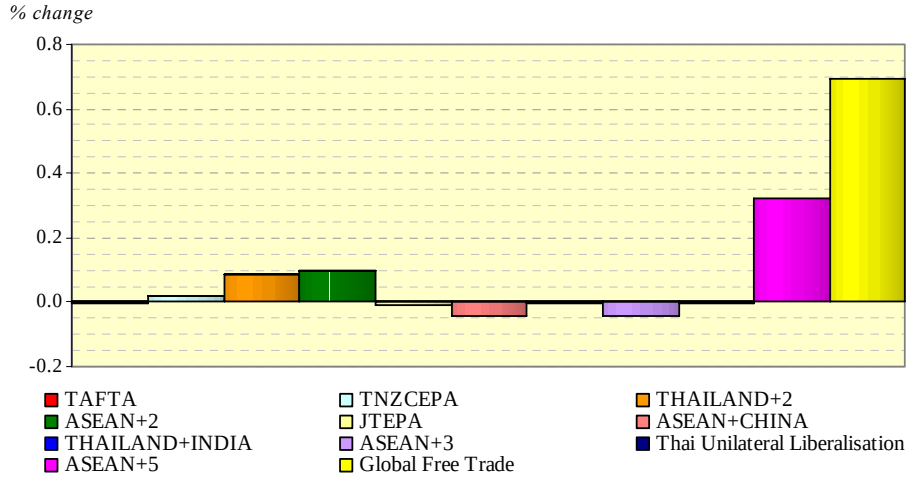


Figure 18: Real GDP growth under various FTA scenarios: INDIA

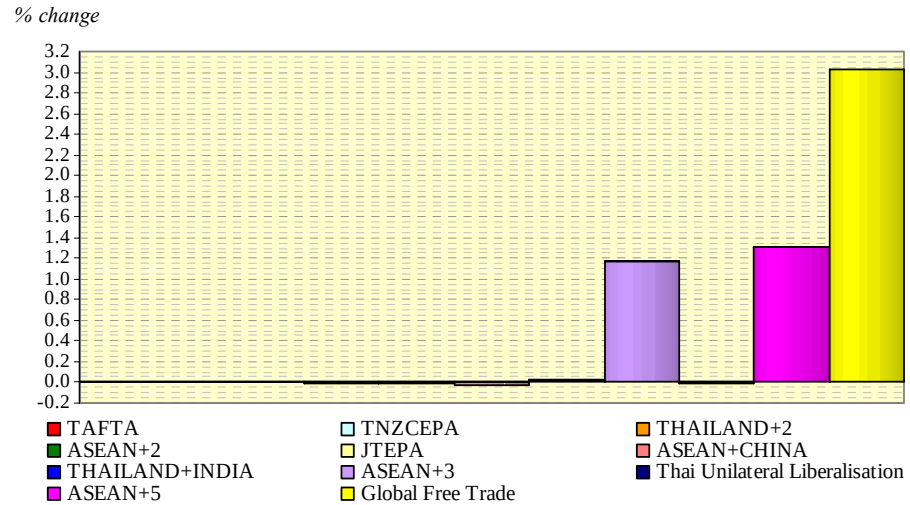


Figure 19: Real GDP growth under various FTA scenarios: JAPAN

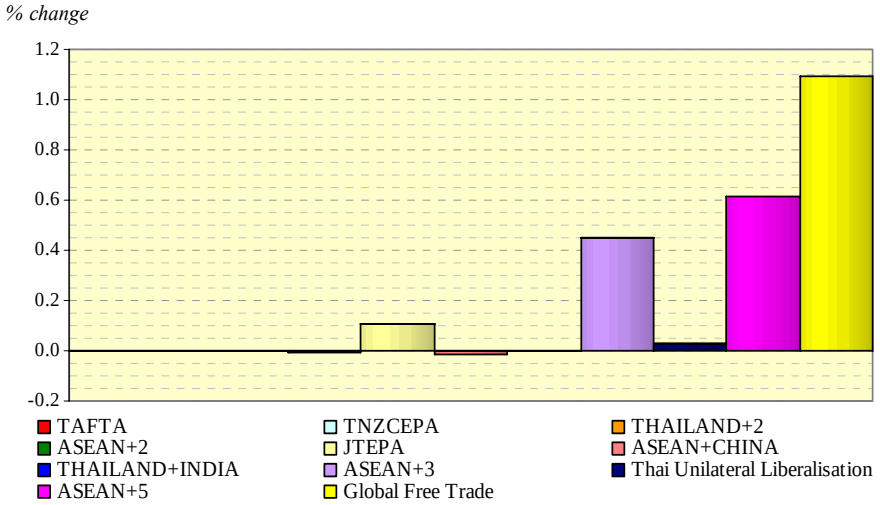


Figure 20: Real GDP growth under various FTA scenarios: CHINA

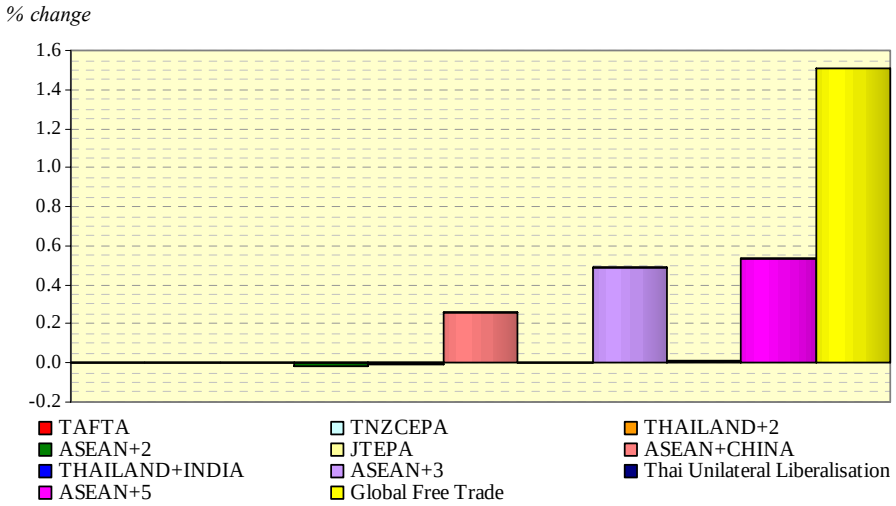


Figure 21: Real GDP growth under various FTA scenarios: NORTH ASEAN

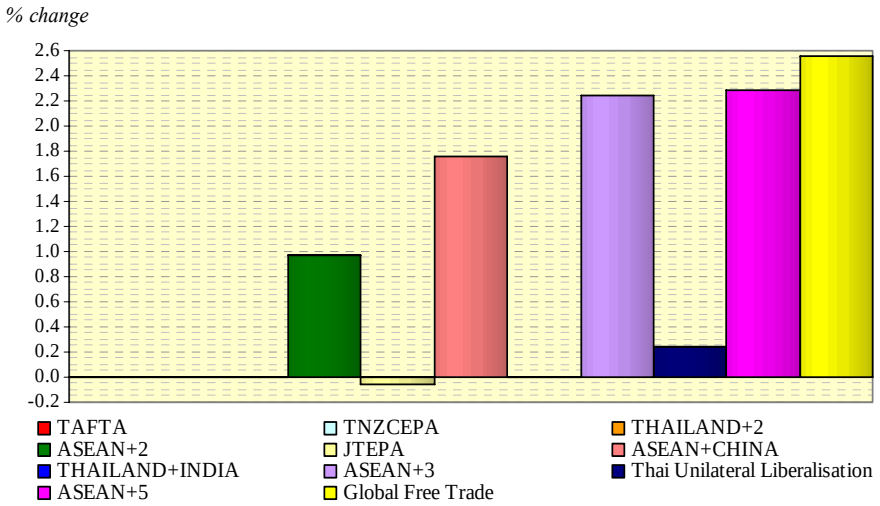


Figure 22: Real GDP growth under various FTA scenarios: SOUTH ASEAN

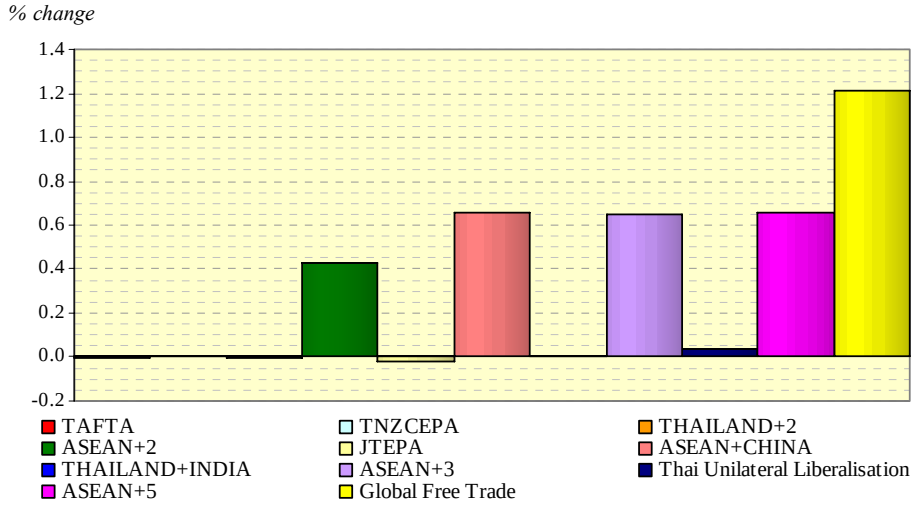


Figure 23: Real GDP growth under various FTA scenarios: WORLD