A Trade Coalition Analysis on East Asian Free Trade Agreement

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Abstract
This study discusses the possibility of the East Asian Free Trade Area (EAFTA) through coalitional games.
From the perspective of coalitional game, the grand coalition of ASEAN6, China, Japan and Korea under the
EAFTA is in the core, which is stable as no winning coalition against it. The countries try to deal in the
coalitions with the highest total welfares for all which finally come to the formation of {(ASEAN6, China),
(ASEAN6, Korea), (ASEAN6, Japan)}. From the alternative coalition, it seems that the presence of ASEAN6
can be in any coalition and be a catalyst to the EAFTA.
Keywords: Trade coalition, coalitional game, EAFTA

1. Introduction
In the real world of trade negotiation having cooperation in trade game which consists of all countries is not so
simple. If it is the case, then the East Asian Free Trade Area (EAFTA) can be difficult to achieve or it will need
longer time. The longer process of the establishment of the EAFTA could be due to the conflicting economic and
non-economic factors that may exist. The negotiating countries may choose the other paths of trade liberalization
by forming coalitions among the members.

The coalition is performed in order to ease the difficulties related to the complex interests of the parties
(Elgstrom *et al*. 2001). Coalitional game can be formed if the members can negotiate effectively. There are some
factors that can influence the ease of establishing coalitions such as geographical, sociological, cultural or
linguistic aspects (Myerson 1997). The exogenous factors can positively give impacts if the negotiating parties
can manage these factors effectively.

For any game with more than 2 players (multi-players), the presence of n-person Nash bargaining without
analysis of coalitions does not show the possible powers of multiple coalitions that may exist. It is insufficient
when we concern only on the grand coalition by ignoring the powers of multiplayer coalitions. In the model with
4 players (ASEAN6, China, Japan and Korea), it is necessary to apply coalitional game in the analysis (Myerson
1997; Branzei *et.al*. 2008). The term of ASEAN6 is used to represent the six ASEAN members, namely
Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam which are included in the Global Trade
Analysis Project (GTAP) Database[2]. In terms of trade negotiation game, the condition of existing coalition is
possible because negotiating countries are trying to get the maximum gains from free trade. This study
investigates the possible trade coalitions that may exist in the establishment process of the EAFTA. Some
coalitions of, for example, ASEAN-Japan, ASEAN-China-Japan, ASEAN-China-Korea will be investigated to
find the pathway to the EAFTA.

2. The Road To East Asian Economic Integration
The movement toward regional trading arrangements is part of the process of the globalization of trade, which
started in the 1980s (Josling 1993). One view is that the gradual introduction of free trade or trade liberalization
at a regional level could be considered as the initial steps towards global liberalization of trade. Such
liberalization may be initially easier when a small number of countries are involved (Bhalla and Bhalla 1997).

Free Trade Area (FTA) is one types of the Preferential Trading Arrangement (PTA) in which tariffs are lowered
on products traded to other members but still maintained against countries that are not members.[3] The efforts to
form regional trade agreements are based mostly on geographic proximity and global economic development.
Empirically, PTAs in the global economy are all geographically based (Krugman 1993). It would also appear
that, in general, the closer countries are to each other, the larger the percentage of trade that takes place between
them. In addition, Egger and Larch (2008) argued that trade is not only impeded by ad-valorem tariffs but also
by non-tariff intra and intercontinental trade costs; which is related to what we call for geographical factor or
distance in the gravity model. As one implication, the creation FTA induces the neighbor or non-distant outsiders

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[2] The GTAP Version 6.2 contains 87 countries/regions and covers 57 sectors.
[3] The classification of PTA basically depends on the ease of access in either international trade or investment
activities in an ascending order of economic integration.

to join (Egger and Larch 2008). On the one hand, the larger the volume of trade between countries within a regional bloc, the greater the potential for trade creation and the less for trade diversion, making the agreement more likely to be welfare-enhancing rather than welfare-reducing (Plummer 1996; Sager 1997; Frankel and Wei 1998). On the other hand, the larger the number of participating countries the larger the differing vested interests from each individual country. As a consequence, more complicated problems arise in dealing with these different interests. In recent years, the creation of FTA is not just a matter of geographical proximity; other strategic reasons such as political pressures also controlled the FTA (Rosendorff and Milner 2001). In addition, to some certain condition, FTAs are performed as a way to create strong political pathways with other countries, especially with big countries, such as FTA between Singapore and the United States of America (USA) under the Singapore-US FTA (Sally 2006).

Conforti and Salvatici (2004) used game theory to investigate the interaction of the countries (developed and developing countries) in the formation of FTA. They concluded that free trade or strong trade liberalization would be the dominant strategy for developing and developed countries. Rosendorff and Milner (2001) used the models of two-stage game: international bargaining and the repeated trade (sub) games that allow a country to perform trade policies and incorporate an escape clause under the signed agreements.[4] The models assume that the information about other domestic political pressures is limited as we do not know exactly what kinds of political pressures happen in other countries. They argued that the escape clause could help the government to preserve international agreements while still get advantage from domestic political support, which is important part for successful international trade agreements.

The economic interdependence forces the neighboring countries in East Asia to cooperate and integrate their economies under the agreements. In the case of Southeast Asia, ASEAN have become more active in fostering economic cooperation in the region since the 1980s. In 1992 the ASEAN signed the Agreement on the Common Effective Preferential Tariff (CEPT) Scheme to form the ASEAN Free Trade Area (AFTA).

Within the last few years, especially after the Asian economic crisis erupted in 1997, there has been intense economic cooperation among East Asian countries, especially those comprising the ASEAN countries, Japan, China and Korea. At the first ASEAN Plus Three (APT) informal summit in Kuala Lumpur in 1997, the participants agreed to hold regular leaders' meetings regarding the initiative to build an East Asian Community (EAC). This APT represents the regional dialogue process incorporating the East Asian countries. It was designed to promote greater regional economic cooperation.

The establishment of some FTA in East Asia such as ASEAN-China FTA, ASEAN-Korea FTA and other ongoing process of bilateral Economic Partnership Agreement (EPA) between Japan and ASEAN countries has created an effective pathway to gradual regional economic integration in East Asia. It seems that this movement into FTA is likely to continue in East Asia.   The establishment of regional FTAs inside East Asian region can be seen as a stepping stone to the creation of the EAFTA.

The proliferation of FTA in East Asia also comes from the competitive nature of FTA   (Sussangkarn 2006). Once a competitor of one country signs an FTA with other countries, this will enforce the respective country to create the same pathway to avoid the disadvantage matters. For example, the creation of ASEAN-China FTA in 2002 gave a strong pressure to Japan to create the kinds of FTAs which finally force Japan to create such as EPA with other countries in the region. Without the movement of China into the ASEAN-China FTA, Japan will not be so intense to conclude the kind of bilateral FTA with ASEAN members (Sussangkarn 2006).

3. The Coalitional Game Model

3.1 Coalitional Game

Parties in a game may deviate from grand coalition[5] due to the possible inefficiency of the grand coalition, which is sometimes difficult to realize because of some conditions. A better outcome by deviating unilaterally could be a fundamental reason. Coalition[6] is a group of players in game (negotiation) that collectively agree to do together to achieve a common goal (Hart and Kurz 1983; Branzei *et.al*. 2008). They act as a single unit relative to the

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[4] The escape clause is treated endogenously to the models as an equilibrium outcome for the countries in strategic trade game (Rosendorff and Milner 2001).

[5] Grand coalition is a coalition that consists of all players.

[6] For better understanding of coalition, then practical definition of coalition is given as shown in part IIIB.

rest of the players (which do not belong to the coalitions) (Hart and Kurz 1983). It is formed mostly as a counter of other player(s).

Coalitional game assumes that the members can negotiate effectively among them (Myerson 1997). It means that the members can actually change their strategies as long as it will give them a better or more benefits for all (the members of coalitions). Once the changing strategy could not give a larger benefit for all (except for them), they may think that other members also do similar movements. Under the Nash equilibrium in non-cooperative game, there are no profitable unilateral deviations. The assumption behind this concept is that players cannot communicate or coordinate with another on any joint agreement. Then, under cooperative game, the players are assumed to have communication among them and even by doing multilateral deviations such as coalitions (Vega-Redondo 2003). The coalitional game in the study assumes that the players are performing cooperative game where the player pays attention not only on its payoff but also on the total payoffs of the game.

In addition, "moral hazard" problem may exist because of the difficulties in monitoring the performance of grand coalition that cause non-optimal outcome (Greenberg 1994). In a game with fewer players (two players), the agreement/equilibrium is easy to set either cooperate or not cooperate. The negotiation is easier when the number of players is small, even though the smaller number of participants does not guarantee the successful agreement. In order for players to get larger benefits, they may deviate from the previous agreement (equilibrium). The increasing number of the parties (in trade negotiation) tends to create increasing complexity in the negotiation process. This is because the potential conflicts coming from the diverse individual interests cause the self-enforcing agreement may be hard or impossible to achieve (Bazerman *et.al.* 2000).

In the analysis of coalitional game, suppose we have a set of all players N = (1, 2, …, n). Then a subset of N is called as a coalition. The coalitional game takes the form (*N, v*). The characteristic function is defined as worth of coalition, v (C), which refers to the total amount of payoffs that can be achieved by forming coalition *C* such that

$$v(\emptyset) = 0 \qquad (1)$$

where $\emptyset$ denotes the empty set. It means that no coalition has worth of zero.

In coalitional games, we use coalitional game with transferable utility. Transferable utility means that the worth of a coalition C (the characteristic function v(C)) is a single number (Kannai 1992). The GTAP model is used to simulate trade negotiation game and find the payoff which is in the form of Equivalent Variation (EV). The EV value as a representation of payoff can be categorized as transferable utility as this payoff can be divided and distributed among the players. It is simply an n-dimensional vector

$$x_i = (x_1, \ldots x_n) \qquad (2)$$

Payoff x_i is corresponding payoff for player *i*th. The allocation of payoff is feasible if the total payoff allocation for the members of coalition is smaller or equal to the worth of coalition (Myerson 1997). In other words, let us say y as payoff allocation. Payoff allocation of y is feasible for coalition *C* if and only if

$$\sum_{i \in C} y_i \leq v(C) \qquad (3)$$

In grand coalition, its worth *v*(*N*) can be formulated as (Myerson, 1997):

$$v(N) = \sum_{i \in N} x_i \qquad (4)$$

The worth of coalition N of all players (grand coalition) with transferable payoff is greater or equal to the sum of the payoffs of any sub-coalition of *N* (Osborne and Rubinstein, 1994):

$$v(N) \geq \sum_{k=1}^{K} v(C_k) \text{ for every coalition } \{C_1, \cdots, C_K\} \text{ of N} \qquad (5)$$

The analysis of coalition cannot be far away from stability. The stability also refers to self-enforcing agreement (Bernheim, Peleg, and Whinston 1987) or core concept (Sene, 1996). An agreement is stable (self enforcing) if (and only if) no possible coalition (deviation from previous agreements) that players want to deviate in order to be better off. The core is the fundamental stability concept in coalitional games. In a non-cooperative game the concept of Nash equilibrium's outcome of strategic game is stable because no unilateral deviation gives better result. Under the coalitional game, the core is considered to be stable if no other coalition could give a better

payoff for all members or the total payoffs of a new coalition are greater than the current payoffs (Osborne and Rubinstein 1994) or at least one better off and none of the rest worse off (Schmidt 2004).

The best allocation of the payoff is when the allocation is in the core. The payoff allocation of x is in the core of v if and only if x is feasible and there is no coalition can increase the payoffs more than x. In other form, x is in the core if and only if (Myerson, 1997):

$$\sum_{i \in N} x_i = v(N) \text{ and } \sum_{i \in C} x_i \geq v(C), \forall C \subseteq N \qquad (6)$$

3.2 The Coalitional Game Model

In this study, ASEAN6 consists of Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam. The investigation of coalitional games in this study is based on the ASEAN6 as single entity only. ASEAN6 as a single entity means that the ASEAN members behave in the same way (applying homogenous strategy). For example: if ASEAN decides to choose strategy x then each ASEAN members should choose the strategy x. So, principally by this treatment we have only four players: ASEAN6, China, Japan and Korea.

Practical definition of coalition is given to explain the process of game simulation. In the coalitional process, one country or existing coalition may join to form a new coalition. For example, in the formation of {(ASEAN6, China), Japan}, the coalition of ASEAN-China is already exist. Then, Japan enters the new coalition together with the existing coalition of ASEAN-China.[7]

The possible coalitions that may be formed in East Asian region are presented in Figure 1. The EAFTA can be constructed from coalitions coming from the fewer members (as shown in Figure 1.[8] At Tier II, the possible coalitions, including the existing ones, consists of two members such as (ASEAN6, China), (China, Japan), etc. Then, Tier II coalitions coalesce together to form Tier III coalitions consisting of three members, such as coalitions of (ASEAN6, China, Japan), (ASEAN6, China, Korea). The three-membership coalitions can be coming from many sub-coalitions, such as coalition of (China, Japan, Korea) which comes from several forms such as {(China, Japan), Korea}, {China, Korea}, {Japan, Korea}.

The processes to the grand coalition of the EAFTA consisting of four members also come from many possible formations of the Tier III coalitions. The presence of CJK into Tier IV is possible if ASEAN and Japan are already in the ASEAN-Japan FTA. So, the possible way to have a grand coalition of ACJK is by renegotiating AC, AK, AJ and CJK and, finally, having the coalition of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan), (China, Japan, Korea)}. Or, if ACK already exists, the ACJK can be the grand coalition through {(ASEAN6, China, Korea), (China, Japan, Korea)}. But the formation of ACJK cannot come from {(China, Japan, Korea), (ASEAN6, Japan)}. It is because by assumption AC and AK should come together. In addition, it seems that there is a possibility of direct movement from Tier II to Tier IV. This coalitional leap is in the formation of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)}.[9]

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[7] From the membership point of view, the coalition of {(A, C), J} and {(A, C, J} are indifferent. But, they are different in the process and payoffs (welfare impacts). In the {(A, C), J} ASEAN-China have been in the FTA which mean they have zero tariffs already for their traded products before Japan entering the coalition. When Japan joins the coalition, the only existing tariffs are between ASEAN- Japan and China Japan. Meanwhile, the coalition of {(A, C, J}, the existing tariffs are still between ASEAN-China, ASEAN-Japan and Japan-China. So, from these kinds of simulations, the values of coalitions, v (C) are different.

[8] In the process of movement from lower tier to higher tier, the coalitional game models applied in the simulation assume that participating countries are playing cooperative game where the overall (total) welfare impacts is in the priority, instead of playing non-cooperative game in which the country just pay attention on the largest payoff that it could get. Under cooperative game, one country will move to the new coalition (or moving from one equilibrium to the new one as long the total payoff-welfare impact is improving.

[9] The coalitions should consist all players (ASEAN, China, Japan and Korea). Other omitted coalitions jumps from Tier III to Tier I are presented in Appendix4.
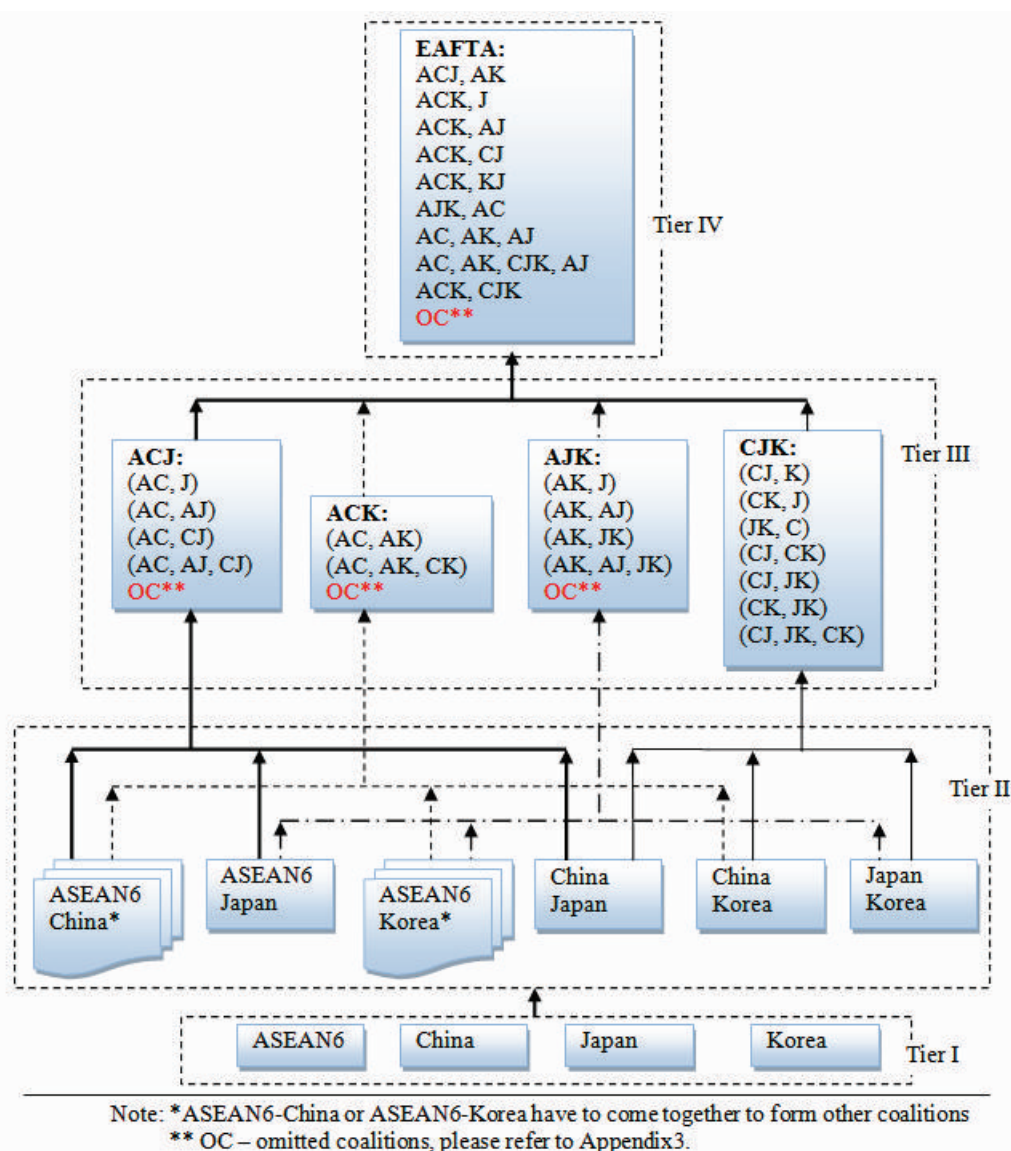
FIGURE 1. The Possible Trade Coalition Roads to the EAFTA

Note: *ASEAN6-China or ASEAN6-Korea have to come together to form other coalitions
** OC – omitted coalitions, please refer to Appendix3.

Not all possible coalition is included in the analysis of the EAFTA through coalitional trade games. Then, this condition is called as the restrictive rule, where some coalitional trade agreements are ignored from the whole processes of the EAFTA. The omitted coalitions are impossible to conclude because some countries (FTAs) have been with ASEAN in the existing FTAs. Therefore, the new coalitions (in the model) are not able to ignore the existing coalitions (the members of the existing FTAs cannot leave or destruct their memberships). As an example, coalition of {(ASEAN6, China, Japan), Korea} will be feasible if Korea is not coming alone but with ASEAN6, or they are joining as ASEAN-Korea. They should be together unless they are in coalition where all members are new comers. It should be {CJK, AC, AK} not {CJK, AC} or {CJK, AK}. The restrictive rule applied in the analysis is different from the concept of multiple memberships in some FTAs at the same time.

3.3 The Payoffs of Trade Coalitional Games
In addition to the use of coalitional game model, this study also employs the Global Trade Analysis Project (GTAP) Model. The GTAP model is used to get the payoffs of trade negotiation games. 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).[10] Production by a firm in each sector in each region is represented by a multi-

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[10] Imports of intermediate goods are distinguished by import partner country or the country of origin (Armington

level production function that involves added values 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 the 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. Labor is 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) shows the level of economic welfare[11]. The EV is considered as the payoff because this shows the welfare impact received by one country as the consequence of its trade strategy applied in trade negotiation game. The aggregation process by sectors and by countries/regions can be found in Appendix 1and 2.

4. Simulations And Discussion
4.1 The Classification of Trade Coalitional Games

Table 1 presents the value of coalition $v(C)$, including the grand coalition $v(N)$[12]. The possible coalitions in the establishment of the EAFTA are classified into four groups: Tier I, Tier II, Tier III, and Tier IV. As long as the coalitions are in the core, the coalitions in Tier I have smaller $v(C)$ than that of Tier II and III. Under the same condition, $v(C)$ in Tier II is smaller than that of Tier III.[13] This is in line with the argument that larger membership of FTA could create larger welfare impacts for the members. More detail discussion of each tier is as follows:

1) Tier I.

It is just an individual country (group) before starting to establish a bilateral FTA.

2) Tier II.

In tier II, the interested members to the liberalization in East Asian Region try to have bilateral FTA. The ASEAN-China FTA and ASEAN-Korean FTA are just two examples. Other bilateral FTA may exist soon such as ASEAN-Japan FTA, Japan-Korean FTA and China-Japan FTA. Trade coalitions in Tier II are the first step to the establishment of the EAFTA through trade coalitional games. The EAFTA depends on the successful stories of these bilateral FTAs.

3) Tier III.

Tier III consists of trade coalitions of {ASEAN6, China, Japan}, {ASEAN6, China, Korea}, {ASEAN6, Japan, Korea} and {China, Japan, Korea}. These four coalitions are in the core which can be tested with their respective sub-coalitions. For example, in the case of trade coalitional game of {ASEAN6, China, Japan}, none of the sub-coalitions of {(ASEAN6, China), Japan}, {(ASEAN6, China), (ASEAN6, Japan)} and {(ASEAN6, China), (ASEAN6, Japan), (China, Japan)} are wining coalitions. It means that the ASEAN6-China-Japan FTA is stable and no member countries want to unilaterally deviate from the agreement.

4) Tier IV, Trade coalition of {ASEAN6, China, Japan, Korea}.

In tier IV, the grand coalition consisting of all players {ASEAN6, China, Japan and Korea} has the largest payoff of USD 21,070.06 million. It is in the core and stable coalition because there is no winning coalition which has larger payoff than that of grand coalition $v(N)$. The possible sub-coalitions of {(ASEAN6, China, Japan), (ASEAN6, Korea)}, {(ASEAN6, China, Korea), Japan}, {(ASEAN6, China, Korea), (ASEAN6, Japan)}, {(ASEAN6, China, Korea), (China, Japan)}, {(ASEAN6, China, Korea), (Korea, Japan)}, {(ASEAN6, Japan, Korea), (ASEAN6, China)} and {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)} could be the last step to the grand coalition. In addition to the definition of FTA in Part II, it is necessary to understand the specific meaning of the FTA through the coalitional processes. The FTA coming from coalition is determined by the process of (road to) its establishment and membership. In a stable (grand) coalition of FTA, the members do not have incentive to deviate from the membership by establishing sub-coalition of FTA. This is because deviation from the current FTA does not give larger benefits to the deviating member(s).

Table 1. Trade Coalitional Games and Their Payoffs

Coalition	$v(C)$	IDN	MYS	PHL	SGP	THA	VNM	AS6	CHN	JPN	KOR
	Tier IV										
	Grand Coalition $v(N)$*										

assumption) (Hertel, ed. 1997).

[11] 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).

[12] The detail coalitions including the omitted ones are stored in Appendix 3.

[13] Checking the stability of the $v(C)$ in the core should be compared with the respective sub-coalitions.

ACJK	21070.1	275.1	993.6	-73.2	-30.4	1695.4	980.4	3841.0	3226.5	7318.5	6684.1
	Sub-coalitions										
(ACJ, AK)	7733.2	-108.8	-163.8	-84.0	-143.4	-170.8	-101.2	-772.1	1261.1	442.0	6802.3
(ACK, J)	10071.7	-55.1	233.4	-194.9	-556.2	850.6	190.7	468.6	2269.6	8018.7	-685.2
(ACK, AJ)	6784.7	-133.2	-338.0	-144.2	-303.7	-329.9	-53.8	-1302.6	2688.4	5779.2	-380.3
(ACK, CJ)	4368.5	54.8	483.7	-64.9	-251.4	1063.3	225.8	1511.1	-627.2	3170.6	314.0
(ACK, KJ)	8897	-22.5	286.0	-162.5	-500.7	890.6	197.0	687.9	2476.6	6976.4	-1243.9
(AJK, AC)	12584.7	-196.7	-423.6	-185.9	-402.3	-433.9	-147.3	-1789.6	3677.8	4607.3	6089.3
Extra**											
(AC, AK, AJ)	13694.2	-228.7	-486.4	-216.5	-449.5	-487.7	-156.7	-2025.6	3545.8	5669.6	6504.4
	Tier III										
	Coalition (ASEAN6, China and Japan)										
ACJ	13402.6	285.4	1011.8	-8.3	136.6	1663.8	778.8	3868.1	2617.9	6916.6	-1220.0
(AC,J)	9954.5	-44.4	255.7	-178.1	-539.4	862.4	186.7	543.0	2135.1	7276.5	-913.7
(AC,AJ)	6416.8	-111.0	-300.0	-122.5	-278.6	-297.7	-53.4	-1163.2	2578.8	5001.2	-652.9
(AC, CJ)	3441.6	71.2	519.0	-44.5	-222.7	1088.3	230.3	1641.63	-441.6	2241.6	-210.8
(AC,AJ,CJ)											
	Coalition (ASEAN6, China and Korea)										
ACK	12014.7	333.3	765.4	128.8	506.5	832.0	789.4	3355.3	1482.1	-1183.9	7177.3
(AC,AK)	7271.6	-88.2	-134.2	-67.2	-128.6	-182.0	-91.3	-691.5	1249.3	-347.6	6713.8
(AC,AK,CK)											
	Coalition (ASEAN6, Japan and Korea)										
AJK	6083.0	126.3	600.1	-65.3	-325.4	1244.5	511.2	2091.4	-728.2	3095.3	896.3
(AK,J)	4920.0	42.9	476.7	-77.5	-283.0	1092.3	232.4	1483.7	-526.4	3246.1	190.1
(AK,AJ)	1283.2	-29.6	-56.7	-27.7	-40.7	-48.7	-8.9	-212.4	-166.2	1017.1	478.5
(AK, JK)	4127.8	60.9	512.8	-56.9	-295.0	1167.9	312.6	1702.4	-500.4	2431.6	-6.2
(AK,AJ,JK)											
	Coalition (China, Japan and Korea)										
CJK	15404.8	-194.9	-390.1	-201.5	-378.5	-349.4	-118.5	-1633.0	3081.3	5809.0	6514.6
(CJ,K)	8395.3	-94.4	-130.7	-74.9	-116.7	-114.0	-75.6	-606.4	1123.3	378.1	6893.9
(CK,J)	7939.5	-113.0	-275.9	-139.6	-265.1	-249.0	-42.2	-1084.7	2435.9	5986.2	-482.7
(JK,C)	14091.2	-166.4	-335.6	-171.0	-332.0	-304.7	-110.5	-1420.2	3226.4	4744.7	6120.2
(CJ, CK)	1313.2	-24.1	-44.1	-25.2	-36.6	-36.1	-6.5	-172.6	-202.5	978.4	537.3
(CJ, JK)	7131.5	-69.5	-85.8	-49.1	-80.0	-77.6	-68.1	-430.1	1263.0	-634.4	6502.9
(CK, JK)	6571.7	-85.4	-221.9	-109.6	-218.4	-204.6	-35.5	-875.4	2643.3	4943.6	-1015.1
(CJ,JK,CK)											
	Tier II										
AC	3889.5	317.4	734.3	165.8	632.0	760.1	580.6	3190.3	699.2	-563.0	-262.3
AJ	3905.3	60.7	518.6	-55.9	-254.8	1123.9	236.9	1629.2	-372.5	2276.1	-240.7
AK	1327.0	91.9	130.8	18.5	-29.1	160.8	281.5	654.4	-181.5	-203.6	672.6
CJ	7494.7	-92.7	-241.1	-118.2	-240.6	-220.2	-38.7	-951.4	2291.2	5203.5	-717.0
CK	7731.4	-76.0	-99.8	-55.5	-96.5	-88.9	-72.7	-489.4	964.3	-417.3	6767.1
JK	1487.2	-26.3	-49.3	-27.8	-41.5	-40.3	-7.1	-192.2	-174.2	1022.8	464.4
	Tier I: ASEAN, China, Korea, Japan, No FTA										

Notes: *Grand Coalition consists of all players. **The possibility of coalition from Tier II to Tier IV.
v (C) is the value of coalition.

4.2 The Coalition Road to the EAFTA

From the cores and their respective sub-coalitions (as presented in Table 1), the possible ways to conclude the EAFTA through trade coalitional games are summarized. All the scenarios at least need two steps to reach the EAFTA, but the process of each step under different scenarios take different times. The investigation on the time needed to accomplish each step to proceed into the FTA is out of the scope of this study. It just compares the value of trade coalitional games on the way to the EAFTA which based on the welfare impacts and the existing trade coalitions in the form of FTA, such as ASEAN-China FTA and ASEAN-Korean FTA. In proposing the possible scenarios, the coalitional trade game starts from fewer members to larger memberships. As was studied by Frankel, Stein and Wei (1996), with increasing larger members (blocks), the regional trade arrangements will create larger economic welfares for the members at every step of the formation. In the case of the EAFTA, as a small 'continental block', it would be a stepping stone to the economic integration in East Asia and further in Asia. The complete flow chart of the seven scenarios is plotted in Figure 2. As a note, there are 5 scenarios in the chart which are not able to be a pathway to the EAFTA. It is because, by tracing the values of the lower level of coalitions $v(C)$, they are not in the core. Theoretically, with the larger numbers of the members (and product coverage), FTA should create the larger total benefits. However, this is not always the case from the coalitional analysis if one coalition is not in the core.

153
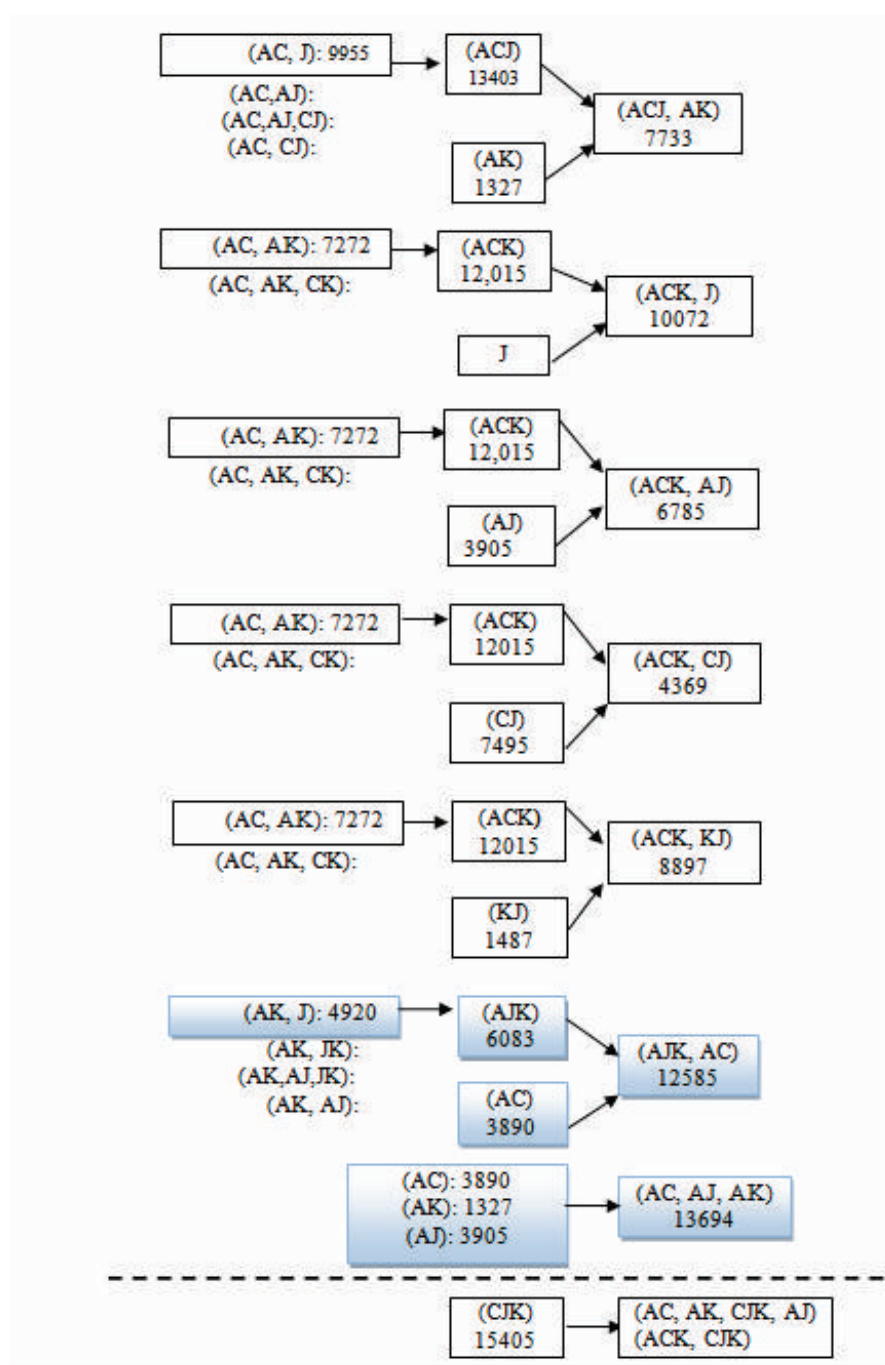
Note: A-ASEAN6, C-China, J-Japan, K-Korea. Values are in USD million

Figure 2. The Coalition Roads to the EAFTA and its Welfare Impacts

There are two feasible scenarios to the grand coalition (the rest are not in the cores). The order listed below is based on the worth (welfare impacts) of coalitional games:

1) The trade coalition of {(ASEAN6, Japan, Korea), (ASEAN6, China)}.
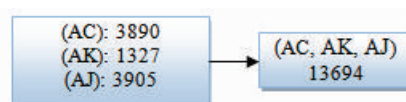2) The trade coalition of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)}.

1.   The trade coalition of {(ASEAN6, Japan, Korea), (ASEAN6, China)}.
The Trade coalition of {(ASEAN6, Japan, Korea), (ASEAN6, China)}, similar to other coalitions, can be concluded with two steps, too. First, the existing ASEAN-Korean FTA invites Japan to coalesce together and conclude the trade agreement under the ASEAN-Korea-Japan Free Trade Area (AJK FTA). Then, once the AJK

FTA established, it can call ASEAN-China FTA to form {(ASEAN6, Japan, Korea), (ASEAN6, China)}, which will be the second step to the EAFTA. It gives the welfare increases by USD 12584.72 million.

2.   The trade coalition of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)}.
Trade coalition of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)} gives the highest welfare impacts to the members (USD 13694.2) than trade coalition of {(ASEAN6, Japan, Korea), (ASEAN6, China)}. Hypothetically, it seems to be the easiest way to conclude trade negotiation games. The free trade agreement between ASEAN and Japan has been in the process. It means generally that the process take less time than the new formation of FTA. By having ASEAN-Japan FTA and two existing FTAs: ASEAN-China FTA and ASEAN-Korean FTA, then they can construct the coalition of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)} and further realize free trade agreement under the EAFTA.

For negotiating countries, the total welfare should be in the priority to get together to achieve a common goal of integrated economies in East Asia. The possible solution is by tracking the pathway of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)} which does not give any preferences to the negotiating countries (please refer to Table 1 or Figure 2 for this consideration). This alternative will have the flow as presented in Figure 3:

Note: A-ASEAN6, C-China, J-Japan, K-Korea. Values are in USD million

Figure 3. Alternative Coalition to the EAFTA

Based on the analysis of trade coalitional games consisting of ASEAN6 countries, China, Japan and Korea, it seems that the creation of EAFTA is reachable and feasible. From the most reachable one, it seems that ASEAN countries can be a catalyst to the EAFTA or as the driving force to achieve the common goals as was stated in the Declaration of the ASEAN Plus Three Summit in December 2005.[14] This is because ASEAN can be the members of any bilateral FTAs more easily than other countries. In addition, the declaration in 2005 sent also a prospective sign of economic integration through a gradual process by setting up and supporting cooperation under the ASEAN Plus One processes, and then by forming the ASEAN Plus Three framework. The ASEAN Plus One can be seen as the bilateral FTA such as ASEAN-China FTA, ASEAN-Korea FTA and ASEAN-Japan FTA.

The findings of the strategy of Japan within East Asian economic integration support the predictions of other studies. The conclusion of ASEAN-Japan Economic Partnership Agreements (EPA) will increase the possibility of the EAFTA through this alternative scenario. The economic alliances that Japan has recently proposed under its FTA with ASEAN and then followed by the bilateral FTAs, framed as EPA, are supporting evidences for how Japan behaves in the EAFTA trade games.

4.3 Japan and ASEAN in Coalitional Game
The road to the establishment of bilateral FTA with ASEAN6 member countries initiated by Japan is different from the ones concluded under ASEAN-China FTA and ASEAN-Korea FTA. Japan has also been pursuing economic integration with ASEAN members under the EPA which is proposed to cover not only market for traded goods (by eliminating import tariff and other trade barriers), but also cooperate in lowering business costs, increasing investment and technology cooperation.

The intention of Japan to have economic integration with ASEAN member countries have been started with the conclusion of the Japan-Singapore Economic Partnership Agreement (JSEPA) in January 2002. It came into force on 30 November 2002. The creation of the JSEPA inspired partly the establishment of the bilateral FTA between Japan and other individual ASEAN countries (Chirathivat, 2007). Coincidently, Japan has been pursuing bilateral FTA with ASEAN as a single entity by signing the framework agreement of Comprehensive

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[14] The common goal of the Kuala Lumpur Declaration on the ASEAN Plus Three Summit pledged on 12 December 2005 is to implement a long term goal of East Asian community which benefit the people with prosperity and peace.

Economic Partnership (CEP) between Japan and ASEAN in ASEAN-Japan Summit in Bali in 2003. The negotiations have been initiated and scheduled to conclude in 2012.

In the following years, Japan signed the agreement with Thailand under the Japan-Thailand Economic Partnership Agreement (JTEPA) in September 2005[15]. The Japan EPA with Indonesia was signed in August 2007 under the Japan-Indonesian Economic Partnership Agreement (JIEPA). Intensive talks of economic integration with other individual ASEAN countries have been also in progress.

From the coalitional trade negotiation we can draw a road map of the East Asian economic integration from Japan's perspectives. Table 2 shows the economic benefits of ASEAN-Japan FTA based on the coalitional trade games under ASEAN6 as individual countries. This table presents that bilateral FTAs between Japan and individual ASEAN countries give positive impacts to both Japan and its partners. The total impact is then used as a value of coalition v (C) (in first column). Under the individual bilateral FTAs, once Japan has an FTA with, for example, Philippines, the FTA will give impacts to other ASEAN countries (including China, Korea and Rest of the World (ROW)). Similarly, when Japan has an FTA with Indonesia, it creates welfare impacts (negative) to the rest. If we sum up the impacts of the simultaneous FTAs, the welfare impacts to each ASEAN6 members will be similar to the one under ASEAN-Japan FTA. For example, the summation of the impacts of IJ, MJ, PJ, SJ, TJ and VJ to Indonesia is similar to the welfare impact of ASEAN6-Japan FTA to Indonesia, which is around USD 60.7 million.

Table 2. Trade Coalitions Between Japan and ASEAN6

Coalitions	v (C)	IDN	MYS	PHL	SGP	THA	VNM	AS6	CHN	JPN	KOR
	Grand Coalition v (N)*										
AJ	3905.3	60.7	518.6	-55.9	-254.8	1123.9	236.9	1629.2	-372.5	2276.1	-240.7
	Sub-coalitions										
IJ	358.7	139.4	-16.0	-6.1	-36.4	-17.4	-1.7	61.9	-43.3	219.3	-39.3
MJ	1316.0	-29.8	679.9	-28.5	-168.3	-52.2	-5.7	395.5	-116.0	636.2	-68.7
PJ	189.6	-4.6	-9.4	63.7	-11.9	-8.9	0.4	29.3	-20.8	126.0	-19.7
SJ	98.9	-1.6	-6.6	-2.3	110.5	-2.8	-4.4	92.8	-8.2	-11.6	-2.7
TJ	2432.1	-35.7	-117.3	-73.1	-134.4	1230.8	-28.8	841.5	-136.4	1201.4	-84.7
VJ	382.1	-7.1	-13.0	-9.59	-14.3	-25.6	277.1	208.4	-47.9	1050	-25.7

Notes: Grand Coalition consists of all players. v (C) is the value of coalition.

The conclusion of the ASEAN Japan (AJ) FTA is feasible, as presented in Figure 4. This is because the value of coalitional trade game v (C) is larger than sub-coalitions which are right now still in the progress of conclusion.
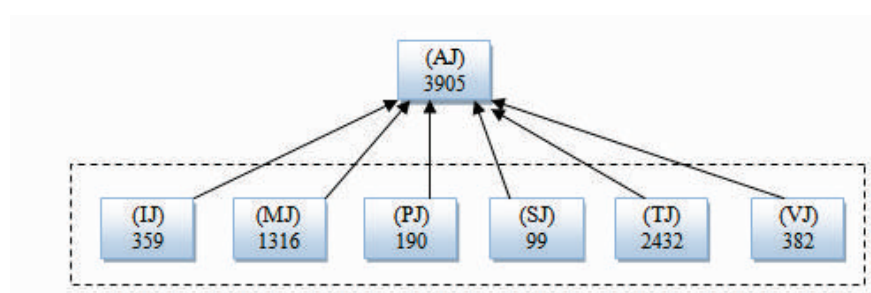
Note: A-ASEAN6, J-Japan. Values are in USD million

Figure 4. The Road to ASEAN-Japan FTA

The principle of CEP between Japan and ASEAN members in 2003 stated that he CEP should involve Japan and all ASEAN member countries. No countries will be left behind in the agreements. So, from this principle, there is no possibility to coalesce some countries by ignoring the others. The only acceleration for individual ASEAN country is the flexibility of the conclusion. This acceleration accommodates the differences in the level of

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[15] The hard talks between Japan and Thailand in the conclusion of JTEPA were related to the negotiation on steel, automobiles and farm products (Chirathivat 2007).

developments of the ASEAN members (especially for the new members of ASEAN) and addresses the sensitive sectors by gradually including them in the agreements.

4.4 The Countries' Perspectives on Coalitional Game in the EAFTA

Table 3 shows the countries' perspectives on the coalitional processes in the creation of the EAFTA. China, Japan and Korea do not want to directly join the EAFTA by establishing grand coalition. Creating a sub-coalition is the best way for China and Japan to realize the EAFTA both in Tier III or Tier IV, and for Korea in Tier IV. This is because the direct establishment of the FTA (as a core) always gives them less welfare impacts than the sub-coalitional trade games. For example, China will not enter directly the China-Japan-Korea FTA if this agreement is established, instead of waiting Japan and Korea form the FTA first and then China will come as the third player. It is similar to Japan's case. The different perspective is from ASEAN6's point of view, where the grand coalition and other direct formations of lower tier (Tier III) always give the highest benefits for ASEAN6.

Table 3. Countries' Perspectives of Coalitions and Sub-Coalitions

	Tier	Core	Player's Best Choice in Sub-coalitions	Core ≥ Sub-Coalition
China	Tier I		C	
	Tier II		(AC)	
	Tier III	(ACJ)	(AC, AJ)	Yes
		(ACK)	(AC, AK)	Yes
		(CJK)	**(JK, C)**	No
	Tier IV	(ACJK)	(ACJ, AK)	No
Japan	Tier I		J	
	Tier II		J	
	Tier III	(ACJ)	**(AC, J)**	No
		(AJK)	(AK, J)	No
		(CJK)	(CK, J)	No
	Tier IV	(ACJK)	(ACK, J)	No
Korea	Tier I		K	
	Tier II		AK	
	Tier III	(ACK)	**(AC, AK)**	Yes
		(AJK)	(AJ, AK)	Yes
		(CJK)	(CJ, K)	No
	Tier IV	(ACJK)	(ACJ, AK)	No
ASEAN	Tier I		A	
	Tier II		(AC)	
	Tier III	(ACJ)	**(AC, CJ)**	Yes
		(ACK)	(AC, AK)	Yes
		(AJK)	(AK, JK)	Yes
	Tier IV	(ACJK)	(ACK, CJ)	Yes

It is common for big countries to prefer bilateral (less membership negotiation) than multilateral (larger membership) agreement. Under the asymmetry conditions of negotiators in terms of market size (i.e., a large and some small countries in the party) and negotiation power, the large economies prefer the bilateral trading regime. Meanwhile, the smaller countries prefer a multilateral bargaining regime (Kim, 2004).

There is one interesting case for China in Tier III in the case of the establishment of ASEAN-China-Korea FTA. From Table 3 we can realize that the sub-coalition of {(ASEAN6, China), (ASEAN6, Korea)} is no longer beneficial than its core {ASEAN6, China, Korea} for China. The real world showed that China took the first step earlier to make a closer trade relationship with ASEAN and then followed by Korea. From sub-coalitional perspective, the sub-coalition of {(ASEAN6, China), (ASEAN6, Korea)} is the best choice for China, Korea and ASEAN6 in order to be in the larger membership of FTA. The creation of ASEAN – China FTA has attracted Korea to establish the ASEAN – Korea FTA.

If we consider the sources of power coming from the ability to control the markets, ASEAN does not have enough capacity to control the markets (it is because its total trade was relatively smaller than other three countries). The best scenario of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)} reflects on how the involvement of ASEAN could determine the success of the EAFTA. From the empirical perspectives, ASEAN has a position to control the direction of the economic integration in East Asia by establishing FTAs with China, Korea and ongoing processes of negotiation with Japan (both ASEAN as individual and a single entity). The

attendance of ASEAN in the process of East Asian economic integration could be a catalyst which is in line with the results that all the cores (Tier III and IV) are beneficial for ASEAN than the sub-coalitions.

5. Conclusion

The coalition is one way to establish the EAFTA when a consensus among all East Asian countries is difficult to reach. From the perspective of coalitional game, the grand coalition of ASEAN6, China, Japan and Korea under the EAFTA is in the core, which is stable as no winning coalition is against it. At the lower tiers (tier III), coalitional games of ASEAN6-China-Japan, ASEAN6-China-Korea, ASEAN6-Japan-Korea and China-Japan-Korea are in the cores. It means that these coalitions are stable and it could be the possible ways to establish the EAFTA. The countries try to deal in the coalition forms with the highest total welfares for all countries in which they finally come to the formation of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)}. The possibility of this scenario is supported by the intention of Japan and ASEAN under the CEP agreement.

The EAFTA can be concluded more easily and seems to take less time if trade coalitional game takes the roadmap of {(ASEAN6, China), (ASEAN6, Korea), (ASEAN6, Japan)}. From the alternative coalition, it seems that the presence of ASEAN6 can be in any coalition and be a catalyst to the EAFTA.

In spite of the significant results, the current study has more interesting findings if the more advanced general equilibrium models which allow scale economy and imperfect competition are employed. The use of the dynamic model of GTAP is more challenging than that of using the standard one. Since then, the use of the dynamic model could accommodate the disequilibrium condition of international capital mobility and the changing stock of capital in the region. This would possibly consequently bring the higher welfare impacts of the negotiating countries and change the direction of coalitional trade negotiation.

References

Bhalla, A. S. and Bhalla, P. (1997), "*Regional Blocs: Building Blocks or Stumbling Blocks?*" London: Macmillan Press Ltd.

Bazerman, M. H., Curhan, J. R., Moore, D. A., & Valley, K. L. 2000, "Negotiation", *Annual Review of Psychology*, Vol. 51(1): 279–314.

Bernheim, D; Peleg, B., and Whinston, M.D., (1987), "Coalition-proof Nash Equilibria-Concepts." *Journal of Economic Theory*, Vol. 42 (1): 1-12

Branzei, R., Dimitrov, D. and Tijs, Stef, (2008), "*Models in Cooperative Game Theory*", Second Edition. Berlin Heidelberg: Springer-Verlag

Elgstrom, O., Bjurulf, B., Johansson, J and Sannerstedt, A., (2001), "Coalitions in European Union Negotiations", *Scandinavian Political Studie*s, Vol. 24 (2): 111-128.

Chirathivat, S. (2007), "Japan Thailand EPA: Problems and Future", *CCAS Working Paper* No. 5, 2007.

Conforti, P. and Salvatici, L. (2004), "Agricultural Trade Liberalization in the Doha Round: Alternative Scenarios and Strategic Interactions Between Developed and Developing Countries", *FAO Commodity and Trade Policy Research Working Paper* No. 10.

Egger, P., and Larch, M. (2008), "Interdependent preferential trade agreement memberships: An empirical analysis", *Journal of International Economics*, 76(2), 384{399.

Frankel, J. A., and Wei, S. J. (1998), "Open Regionalism in a World of Continental Trade Blocs", *IMF Working Papers*. WP/98/10.

Greenberg, J. (1994), "Coalition Structure", In Aumann, R.J. and S. Hart. eds. 1994. *Handbook of Game Theory* Vol. II, Elsevier Science Publishers.

Hart, S. and Kurz, M. (1983), "Endogenous Formation of Coalitions", *Econometrics*, Vol. 51(4): 1047 - 1064

Josling, T. (1993), "Multilateralism: A Constraint on Unilateralism and Regionalism in Agricultural Trade", *American Journal of Agricultural Economics*, Vol. 75 (August): 803-809.

Kannai, Y. (1992), "The Core and Balancedness." In Aumann, R.J. and S. Hart. eds. *Handbook of Game Theory* Vol. I, Elsevier Science Publishers.

Kim, YH. (2004), "The Optimal Trade Bargaining Strategies in the Negotiation of DDA", *Journal of Policy Modeling*. Vol. 26 (1): 65–80.

Krugman, P. (1993), "Regionalism versus Multilateralism: Analytical Notes", In DeMello, J. and A. Panagariya. eds. 1993. *New Dimensions in Regional Integration*. Cambridge: Cambridge University Press.

Myerson, R.B. (1997), "*Game Theory: Analysis of Conflict*", Harvard University Press.

Osborne, M.J., and Rubinstein, A. (1994), "*A Course in Game Theory*", *London*, England: MIT Press.

Plummer, M.G. (1996), "The ASEAN Free Trade Area: Backwards or Forwards", *CAS Discussion Paper No. 5*. Centre for Asian Studies.

Rosendorff, B.P., and Milner, H.V. (2001), "The Optimal Design of International Trade Institutions: Uncertainty and Escape", *International organization*, 55(4): 829-857.

Sager, M.A. (1997), "Regional Trade Agreements: Their Role and the Economic Impact on Trade Flows", *The World Economy*, Vol. 20(2): 239-252

Sally, R. (2006), "Free Trade Agreements and the Prospects for Regional Integration in East Asia", *Asian Economic Policy Review,* Vol.1(2): 306–321

Schmidt, C. (ed.). (2004), "*Game Theory and Economic Analysis: A quiet Revolution in Economics",* Taylor & Francis e-Library, 2004.

Sened, I. (1996), "A Model of Coalition Formation: Theory and Evidence", *The Journal of Politics*, Vol. 58(2): 350-372.

Sussangkarn, C. (2006), "Comment on Free Trade Agreements and the Prospects for Regional Integration in East Asia", *Asian Economic Policy Review.* Vol. 1 (2): 322–323.

Vega-Redondo, F. (2003), "*Economics and the Theory of Games",* UK: Cambridge University Press