

Trade Negotiations in the East Asian Region: Cooperative versus Non-Cooperative Game Analysis

Zamroni*

Abstract

Full liberalization under the EAFTA can be attained more easily when participating countries can maintain trade agreements under cooperative instead of non-cooperative games. In trade game when No-Liberalization strategy is excluded, the negotiating countries are easier to move to cooperative game without having any further deals such as inter-country tradeoffs. Under non-cooperative trade games, the presence of ASEAN6 as a single entity gives larger welfare impacts to the ASEAN6 member countries. The reciprocity in non-cooperative trade negotiation game can be an accelerator for cooperative game in case when Full-Liberalization cannot be reached by all participating members of the EAFTA.

1. Introduction

Characteristics of East Asian countries are similar to those of countries establishing the World Trade Organization (WTO), where some are at a higher level of economic development with strong political bargaining powers, while others lag behind. The different sizes of the East Asian economies can be recognized through some indicators such as their total trade. According to the WTO statistical data in 2004, China leads with total trade of USD 1,760.40 billion, followed by Japan and Korea with USD 1,226.60 billion and USD 634.85 billion respectively (WTO 2008). Among ASEAN countries, Singapore leads with USD 510.52 billion, followed by Malaysia, Thailand, Indonesia and Philippines with USD 291.83 billion, 261.41 billion, 183.86 billion and 101.49 billion respectively. Other ASEAN members account for less than USD 100 million in their total trade.

The establishment of some FTAs in East Asia including the ASEAN-China FTA in 2002, the Japan-Singapore Economic Partnership Agreement (JSEPA) in 2002, and other ongoing talks for bilateral EPAs between Japan and ASEAN individual countries has created an effective pathway to gradual regional economic integration in East Asia. If the competitors of a given country sign an FTA

* Doctoral student, Graduate School of International Development (GSID), Nagoya University and Economic Researcher at the Research Centre for Economics (P2E), the Indonesian Institute of Sciences (LIPI). I would like to present my sincere gratitude to Prof Shigeru OTSUBO, Prof. Hiroshi OSADA and Prof. Naoko SHINKAI for their helpful comments and suggestions. My thanks are also extended to the two anonymous referees for their constructive comments and suggestions.

with others, this will induce the country to follow the same pathway to avoid disadvantages. The creation of an ASEAN-China FTA in 2002 created strong pressure for Japan to join the FTAs and other trade agreements such as the EPA with other countries in the region (Asami 2002).

There have been only a limited number of efforts that empirically evaluated the degree of economic integration among East Asian economies based on trade negotiation analysis. In addition, as yet no study has critically investigated the possible formation of an East Asian Free Trade Agreement (EAFTA) related mainly to trade negotiation strategies consisting of ASEAN countries, Japan, China and Korea using a game theoretical approach. The current study uses a model of trade negotiations incorporating the players of ASEAN countries, China (including Hong Kong), Japan and Korea. For ASEAN countries, the model uses six countries only. This is because in the GTAP Database (version 6.2), the only disaggregated countries of the ASEAN region are Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam. As the number of ASEAN countries in the model is six, then the term of ASEAN6 (ASEAN-Six) is used to represent those six ASEAN countries in the models.¹ In strategic games ASEAN6 is treated either as individual countries or as a single entity. ASEAN6 as individual countries means each individual ASEAN country behaves in different ways or each member is free to set its own strategy (applying heterogeneous trade strategies). ASEAN as a single entity means the members behave in the same way (i.e. applying a homogenous trade strategy).²

The aim of this study is to explore the possibility of the EAFTA consisting of ASEAN6 countries, China, Japan and Korea with their strategies chosen in trade negotiation games. This study investigates the welfare impacts of trade negotiations by comparing non-cooperative and cooperative game analyses. The first question is *“In comparison with non-cooperative game, does a cooperative game give a larger welfare increase to negotiating countries under the EAFTA?”* The second question is *“Under non-cooperative condition, should ASEAN countries negotiate as individual countries or as a single entity?”*

2. Full Liberalization and Partial Liberalization Strategy

2.1 Degree of Liberalization

In trade negotiation, some concepts of the degree of liberalization are crucial, especially related to partial liberalization. Partial liberalization strategy would be the second option in pursuing welfare gains from trade if full liberalization is difficult to realize. In literatures, partial liberalization is defined as percentage tariff reduction in traded products across borders (Chan 1985; Dung 2002). Partial liberalization can also be expressed as liberalization in specific sector (such as agricultural sector). What kind of partial liberalization can be proposed in respect to the EAFTA? In this study, partial liberalization is defined as liberalization (by 100 per cent import tariffs elimination) in traded goods where agricultural products are excluded from liberalization or it means liberalization in manufactured

products only. The next following explanations in this sub-section and sub-section 2.2 present the way of thinking in defining partial liberalization.

In order to get the basic views of the liberalization process in the East Asian region, the unilateral tariff reduction scenarios are simulated. First, simulation of unilateral tariff reduction is conducted under Partial Liberalization (by sector) and then Full liberalization unilaterally. Second, simulation is conducted under percentage tariff reduction: 50%, 75% and 100% (Full Liberalization). Table 1 presents the welfare changes of unilateral tariff liberalization (liberalization by one country where import tariffs are removed without having reciprocities from partner countries). Unilateral liberalization may deteriorate the term of trade (TOT), but it would be welfare-improving for liberalizing country (Zarazaga 1999; Coates and Ludema 1998).

Table 1 Welfare Changes under Unilateral Tariff Reductions in USD Million³

		Welfare Changes	ASEAN6	China	Japan	Korea
By Sectors	Partial Liberalization	Terms of Trade	− 2545	− 8611.4	− 1110.9	− 1081.7
		Allocative Efficiency	2330.0	6124.3	360.5	1064.9
		Investment-Saving	1336.4	1772.7	146.1	161.9
		Total	1121.1	− 714.4	− 604.4	145.1
	Full Liberalization	Terms of Trade	− 3283.5	− 9727.5	− 3417.7	− 1751.8
		Allocative Efficiency	3155.4	9234.5	5239.0	6232.9
		Investment-Saving	1344.0	1929.7	379.7	196.6
		Total	1216.1	1436.8	2201.0	4677.6
By Percentage	Partial 50%	Terms of Trade	− 1641.7	− 4863.7	− 1708.9	− 875.9
		Allocative Efficiency	1577.6	4617.2	2619.5	3116.4
		IS	672.1	964.9	189.9	98.3
		Total	608.0	718.4	1100.5	2338.8
	Partial 75%	Terms of Trade	− 2462.7	− 7295.6	− 2563.3	− 1313.9
		Allocative Efficiency	2366.6	6925.3	3929.3	4674.6
		Investment-Saving	1008.2	1447.3	284.8	147.4
		Total	912.0	1077.6	1650.8	3508.2
	Full Liberalization	Terms of Trade	− 3283.5	− 9727.5	− 3417.7	− 1751.8
		Allocative Efficiency	3155.4	9234.5	5239.0	6232.9
		Investment-Saving	1344.0	1929.7	379.7	196.6
		Total	1216.1	1436.8	2201.0	4677.6

Source: GTAP6 Calculation

Notes: TOT: Index of prices receive for tradable products produced minus index of prices paid for tradable products used in one region. Allocative efficiency is a gain from the reduction of excess burden (taxes/ tariff) so that commodity or endowment can be reallocated to the best possible uses. I-S Investment Saving balance is the contribution of changes in the price of capital goods (it is a kind of TOT of capital goods).

From Table 1, unilateral movement from partial liberalization (by sector) to full liberalization gives increasing total welfare for the respecting countries. The increasing welfare comes from the

gains in allocative efficiency and investment-saving. Meanwhile, the TOT of each country deteriorates when the country moves from partial liberalization to full liberalization unilaterally. Or, on the contrary, the country's TOTs improve when it tries to protect some products (agricultural sector). Unilateral tariff reduction by percentage also gives similar results of movement from less protected to full liberalization. The country's TOT deteriorates as it moves to full liberalization unilaterally, but the change of total welfare improves.

2.2 Product Coverage

In order to comply with the WTO principle of product coverage (Article XXIV) in the creation of free trade area, the share of traded goods including agricultural products in East Asian trade is an important aspect to be disclosed.⁴ According to the WTO's 1994 classifications, agricultural products are listed under the Harmonized System (HS) from chapter 1 to 24 (animal and animal products, vegetable products and foodstuffs) plus some products from other chapters, such as hides and skin, silk, wool and animal hair and raw cotton. In this study, processed agricultural products are included. Forestry and fishery are excluded from agriculture, because they are classified as natural resources by the WTO definition.

Table 2 The Shares of Agricultural Products to Total Exports

	China		Japan		Korea		CJK		World
Indonesia	13.36	8.12	9.36	0.33	4.62	0.94	9.61	2.53	11.89
Malaysia	9.75	8.05	4.18	0.17	4.54	0.25	6.38	2.03	6.31
Philippines	8.99	6.00	7.55	0.19	7.72	0.91	7.93	1.30	6.56
Singapore	1.75	3.13	4.91	1.49	0.91	0.60	2.56	1.89	3.85
Thailand	16.53	3.08	22.27	0.76	19.92	1.81	20.14	1.41	15.66
Viet Nam	26.37	2.50	20.97	0.35	32.27	0.29	23.54	1.26	22.96
ASEAN6	9.34	4.83	10.64	0.69	6.53	0.78	9.60	1.80	8.94
World		3.43		0.81		1.49		2.06	

Source: GTAP 6.2 Database

Notes: CJK - China, Japan and Korea. Numbers are agricultural contents in total exports of row countries to column countries, while, numbers in shaded areas are those of column countries to the row countries.

Table 2 shows the export shares of agricultural products to total exports of each ASEAN country, China, Japan and Korea. Viet Nam has the largest agricultural contents, in which 23.54 percent of its total exports to China, Japan and Korea are agricultural products. In exporting products to the world, it is around 22.96 percent of Viet Nam's exports are agricultural products. It is the largest agricultural contents among ASEAN countries. The next two largest ASEAN countries are Thailand and

Indonesia where their exports to China, Japan and Korea consist of agricultural products by 20.14 percent and 9.61 percent respectively. From the sides of ASEAN trading partners, agricultural contents of China's exports to ASEAN is 3.43 percent, which is larger than those of Japan and Korea. The agricultural content in total exports of the three countries (China, Japan and Korea) to the world is around 2.06 percent.

In respect to the relatively low share of agricultural products in intra East Asian trades (which was less than 10 percent), it can be legally concluded that the traded goods comply the product coverage principle of the WTO in establishing the EAFTA. Of course, this kind of partial liberalization strategy is not the final strategy, but it is a kind of a stepping stone to move into full liberalization. The option of partial liberalization in trade negotiation game could give a pathway to the easier process of creating the EAFTA. This is partly because of existing higher tariffs of agricultural products and sensitive issues in some East Asian countries. From these reasonable evidences, partial liberalization is then defined as liberalization in traded goods where agricultural products are excluded from liberalization or it means liberalization in manufactured products only.

Table 3 The Existing Ad-Valorem Tariffs and Export Shares

	Ad-Valorem Tariffs ⁵ (%)		Export Share in East Asia [*]					
	Agriculture	Manufacture	Agriculture		Manufacture		Total	
			ASEAN	EA	ASEAN	EA	ASEAN	EA
Indonesia	8.75	6.39	22.47	10.71	11.41	5.43	12.19	5.70
Malaysia	14.38	6.28	28.01	11.66	32.55	8.59	32.23	8.75
Philippines	12.52	3.45	3.39	3.02	6.97	3.14	6.71	3.13
Singapore	0.98	0.00	12.90	4.44	35.88	8.74	34.27	8.51
Thailand	35.89	10.75	26.50	18.42	11.31	4.40	12.37	5.13
Viet Nam	28.06	18.23	6.73	4.71	1.88	0.82	2.22	1.02
China	10.36	9.02		37.43		32.41		32.67
Japan	14.41	1.48		4.01		25.51		24.39
Korea	34.72	4.09		5.59		10.97		10.69
Total			100.00	100.00	100.00	100.00	100.00	100.00

Source: The GTAP Database Version 6.2

Notes: *Export Data are in 2002. The export data are from those nine East Asian countries only. The EA covers ASEAN6 countries, China, Japan and Korea

In order to get the overall pictures of the tariff elimination process, the ad-valorem tariff rates of ASEAN6, China, Japan and Korea are presented in Table 3. In trade liberalization, the benefits of trade depend on the existing tariff rates before trade liberalization and the size of the countries (trade sector). The higher existing tariff rates before free trade and larger size of trade sectors relative to others tend to create higher benefits of trade liberalization. As presented in Table 3, among the

ASEAN6 members Thailand has the highest export share in agricultural products in East Asian markets with 18.42 percent, while Singapore leads with the share of 8.74 percent in manufactured products. Among the East Asian countries, China occupies the largest shares of agricultural and manufactured products with the shares of 37.43 percent and 32.41 percent respectively. From the level of ad-valorem tariffs prior to the creation of the EAFTA, Korea, Thailand and Viet Nam are countries which have relatively higher tariffs in their traded products.

3. Trade Negotiation Game Model

3.1 Definition of Trade Negotiation

The terms “negotiation” and “bargaining” are sometimes used with similar meanings, overall they can be used interchangeably (Conceição-Heldt 2006). Negotiation as a dynamic process consists of a series of decisions controlled by interests or objectives of each participant and anticipation of the other party’s interests and motivations (Stuhlmacher and Stevenson 1997). In negotiation, the interdependent parties try to achieve their objectives through jointly agreed action (Mouzas 2006).

From these definitions, trade negotiation can be characterized as a process of decision making where participating countries try to attain their objectives by reconciling their respective trade policies (which usually involve tariffs and non tariff barriers to trade) through joint agreement. The negotiating countries with different sizes, characteristics and interests try to reconcile their trade policies in order to attain the joint objective which is commonly seen as an increase in trade relations (volumes of exports and imports) and the improvement of their citizens’ welfares.

3.2 Non-Cooperative Trade Game

A game model with n -players and their strategies can be formulated as, $G = (S, u)$ where $S = (s_1, s_2, \dots, s_i)$ is the strategy of every player i and $u = (u_1, u_2, \dots, u_i)$ is the utility (payoff) of player i . From a specific combination of possible strategies of n -player game, a collective strategy s_i^* for every player i , is a Nash equilibrium if no player i could improve his payoff by changing only his own strategy. In other words, in Nash equilibrium, no player wants to deviate from his strategy if the other players do not deviate from their strategies. A collective strategy (s_i^*, s_{-i}^*) , where s_i^* played by player i and s_{-i}^* played by other players (except player i), is a Nash equilibrium if and only if $u_i(s_i^*, s_{-i}^*) \geq u_i(s_i, s_{-i}^*)$ for every player i , and $s_i \in S_i$. We can say that for player i and his strategy $s_i, (s_i^*, s_{-i}^*)$ is at least as good as (s_i, s_{-i}^*) . Under the non-cooperative Nash game model, a country is assumed to have concern only for the impact of proposed tariffs on its own welfare (payoff) and does not consider the impact of tariff reduction on the welfares (payoffs) of other countries. ⁶

3.3 Cooperative Trade Game

In cooperative trade game, the parties are assumed to be able to communicate with each other and agree on a joint action; while in non-cooperative game communication among players is impossible. There are some concepts in defining cooperative game (Chan 1985) which depend on the characteristics of the games. One type of the concepts is that the players try to maximize the joint welfare (Chan 1985; Limao 2005). From this standpoint, cooperative game is defined when the players try to maximize their combined welfare. This concept is known as Cooperative Linear Scheme (CLS) (Chan 1985). The cooperative solution maximizes sum payoffs of all players.

The second concept refers to Nash cooperative game, where the countries are assumed to find the tariff schedule that maximizes their own welfares with respect to certain minimum levels of welfare (security level) of each negotiating country (Baldwin and Clarke 1987). The improvement of one country's welfare should increase the welfare of the group. The bargaining process in Nash cooperative game allows the countries to do inter-country tradeoffs by proposing a joint welfare.⁷ The joint welfare is determined from the difference of welfare of each country under the new strategy (of tariff reductions) and the security level. Baldwin and Clarke proposed that the security level of welfare can be the payoff under non-cooperative game. In order to be willing to move to the new equilibrium, each country has to get the higher level of welfare or at least equals to the security level. Nash cooperative game employs not only efficiency (considering maximum combined welfare under CLS) but also equity for the negotiating countries (Chan 1985). The inter-country tradeoff is introduced to show the distribution of joint welfare. By doing inter-country tradeoffs and having a joint welfare, each country is assured to get at least its security level. The remaining joint welfare is then redistributed to the contributing countries proportionally.⁸ The equilibrium after having inter-country tradeoff is then set as Cooperative Inter-country Tradeoff (CITO).

It is assumed that cooperative game is superior to non-cooperative game in the case of free trade agreement among East Asian countries. This is because in cooperative equilibrium, each country achieves higher welfare or at least as good as in non-cooperative game. In cooperative game, concession or compensation can be a catalyst to reach agreement (Kennedy, Von Witzke and Roe 1996). Some types of compensations are structural adjustment loans to countries in the gradual movement toward liberalization, development assistance, etc. Compensation should not make the conditions worse than in the non-cooperative ones (Kennedy, Von Witzke and Roe 1996). The compensation is not easy to quantify. In doing so, this study introduces CITO (as is discussed earlier) and reciprocity (as will be explained in Section 4.2).

3.4 The Payoffs of Trade Negotiation Game

In addition to the use of game theoretical model, this study also employs the Global Trade Analysis Project (GTAP) Model. The GTAP model is used to get the payoffs of trade negotiation

game. The GTAP Model is a multi-region-multi-sector Computable General Equilibrium (CGE) model with the assumption of perfect competition and constant returns to scale and bilateral trade is brought to the model under the Armington assumption (Hertel ed. 1997).⁹ Production by a firm in each sector in each region is represented by a multi-level production function that involves value-added and intermediate inputs. On the demand side, total income is allocated among three kinds of final demands: government, private household and savings, which are derived from an aggregate utility function of Cobb-Douglas type. There are some treatments in using the endowment factors in the production processes. Land and natural resources are assumed to be used exclusively by agricultural and food production sectors. Labors are assumed to be mobile across industries but not across countries/regions. International capital is set to be mobile across industries and regions (free capital flows). Equilibrium satisfies the conditions where demand equals supply for all goods and factors of production, and the firms in each industry earn zero profit.

In the GTAP model, the equivalent variation (EV) is used to show the level of economic welfare. The EV is the difference between the expenditure required to obtain the new (post-simulation) level of utility at initial prices and the utility available initially (Huff and Hertel 2000). The EV is considered as the payoff because it shows the welfare impact received by one country as the consequence of its trade strategy applied in trade negotiation game.

4. Trade Negotiation Simulations¹⁰

4.1 The Treatment of ASEAN6 and the Type of Liberalization

The main classifications of simulations using game theory for the EAFTA trade game consisting of ASEAN6 countries, China, Japan and Korea are outlined as follows:

- i. ASEAN6 is treated as individual countries: trade negotiations of each single ASEAN6 country (Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam) with China, Japan and Korea. ASEAN6 as individual countries means that each ASEAN6 country can propose tariff reduction strategy independently from other ASEAN6 countries (applying heterogeneous strategies).
- ii. ASEAN6 is treated as a single entity:¹¹ trade negotiation games between ASEAN6, China, Japan and Korea. Treating ASEAN6 countries as a single entity means that these countries conduct a similar strategy (applying homogeneous strategy) of tariff reduction.

In doing simulations, the set of conditions regarding the choices of trade strategies in trade game is presented. This is a finite game with two choices of strategies. The choices of trade strategies in each simulation of finite trade games are: (i) *No-Liberalization* and *Partial-Liberalization* (NP); (ii) *No-Liberalization* and *Full-Liberalization* (NF); (iii) *Partial-Liberalization* and *Full-Liberalization* (PF); (iv) *No-Liberalization*, *Partial-Liberalization* and *Full-Liberalization* (NPF). The PF is the only game which excludes No-Liberalization strategy as an option in trade negotiation game.¹²

No liberalization means no action is taken by the parties to eliminate the existing ad-valorem tariff barriers either in manufactured or agricultural products. Partial-Liberalization is defined as liberalization (by 100 percent import tariff elimination) in manufactured products only, while agricultural products are excluded. Full-Liberalization is defined as liberalization both in manufactured and agricultural products. Trade negotiation games used in this study are based solely on the removal of tariff barriers, but the results obtained can be viewed as the basic features of economic integration.

4.2 The Agreements in Trade Negotiation Games

Under non-cooperative game, a trade negotiation can be considered in agreement when it is in Nash equilibrium point. In cooperative game, the agreement exists when all players move together to Full-Liberalization to get the highest payoffs. Trade game simulations are conducted through the two processes: *first*, simulation is conducted under non-cooperative game. *Second*, simulation is performed under cooperative game. There are three kinds of simulations in cooperative games: *first*, the simulations are conducted under Cooperative Linear Scheme (CLS). *Second*, trade cooperative game is investigated with the supplementary operation of inter-country tradeoff (CITO).¹³ In principle, the CITO operation is not performed when the payoffs of each country/group under CLS exceeds or at least equal to the payoff under non-cooperative game. For assurance, the welfare reducing countries still receive the security level that they have already achieved under non-cooperative game. Then, *third*, for supplement of analysis to cooperative games, the reciprocity (REC) is introduced.

Reciprocity is a legal commitment (WTO, Article XXIV) in which one country gives the others certain treatments (such as tariff reduction) while the others give concession with equivalent treatments (Bhagwati 2002; Freund 2003). In trade game simulations, reciprocation means if, for example, one country chooses Partial-Liberalization (as partial-liberalizing country) while the others choose Full-Liberalization (as full-liberalizing countries), the partial-liberalizing country still receives preference (tariff reduction in manufactured products) from the full-liberalizing countries. In order to comply the WTO principle of non-discriminatory, then the receiver has to reciprocate by giving the equal concession.¹⁴ The reciprocity is introduced in order to avoid or eliminate the free riders that possibly exist in non-cooperative trade games. Without reciprocity, the existing free riders could enjoy the benefits of liberalization without granting larger/full market accesses to their trading partners in the FTA. In practice, reciprocity can be used as a condition to renegotiate the free trade agreements (Bagwell and Staiger 2001) especially when one or more countries are staying away from free trade or are reluctant to be in Full-Liberalization.

The level of reciprocal tariff in the trade negotiation simulations refers to: *first*, the differentiation of reciprocal tariff between developed and developing countries as was introduced by Finger, Ulrich and Castro (2002). This reciprocal tariff is referred to an informal criterion at the Uruguay Round of ability to pay, where developed countries are assumed to be able to reduce overall tariffs by one-third

(around 33.3 percent) while developing countries reduce tariffs by one-fourth (25 percent) on all traded goods. This reciprocation takes the form 'Reciprocation 1' (REC1). *Second*, the reciprocity with full liberalization (100 percent tariff reduction in all products) is also simulated to see its comparison with cooperative game. The second reciprocity takes the form 'Reciprocation 2' (REC2). In addition, the larger reciprocal tariffs are also simulated in order to check the effectiveness of the reciprocity, whether it works through the degree of tariff reduction or uniformity.¹⁵

5. Simulation Results

The presence of ASEAN6 in the creation of the East Asian Free Trade Area (EAFTA) can be a key factor to determine the success of the EAFTA. The participation of ASEAN6 members can be in the form of individual countries or as a single entity. These two types of entrances give different impacts to both ASEAN6 members and their partners: China, Japan and Korea. The application of game models illustrates the interaction among participating countries in the EAFTA from the perspectives of non-cooperative and cooperative games. The policy options in trade games dictate the welfare impacts and the ease of establishing the EAFTA. At this section, four different trade negotiation games are simulated: No-Partial (NP), No-Full (NF), Partial-Full (PF), and No-Partial-Full (NPF). The analyses are grouped into two: *first*, welfare impacts of trade negotiation when No-Liberalization strategy is included. It covers NP, NF and NPF. *Second*, welfare impacts of trade negotiation when No-Liberalization strategy is excluded. It includes only PF.

5.1 The Welfare Impacts of Trade Negotiation Games: No-Liberalization is Included

The analyses of simulations in this part cover the NP, NF and NPF trade games.¹⁶ Under non-cooperative game, the presence of ASEAN6 in the NP trade game as individual countries or as a single entity gives similar results to ASEAN6 members and their partners (China, Japan and Korea). This is because all negotiating countries mobilize similar strategy in both ASEAN6 formations, in which Japan prefers No-Liberalization, while the others choose Partial-Liberalization. From simulations of the NF and NPF non-cooperative trade game, it seems that the presence of ASEAN6 as a single entity gives larger benefits to the members than under ASEAN6 as individual countries. Under cooperative game-CLS, the formation of ASEAN6 either as a single entity or individual countries gives the same results to the negotiating countries. This is because under cooperative game, in order to get the maximum benefits they apply the same strategy (Full-Liberalization) in both ASEAN6 formations.

In trade games when No-Liberalization is included as one strategic option, there is a possibility that one country could deviate from trade liberalization. This deviation is arguable because in non-cooperative game, the players (countries) are free to choose the best strategy no matter what other players do. In the NF non-cooperative trade game China, Japan and even Singapore prefer No-

Liberalization as the best strategy.¹⁷

If the welfare impacts of non-cooperative games are compared to the ones in cooperative trade games under the ASEAN6 as a single entity formation, the welfare impacts will be larger if the countries prefer cooperative to non-cooperative games. Under cooperative game, the joint welfare can be maximized under Full-Liberalization strategy. The movement of negotiating countries from non-cooperative to cooperative game gives the increasing total welfares. It increases from USD 7252.98 million to USD 16369.76 million for the NP games. Then, the increase of total welfare is getting larger to USD 21070 million for the NF and NPF games. In the NPF trade games with more choices ASEAN6, China, Japan and Korea receive larger welfares when they move together to cooperative equilibrium under CLS for both ASEAN6 as individual countries and as a single entity.

The welfare reducing countries in cooperative game lose their competitiveness both in agriculture and manufacturing products (their TOTs deteriorate significantly). In other condition, the movement to cooperative game gives these countries a positive impact by having a better allocation of production factors (allocative efficiency) especially in manufacturing sector. In the NPF games, by investigating welfares received by each ASEAN6 members, countries like Indonesia, Philippines and Singapore achieve less welfare when moving into cooperative game. Their decreasing welfares are mainly coming from their deteriorating TOTs. So, in order for the losing countries to be able to move to cooperative game, they should get their security levels (the payoffs under non-cooperative game) by doing inter-country tradeoff (CITO). The compensation under CITO is delivered to make sure that all parties are better off.

Countries in trade games may choose similar strategy in both conditions (ASEAN6 as individual countries and single entity), but their welfares under CITO may be different. The difference is coming from the sources of inter-country tradeoff. As ASEAN6 performs individual country formation, the inter-country tradeoffs are among all nine countries, while when ASEAN6 as a single entity, the tradeoffs are among ASEAN6, China, Japan and Korea.

For example, from the perspective of ASEAN6 as a single entity in the NP games, by moving from non-cooperative to cooperative games ASEAN6 gets less benefit from USD 3005.02 million to USD 2778.45 million. So, in order for ASEAN6 countries to be able to move to cooperative game, they should get the security level of USD 3005.02 million by doing inter-country tradeoff. By inter-country tradeoffs, China and Japan could not attain the welfare levels under CLS instead of less welfare levels under CITO, but their welfares are still much higher than under non-cooperative game. So, no country is losing under this cooperative game. Then, in the NPF game, the inter-country tradeoff exists only inside ASEAN6, while China, Japan and Korea do not get the impact of the losing welfare of each ASEAN6 single country. In ASEAN6, inter-country tradeoff gives assurance for the welfare reducing countries such as Indonesia, Philippines and Singapore to attain their security level of welfares.

Other condition of the inter-country tradeoff is under ASEAN6 as individual countries such as in the case of the NF game in which the inter-country tradeoff occurs between each single ASEAN6 countries, China, Japan and Korea. At this tradeoff Philippines (the losing country) receives its security level of USD 19.14 million and as the consequence the welfare-increasing countries, including China, Japan and Korea get less benefits than under CLS.

Other mechanism to stimulate the negotiating countries in establishing the EAFTA is by applying reciprocity in trade game. With reciprocity, the negotiating countries (especially the reluctant countries) can get larger benefits compared to non-cooperative game. In trade games, almost all countries are better off under REC2 than under REC1. Non-cooperative game with REC2 gives the results which are identical to cooperative trade game (CLS). Under REC2, for example in the NF game, the parties such as Japan, China and some members of ASEAN6: Malaysia, Thailand and Viet Nam receive greater welfares than that of REC1. Similar to the condition of the movement from non-cooperative to cooperative game, under REC2, some countries are worse off and others better off. In order to have reciprocation in trade negotiation game, further negotiation should be conducted and the less benefitted countries should get at least their security levels as they have achieved under non-cooperative game without reciprocity.

Under non-cooperative game, REC1 does not give enough support for countries to change their non-cooperative strategy. Meanwhile, with larger reciprocal tariffs (with 75 percent or more, including REC2) all reluctant countries could change their non-cooperative to cooperative strategies. Countries like Singapore, China and Japan can change their strategies from No-Liberalization to Full-Liberalization (in the case of the NF game) and from Partial-Liberalization to Full-Liberalization in the case of the NPF game. So, in trade games when No-Liberalization strategy is set as one option, uniformity in reciprocal tariff does not work well to induce the countries to change their strategies unless it approaches larger tariff reduction.

5.2 The Welfare Impacts of Trade Negotiation Game: No-Liberalization is Excluded

The simulations here are when No-Liberalization option is excluded from trade negotiation game, which refers to the Partial-Full Liberalization (PF) trade game. Under ASEAN6 as individual countries (Table 4), individual ASEAN6 countries, China and Japan are all better off by moving from non-cooperative to cooperative game. It means that this game does not need the inter-country tradeoffs among the participating countries. Their respective welfares in cooperative games are similar either under CLS or CITO.

In non-cooperative game of ASEAN6 as individual countries, Indonesia, Singapore, China and Japan choose Partial-Liberalization as the best strategy. Under the formation of ASEAN6 as single entity, Indonesia and Singapore change their strategies from Partial-Liberalization to Full-Liberalization. The changing strategies of the two countries causes the total ASEAN6's welfares

**Table 4 The Welfare Impacts of the EAFTA Trade Negotiation Game
(Partial-Liberalization, Full-Liberalization)**

	ASEAN6 as Individual Countries					ASEAN6 as Single Entity				
	NC	S	CLS	CITO	REC1	NC	S	CLS	CITO	REC1
IDN	255.2	P	275.1	275.1	260.5	262.3	F	275.1	275.1	265.2
MYS	943.8	F	993.6	993.6	953.4	942.9	F	993.6	993.6	952.7
PHL	-87.2	F	-73.2	-73.2	-83.5	-87.4	F	-73.2	-73.2	-83.7
SGP	-102.0	P	-30.4	-30.4	-78.6	-92.3	F	-30.4	-30.4	-72.1
THA	1023.2	F	1695.4	1695.4	1239.1	1022.7	F	1695.4	1695.4	1238.7
VNM	874.2	F	980.4	980.4	902.3	873.7	F	980.4	980.4	901.9
AS6	2907.3		3841.0	3841.0	3193.1	2921.8	F	3841.0	3840.6	3202.8
CHN	2675.9	P	3226.5	3226.5	2863.9	2675.4	P	3226.5	3226.5	2863.6
JPN	7243.1	P	7318.5	7318.5	7261.9	7242.6	P	7318.5	7318.5	7261.6
KOR	3488.9	F	6684.1	6684.1	4548.6	3462.5	F	6684.1	6684.1	4531.3
	16315.3		21070.1	21070.1	17867.5	16302.4		21070.1	21070.1	17859.3

Note: The welfare impacts are in Equivalent Variation (EV) in (millions US Dollar). NC-Non-cooperative equilibrium, S-Strategy, CLS: Cooperative Linear Scheme, CITO: Cooperative with inter-country tradeoffs, REC1-Reciprocity1, REC2-Reciprocity 2 (not shown in the Table), its result is similar to CLS, P-Partial Liberalization, N-No Liberalization. Under REC1, China, Japan, Indonesia and Singapore (ASEAN6 as individual countries) are able to be in Full-Liberalization.

slightly increases from USD 2907.28 million to 2921.82 million, but the total welfare for all countries (including China, Japan and Korea) decreases from USD 16,315.27 million to USD 16302.40 million.

Similar to ASEAN6 as individual countries, under ASEAN6 as single entity there is no need to have inter-country tradeoffs, because ASEAN6, China, Japan and Korea receive larger welfares when moving to cooperative game. So, by this trade game, trade agreement is easier to conclude. This is because there is no additional negotiation/bargaining process through inter-country tradeoffs.

Even though by having trade game of Partial-Full Liberalization the Nash equilibrium point can be attained easily, but in the real world the negation of this equilibrium is sometimes difficult due to some certain condition of such as *force majeure*.¹⁸ When the agreement of Full-Liberalization cannot be concluded, non-cooperative games with REC1 and REC2 could give the optional solutions. Non-cooperative game with REC1 gives better results for all countries either under ASEAN6 as individual countries or as a single entity. In addition, non-cooperative game with REC2 makes all countries better off and the results are similar to that of under cooperative game (CLS).¹⁹ In the PF trade game, REC1 has power to induce the reluctant countries such as China and Japan to change their strategies from Partial to Full-Liberalization. The larger reciprocal tariffs of 75 percent or more could induce all countries to be in Full-Liberalization. This is due to the welfare impacts that they receive which is

Table 5 Welfare Decompositions of Non-Cooperative Partial-Full Liberalization Games (ASEAN6 as Individual Countries)

	ASEAN6 as Individual Countries									
	IDN	MYS	PHL	SGP	THA	VNM	AS6	CHN	JPN	KOR
Welfare	255.2 <i>254.1</i>	943.8	-87.2	-102.0 <i>-102.7</i>	1023.2	874.2	2907.3	2675.9 <i>2560.7</i>	7243.1 <i>7163.8</i>	3488.9
Alloc. Ef	157.5 <i>162.8</i>	365.7	68.2	-8.2 <i>-8.2</i>	759.4	668.0	2010.6	4472.6 <i>4478.3</i>	1130.3 <i>1588.9</i>	1097.9
Agri	-4.3 <i>-0.18</i>	9.5	5.9	0.4 <i>0.5</i>	19.0	-1.4	29.2	54.5 <i>-25.9</i>	240.7 <i>473.28</i>	101.6
Manuf	159.9 <i>161.0</i>	355.6	62.3	-1.0 <i>-1.0</i>	741.2	663.0	1981.0	4259.3 <i>4330.7</i>	613.1 <i>811.72</i>	996.8
TOT	104.2 <i>96.9</i>	219.9	-158.8	-104.9 <i>-105.7</i>	243.9	113.2	417.5	-2311.9 <i>2454.7</i>	6890.4 <i>6273.2</i>	2821.9
Agri	87.4 <i>87.2</i>	50.9	6.3	-10.2 <i>-11.32</i>	175.7	58.2	368.3	21.2 <i>-13.9</i>	4.7 <i>-129.7</i>	33.3
Manuf	-36.1 <i>-48.1</i>	-280.9	-181.0	-83.7 <i>-83.5</i>	-186.4	-7.8	-776.1	-2324.0 <i>-2415.5</i>	5806.8 <i>5384.2</i>	1882.7
Capital- TOT	-6.5 <i>-5.5</i>	358.1	3.4	11.2 <i>11.2</i>	20.0	93.0	479.1	515.2 <i>537.1</i>	-777.6 <i>-698.3</i>	-430.8
	ASEAN6 as Single Entity									
	IDN	MYS	PHL	SGP	THA	VNM	AS6	CHN	JPN	KOR
Welfare	262.3	942.9	-87.4	-92.3	1022.7	873.7	2921.8	2675.4 <i>2560.1</i>	7242.6 <i>7163.3</i>	3462.5
Alloc. Ef	158.8	366.0	68.3	-7.3	759.8	668.2	2013.7	4472.9 <i>4478.6</i>	1130.4 <i>1588.9</i>	1075.7
Agri	-1.8	9.6	6.0	0.6	19.2	-1.3	32.3	54.2 <i>-26.22</i>	240.7 <i>473.3</i>	79.4
Manuf	158.8	355.8	62.4	-0.8	741.3	663.1	1980.6	4259.8 <i>4331.2</i>	613.2 <i>811.8</i>	997.2
TOT	112.0	219.0	-159.1	-96.7	242.9	112.6	430.7	-2313.1 <i>-2455.9</i>	6889.5 <i>6272.3</i>	2817.1
Agri	87.4	50.7	6.2	-8.9	175.2	57.8	368.4	20.8 <i>-14.33</i>	4.7 <i>-129.7</i>	32.4
Manuf	-25.2	-286.4	-181.2	-80.3	-187.2	-7.9	-768.2	-2324.7 <i>-2416.1</i>	5806.1 <i>5388.4</i>	1879.5
Capital- TOT	-8.5	358.0	3.4	11.6	20.0	92.9	477.3	515.6 <i>537.46</i>	-777.3 <i>-698.0</i>	-430.2

Note: *Italic numbers* shows the welfare decompositions of respecting countries when they are not using their dominant strategies.

closely enough to the welfare impacts under cooperative game-CLS. It seems that uniformity in reciprocal tariffs in PF trade game work better than in other trade games.

The welfare decomposition of non-cooperative games when the countries apply a dominant strategy can be found in Table 5. This table also tells us about the reasons of choosing Partial-Liberalization as a dominant strategy for countries like Indonesia, Singapore, Japan and China. For Singapore, taking Partial-Liberalization as the best strategy should be taken cautiously. As a small country with negligible agricultural sector, Full-Liberalization could be the best strategy, but in the PF game simulation Partial-Liberalization is better for this country.²⁰

In general, the most reasons of being in Partial-Liberalization are having a better TOT in agricultural products. Better TOTs in agricultural products imply the better income for endowment inputs such as unskilled and skilled labors in respecting countries. On the contrary, better TOTs have to be compensated by decreasing the level of allocative efficiency of endowment inputs and capital goods' TOT.

5.3 Liberalization Paths in the Establishment of the EAFTA

The final target of doing trade negotiation games is the establishment of the EAFTA. How is trade liberalization set up through either Full-Liberalization thoroughly, Partial-Liberalization, reciprocity or combinations of all paths? How can Partial-Liberalization be accommodated as a pathway for some countries to engage in the trade liberalization process?

By having more choices in non-cooperative trade game of NPF, there is a possibility that one country may choose No-Liberalization like what Japan does (in this trade game, No-Liberalization is dominant strategy for Japan). Other countries such as Indonesia, Singapore and China (in trade game of ASEAN6 as single entity) prefer Partial-Liberalization, while the rests are in Full-Liberalization. This suggests that by giving multi-choices of strategies, ranging from No-Liberalization to Full-Liberalization tends to encourage some countries to deviate from Full-Liberalization. In a non-cooperative trade game where the negotiating countries have several options of strategies, it is possible for countries to depart from Full-Liberalization strategy and be free riders, especially when there is no reciprocation scheme in trade negotiation game.

For a large country, departing from free trade is possible in non-cooperative trade negotiation games. This is because of the higher domestic welfare that can be achieved by setting up optimal tariffs (Hungerford 1991). Once the trade liberalization strategy is set as a common target by the negotiating countries in the region, No-Liberalization strategy should be excluded from trade game. The only acceptable choice for the country is liberalization either fully or partially. In the dynamic concept, Partial-Liberalization could be seen as a gradual liberalization, where the respecting countries try to liberalize their trade gradually over a specified period.

Should ASEAN6 countries negotiate as individual countries or as single entity and how easy is

trade agreement concluded? Under non-cooperative game, the formation of ASEAN6 as single entity could give larger benefits for ASEAN6 member countries. It seems that the free trade agreement is easier to conclude when the participating countries playing trade negotiation game of Partial-Full Liberalization or in trade game when No-Liberalization strategy is taken away. One possible reason is that under this game, the negotiating countries can simply move from non-cooperative to cooperative game without having any further deals such as inter-country tradeoff among the members regardless the formations of ASEAN6. In addition, it is found that excluding No-Liberalization strategy in trade negotiation game allows larger benefits in total to the negotiating countries.

Doing free trade negotiation is not as simple as in trade game simulations due to the different and conflicting interest among the members. Probably, one country is reluctant to move to Full-Liberalization because of domestic and political pressures against the liberalization policy. In this study, optional solution has been introduced by presenting reciprocity in trade negotiation games in case where not all negotiating countries could reach free trade agreement. Non-cooperative game with REC2 (under Full-Liberalization scheme) gives similar welfare gains to cooperative game. Meanwhile, reciprocity of REC1 could give injection to most of the reluctant countries to move to Full-Liberalization when they negotiate in trade game where No-Liberalization option is excluded. Principally, the reciprocity could induce all reluctant countries in each trade game, when the reciprocal tariff reduction is larger enough or 75 percent or more. By this level of reciprocity, the countries could occupy larger welfare which is close to the cooperative payoff. In addition, the uniformity in reciprocal tariff could also attract some countries especially in trade game with No-Liberalization option. It seems that reciprocity is another possible option to reach cooperative trade negotiation games. Further more, delivering reciprocity in non-cooperative games could help the EAFTA free from the free riders.

6. Conclusion

From the simulations of either non-cooperative or cooperative trade negotiation games, the superiority of Full-Liberalization strategy over No-Liberalization and Partial-Liberalization in most cases exists, which is in line with the theoretical framework that free trade creates the best benefits for trading countries. Under non-cooperative trade game, the presence of ASEAN6 as a single entity gives larger welfare impacts to ASEAN6 countries. Full-Liberalization under the EAFTA can be attained more easily when the participating countries conclude trade agreements in cooperative rather than non-cooperative games. The cooperative games maximize the welfare impacts to the participating countries because the countries are able to do bargaining to move together to Full-Liberalization and deal with inter-country tradeoffs. This tradeoff is delivered in order to assure that the welfares of the countries under cooperative game exceed or at least equal to the welfares under

non-cooperative trade game.

In trade game when No-Liberalization is excluded, the negotiating countries are easier to move to cooperative game without having any further deals such as inter-country tradeoffs. Excluding No-Liberalization strategy means no possibilities for countries to depart from trade liberalization path. They should pursue trade liberalization either through directly Full or Partial-Liberalization by gradually liberalizing trade over a specified number of years. The reciprocity can avoid the possible existence of the free riders in non-cooperative trade negotiation games. The reciprocity of 100 percent liberalization in non-cooperative trade game can be an accelerator in case where Full-Liberalization cannot be reached by all parties of the EAFTA. Reciprocity with larger tariff reduction (of 75 percent or more) could also induce all reluctant countries to be in Full-Liberalization. In addition, the uniformity in reciprocal tariff gives contribution to induce countries to be in Full-Liberalization, especially when No-Liberalization option is excluded in trade games.

Notes

- 1 ASEAN6 refers to the six ASEAN members: Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam.
- 2 This, however, does not mean ASEAN6 as a common market.
- 3 Partial liberalization by sector means liberalization in manufactured products only, agricultural products are excluded. Full liberalization means liberalization in manufactured and agricultural products. Tariff reduction by percentage means tariff is reduced by a certain percentage such as 50 percent, etc.
- 4 The creation of FTA should be comprehensive and cover larger number of products. The coverage of more than 90 percent has been considered 'comprehensive' in practice.
- 5 It is an average of ad-valorem tariffs. For ASEAN6 countries, the tariffs are average taxes on imports from China, Japan and Korea. For Japan, for example, the tariffs are calculated as an average tax on imports from ASEAN6, China and Korea.
- 6 In non-cooperative game with n-players, the Nash equilibrium occurs when no player can improve his payoff by changing only his own strategy, while other players' strategies remained unchanged (Myerson, 1997). The Nash equilibrium is a kind of optimal collective strategy in a game with multi-players.
- 7 Inter-country tradeoff is tradeoff of losing welfare for negotiating countries to achieve a larger joint welfare (Baldwin and Clarke, 1987).
- 8 The distribution of welfare depends on the share or contribution of each country to the joint welfare. The larger contributing countries occupy the bigger part of redistributed joint welfare.
- 9 The GTAP Version 6.2 contains 87 countries/regions and covering 57 sectors. Imports of intermediate goods are distinguished by import partner country or the country of origin (Armington assumption).
- 10 The agreement in game model is treated as bilateral trading block that obeys the WTO principle of Article XXIV.
- 11 ASEAN6 as a single entity means that ASEAN6 mobilizes similar trade strategy in trade negotiation. It is not a single entity like a common market.
- 12 The inclusion and exclusion of No-Liberalization strategy as an option shapes the characteristics of trade negotiation games such as welfare impacts and the ease in concluding the agreement.
- 13 In practice, the political feasibility of inter-country tradeoff is probably questionable and this should be negotiated firmly prior to the conclusion of the FTA. Inter-country transfers are common in regional trading arrangements such as what is called the structural-funds system in the European Union (Cadot, et al., 2001) and the compensation funds in the extension membership of European Community to Southern European countries

(Sapir, 1993 as cited in Cadot, et al., 2001).

- 14 Due to the different sizes of negotiating countries, the term of equivalent treatment does not necessarily mean similar concession (Freund, 2003). It possibly differs from one group of countries to the others.
- 15 Reciprocities are simulated starting from 25 percent to 100 percent either with uniform tariffs or not. Uniformity means that the countries impose similar reciprocal tariffs regardless developed or developing countries.
- 16 The simulation results of trade games when No-Liberalization is included are presented in Appendix 2 (NP), 3 (NF) and 4 (NPF).
- 17 At this game, Singapore prefers to stay away from Full-Liberalization. No-Liberalization for Singapore is just because Singapore has already had zero tariffs in manufactured products with its partners: China, Japan and Korea.
- 18 The *force majeure* can be in the form of un-controllable non-economic factors such high domestic and foreign political pressures, or natural disasters.
- 19 The result of REC2 is similar to that of CLS. So, it is not shown in table.
- 20 It should be recognized that when investigating the dominant strategy Singapore has already eliminated import tariffs in manufacturing sector with its partners: China, Japan and Korea. So, no additional benefit comes from tariff elimination in, for example, the increase of its TOTs. This condition brings Partial-Liberalization as dominant strategy for Singapore in non-cooperative trade game.

References

- Asami, Tadahiro. 2002. Japan's Strong Leadership Urged to Promote Regional Economic Cooperation in East Asia. *International Finance Journal* No.1085.
- Bagwell, Kyle and Robert W. Staiger. 2001. Reciprocity, Non-discrimination and Preferential Agreements in the Multilateral Trading System. *European Journal of Political Economy*, 17: 281–325.
- Baldwin, Robert E. and Richard N Clarke. 1987. Game-Modeling Multilateral Trade Negotiations. *Journal of Policy Modeling* 9(2): 257–284.
- Bhagwati, Jagdish. 2002. *Introduction: The Unilateral Freeing of Trade versus Reciprocity*. In Bhagwati, Jagdish. ed. *Going Alone: The Case for Relaxed Reciprocity in Freeing Trade*. The MIT Press: Cambridge, England.
- Cadot, Olivier, de Melo, Jaime and Marcelo Olarreaga. 2001. Can bilateralism ease the pains of multilateral trade liberalization? *European Economic Review*, 45: 27–44.
- Chan, Kenneth S. 1985. The International Negotiation Game: Some Evidence from the Tokyo Round. *The Review of Economics and Statistics*. Vol. 67(3): 456–464.
- Coates, Daniel E. and Rodney D. Ludema. 1998. Unilateral Trade Liberalization as Leadership in Trade Negotiations. *EconWPA*. No. 9802002.
- Conceição-Heldt, Eugénia da. 2006. Integrative and Distributive Bargaining Situations in the European Union: What Difference Does It Make? *Negotiation Journal*. April 2006.
- Dung, Nguyen Tien. 2002. Trade Reforms in Vietnam: A Computable General Equilibrium Analysis. *Forum of International Development Studies*, 21: 189–216.
- Finger, J. Michael, Reincke Ulrich and Adriana, Castro. 2002. *Market Access Bargaining in the Uruguay Round: How Tightly Does Reciprocity Constrain?* In Bhagwati, Jagdish. ed. *Going Alone: The Case for Relaxed Reciprocity in Freeing Trade*. The MIT Press: Cambridge, England.
- Freund, Caroline L. 2003. Reciprocity in Free Trade Agreements. *World Bank Policy Research Working Paper* No. 3061
- Hertel, Thomas W. ed. 1997. *Global trade analysis: Modeling and applications*. Cambridge: Cambridge University Press.
- Huff, Karen M. and Thomas W. Hertel. 2000. Decomposing welfare changes in the GTAP model. *GTAP Technical Paper*. No. 19, Purdue University.
- Hungerford, Thomas L. 1991. GATT: A cooperative equilibrium in non-cooperative trading regime? *Journal of International Economics*. 31: 357–369.

- Kennedy, P. Lynn, Harald Von Witzke, and Terry L. Roe. 1996. Multilateral agricultural trade negotiations: a non-cooperative and cooperative game approach. *European Review of Agricultural Economics*. 23: 381–399.
- Limao, Nuno. 2005. Trade policy, cross-border externalities and lobbies: do linked agreements enforce more cooperative outcomes? *Journal of International Economics*. No. 67: 175–199.
- Mouzas, Stefanos. 2006. Negotiating Umbrella Agreements. *Negotiation Journal*. July 2006.
- Myerson, Roger B. 1997. *Game theory: Analysis of conflict*. Harvard University Press.
- Sapir, A. 1993. *Discussion*. In de Melo, J. Panagariya, A. eds. *New Dimensions in Regional Integration*. Cambridge University Press, Cambridge. pp. 230–233.
- Stuhlmacher, Alice F, and Mary K. Stevenson. 1997. Using Policy Modeling to Describe the Negotiation Exchange. *Group Decision and Negotiation*. 6: 317–337.
- World Trade Organization (WTO). 2008. WTO Statistics. Accessed from: <http://stat.wto.org/CountryProfile/WSDBCountryPFReporter.aspx?Language=E>
- Zarazaga, Carlos E. J. M. 1999. Measuring the Benefits of Unilateral Trade Liberalization. Part 1: Static Models. *Economic and Financial Review*, Third Quarter: 14–25.

APPENDICES

Appendix 1 GTAP Aggregated Sectors and Country/Region

	New Codes	Description/Comprising Sectors
Aggregated Sectors	Agri	Agriculture: Paddy rice; Wheat; Cereal grains nec; Vegetables, fruit, nuts; Oil seeds; Sugar cane, sugar beet; Plant-based fibers; Crops nec; Cattle, sheep, goats, horses; Animal products nec; Raw milk; Wool, silk-worm cocoons; Meat; cattle, sheep, goats, horse; Meat products nec; Vegetables oils and fats; Dairy products; Processed rice; Sugar; Food products nec; Beverages and tobacco products.
	Man	Manufacture: Coal; Oil; Gas; Minerals nec; Textiles; Wearing apparel; Leather products; Forestry; Fishing; Wood products; Paper products, publishing; Petroleum, coal products; Chemical, rubber, plastic prods; Mineral products nec; Ferrous metals; Metals nec; Metal products; Motor vehicles and parts; Transport equipment nec; Electronic equipment; Machinery and equipment nec; Manufactures nec.
	Servo	Services: Electricity; Gas manufacture, distribution; Water; Construction; Trade; Transport nec; Sea transport; Air transport; Communication; Financial services nec; Insurance; Business services nec; Recreation and other services; pubadmin/ defence/ dealth/ educat; dwellings.
Country/Region	IDN MYS PHP SGP THA VNM CHN JPN KOR ROW	Indonesia Malaysia Philippines Singapore Thailand Viet Nam China (including Hong Kong) Japan Korea Rest of the world

Appendix 2 The Welfare Impacts of the EAFTA Trade Negotiation Game (No-Liberalization, Partial-Liberalization)

	ASEAN6 as Individual Countries					ASEAN6 as Single Entity				
	NC	S	CLS	CITO	REC1	NC	S	CLS	CITO	REC1
IDN	317.0	P	256.7	317.0	303.5	317.0	P	256.7	317.0	303.5
MYS	677.8	P	931.0	896.8	737.9	677.8	P	931.0	677.8	737.9
PHL	107.3	P	-100.1	107.3	52.6	107.3	P	-100.1	107.3	52.6
SGP	496.2	P	-96.9	496.2	345.1	496.2	P	-96.9	496.2	345.1
THA	706.9	P	937.9	906.8	762.9	706.9	P	937.9	706.9	762.9
VNM	699.8	P	849.9	829.7	746.6	699.8	P	849.9	699.8	746.6
AS6	3005.0		2778.5	3553.9	2948.7	3005.0	P	2778.5	3005.0	2948.7
CHN	1205.8	P	2683.1	2484.1	1693.3	1205.8	P	2683.1	2566.0	1693.3
JPN	-1159.6	N	7264.7	6130.0	1018.9	-1159.6	N	7264.7	6597.0	1018.9
KOR	4201.7	P	3643.5	4201.7	4084.9	4201.7	P	3643.5	4201.7	4084.9
Total	7253.0		16369.8	16369.8	9745.8	7253.0		16369.7	16369.8	9745.8

Note: The welfare impacts are in Equivalent Variation (EV) in (millions US Dollar). NC-Non-cooperative equilibrium, S-Strategy, CLS: Cooperative Linear Scheme, CITO: Cooperative with inter-country tradeoffs, REC1-Reciprocity1, REC2-Reciprocity 2 (not shown in the Table), its result is similar to CLS, P-Partial Liberalization, N-No Liberalization. Under REC1, Japan remains in Partial-Liberalization.

**Appendix 3 The Welfare Impacts of the EAFTA Trade Negotiation Game
(No-Liberalization, Full-Liberalization)**

	ASEAN6 as Individual Countries					ASEAN6 as Single Entity				
	NC	S	CLS	CITO	REC1	NC	S	CLS	CITO	REC1
IDN	92.9	F	275.1	274.2	139.1	91.9	F	275.1	269.9	138.4
MYS	134.7	F	993.6	989.7	342.6	130.8	F	993.6	969.1	340.0
PHL	19.1	F	−73.2	19.1	−7.0	18.5	F	−73.2	18.5	−7.4
SGP	−112.0	N	−30.4	−30.8	−83.6	−29.1	F	−30.4	−29.1	−28.3
HA	161.6	F	1695.4	1688.4	591.0	160.8	F	1695.4	1651.9	590.5
VNM	282.6	F	980.4	977.3	467.4	281.5	F	980.4	960.6	466.6
AS6	578.9		3841.0	3918.0	1449.5	654.4	F	3841.0	3841.0	1499.8
CHN	−176.7	N	3226.5	3211.0	898.3	−181.5	N	3226.5	3226.5	895.1
JPN	−194.1	N	7318.5	7284.3	1743.6	−203.6	N	7318.5	7318.5	1737.3
KOR	692.7	F	6684.1	6656.9	2484.8	672.6	F	6684.1	6684.1	2471.4
Total	900.8		21070.1	21070.1	6576.2	941.9		21070.1	21070.1	6603.6

Note: The welfare impacts are in Equivalent Variation (EV) in (millions US Dollar). NC-Non-cooperative equilibrium, S-Strategy, CLS: Cooperative Linear Scheme, CITO: Cooperative with inter-country tradeoffs, REC1-Reciprocity1, REC2-Reciprocity 2 (not shown in the Table), its result is similar to CLS, P-Partial Liberalization, N-No Liberalization. Under REC1, Japan, China and Singapore (under ASEAN6 individual countries) remain in No-Liberalization

**Appendix 4 The Welfare Impacts of the EAFTA Trade Negotiation Game
(No, Partial, Full-Liberalization)**

	ASEAN6 as Individual Countries					ASEAN6 as Single Entity				
	NC	S	CLS	CITO	REC1	NC	S	CLS	CITO	REC1
IDN	315.6	P	275.1	315.6	307.3	322.7	F	275.1	322.7	312.1
MYS	690.6	F	993.6	977.9	760.3	689.7	F	993.6	833.4	759.7
PHL	120.2	F	−73.2	120.2	69.2	120.0	F	−73.2	120.0	69.1
SGP	491.1	P	−30.4	491.1	363.5	500.8	F	−30.4	500.8	369.9
THA	792.2	F	1695.4	1648.7	1064.1	791.6	F	1695.4	1219.0	1063.7
VNM	724.2	F	980.4	967.2	799.0	723.6	F	980.4	845.1	798.6
AS6	3133.9		3841.0	4520.8	3363.3	3148.4	F	3841.0	3841.0	3373.0
CHN	1198.6	P	3226.5	3121.8	1874.2	1198.1	P	3226.5	3226.5	1873.8
JPN	−1181.1	N	7318.5	6879.5	1016.1	−1181.6	N	7318.5	7318.5	1015.8
KOR	4047.1	F	6684.1	6547.9	4989.9	4020.7	F	6684.1	6684.1	4972.7
Total	7198.5		21070.1	21070.1	11243.5	7185.6		21070.1	21070.1	11235.3

Note: The welfare impacts are in Equivalent Variation (EV) in (millions US Dollar). NC-Non-cooperative equilibrium, S-Strategy, CLS: Cooperative Linear Scheme, CITO: Cooperative with inter-country tradeoffs, REC1-Reciprocity1, REC2-Reciprocity 2 (not shown in the Table), its result is similar to CLS, P-Partial Liberalization, N-No Liberalization. Under REC1, China, Japan, Indonesia and Singapore (under ASEAN6 as individual countries) could not change their strategies to Full-Liberalization.