China-Japan-Korea (CJK)'s FTA Strategy towards ASEAN Countries: A Game Theoretical Approach

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This paper analyzes the FTA strategies of China, Japan and Korea (CJK) toward ASEAN countries using a three-player game. It explores the implications of China, Japan, and/or Korea participating in an FTA with ASEAN and the corresponding rewards in a payoff matrix. The Nash equilibrium occurs when China, Korea and Japan all choose to participate in an FTA with ASEAN. Dominant strategies and response functions for each country are analyzed using Error Correction Mechanism (ECM) and Vector Auto Regression (VAR) models. The paper also finds that Japan's action to create FTA will be the most effective for regional settings. Although the game analysis is backward looking, it is a useful benchmark for understanding future FTA policies in East Asia.

1. Introduction

The new millennium has witnessed the on going process of East Asian intra regional trade expansion that establish Regional Trade Agreements (RTAs) in the form of Free Trade Agreements (FTAs) and Economic Partnership Agreements (EPAs). Regionalism acts as a powerful mantra that spells the word "whether you with us or against us". The act of exclusion from regionalism will only lead to marginalization. Therefore, the general idea is how to make it work. Having said this, the study of regionalism is very vital since the trend has indeed created a profound regional and indeed global significance (Harvey and Lee, 2002).

Unfortunately, there have been only a limited number of efforts that empirically evaluated the degree of economic integration among East Asian economies based on FTA analysis. In addition, no study has yet critically investigated the possible formation of an East Asian FTA

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related mainly to FTA strategies consisting of ASEAN and CJK countries using a game theoretical approach. This paper defines FTA strategies as the choices between two options of creating or withholding FTAs. This paper sets up three player game incorporating China, Japan and Korea (CJK) with their FTA strategies toward ASEAN member countries. Regionally speaking, it is very important to see how CJK countries decide their FTA strategies as to reach the goal of setting East Asian wide FTA.

The remainder of this paper is organized as follows. The second section studies the basic concepts from literature review. The third section covers materials and methods. The fourth section examines the result of the regressions. The last section presents conclusion and some concluding remarks.

2. Literature Review

Since Baldwin and Clarke in 1985, there have been very limited literatures discussing FTA strategy using game theory. Harrison and Rutstrom (1987) and Gander (2008) are among the relatively few. Baldwin and Clarke (1985) use actual trade and tariff data for the United States and the European Community to demonstrate how to model a Tokyo Round (as a form of trade negotiation) into a game among countries attempting to minimize individual welfare loss functions. They found that, while the game model tracks closely the decisions of the negotiators in the Tokyo Round, later unilateral political decisions resulted in less optimal tariffs.

Harrison and Rustrom (1987) suggest an alternative approach to the quantitative analysis of trade policy evaluation suggested by the notions of non-cooperative trade wars and cooperative trade negotiations. They specifically illustrate their approach by computing the outcome of a trilateral trade war between the United States, the European Union (EU) and Japan, and then a bilateral trade war between the United States and Canada. In each case they assume that other trading blocs do not react against the warring blocs. They found that the United States and the EU would each 'win' in the former trade war whilst Japan would lose, using the trilateral Free Trade outcome as a basis for comparison. They also found that both Canada and the United States would lose from a bilateral trade war, with the losses to Canada around ten times larger than those

of the United States as a percent of GNP. They show that most of the substantive aspects of a trilateral agreement between the EU, the United States and Japan can be achieved bilaterally by the EU and the United States, whether or not Japan reacts strategically to that bilateral negotiation process.

Gander (2008) uses a game theoretical approach to FTA made within ASEAN countries and between ASEAN countries and outside countries and the rest of the world (ROW). Using dynamic game theory, he found that as the number of players within ASEAN increases, the number of potential coalitions increases very rapidly. The FTA's multiply and become very complex. The same potential complexity holds for FTA's between ASEAN as a single entity and non member countries.

What is the incentive (Payoff) for countries in doing FTA? On the theoretical side, we have the so-called "endogenous growth theories" embracing the proposition that trade liberalization with greater openness might promote long-run economic growth under certain conditions. For example, Grossman and Helpman (1991) and Feenstra (1996) argue that if a free trade system is formed under conditions in which technology transfer occurs between the involved economies, production efficiency can be improved, and thus free trade can ultimately induce economic growth among the FTA member countries. Another theoretical link between trade and growth was described in a "learning-by-doing" model, as emphasized by Lucas (1988) and Young (1991). If free trade allows countries to specialize in industries with economies of scale, then their long-run economic growth can be increased. These examples demonstrate that certain economic conditions are required in order to realize a positive relationship between free trade and economic growth; thus, it can be inferred that the theoretical models do not necessarily yield an unambiguous prediction regarding the relationship between free trade and economic growth.

Given the limited amount of scholars using game theory for FTA strategy, let alone East Asian FTA, this paper aims to enrich the shelf of knowledge by doing a game theoretical approach on CJK FTA strategy towards ASEAN countries.

3. Methodology

3.1 Assumptions

1. Non Cooperative game
The most fundamental solution concept in game theory is Nash equilibrium. A game model with n-countries and their strategies can be formulated as $G = (S, u)$, where $S = (s_1, s_2, ...s_i)$ is the strategy of every country i and $u = (u_1, u_2, ...u_i)$ is the utility (payoff) of country i. From a specific combination of possible strategies of n-country game, a collective strategy s_i^* for every country i, is Nash equilibrium if no country i could improve her payoff by changing only her own strategy. In other words, in Nash equilibrium, no country wants to deviate from her strategy if the other countries do not deviate from their strategies. A collective strategy (s_i^*, s_{-i}^*), where s_i^* played by country i and s_{-i}^* played by other countries (except country i), is a Nash equilibrium if and only u_i $(s_i^*, s_{-i}^*) \geq u_i (s_i, s_{-i}^*)$ for every country i, and $s \in S$ .We can say that for country i and her 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. We can find the Nash equilibria of a game in which each country has only a few actions by examining each action profile in turn to see if it satisfies the conditions for equilibrium. Consider country i, for any given actions of the players other than i, country i's actions give her various payoffs. We denote the set of country i's best actions when the list of the other country's actions is a_{-i} by $B_i (a_{-i})$. Then we can define function B_i by $B_i (a_{-i}) = \{ a_{-i}$ in $A_i : u_i (a_i, a_{-i}) \geq u_i (a_i', a_{-i})$ for all a_i' in B_i $\}$: any action in $B_i (a_{-i})$ is at least as good for country i as every other action of country i when the other countries' actions are given by a_{-i}. We call B_i the best response function of country i. The function B_i is set-valued as it associates a set of actions with any list of other countries' actions. Every member of the set $B_i (a_{-i})$ is the best response of country i to a_{-i} if each other countries adheres to a_{-i}, then country i can do no better than choose a member of $B_i (a_{-i})$.

2. Players
The players involved in this game are China, Japan and Korea. Being acknowledged as the economic front runners, Japan, China and Korea are assumed to have heavy responsibility for the economic welfare in the

East Asian region. It is very obvious that East Asian regionalism cannot be put into practice without these countries' strong support.

3. Strategies

This paper divides the strategies into two: (i) creates FTA with ASEAN member countries or (ii) withholds FTA with ASEAN member countries. The agreement data is compiled from UNESCAP Interactive Trade Indicators (ITI) component of Asia Pacific Trade and Investment Agreement Database (APTIAD). Given the nature of the data (*ex post*), the strategies is described as backward looking in a way that strategy selection is based on experience measured by relative past realized outputs. Although the China, Japan and Korea are involved in a non cooperative game, this paper assumes each countries share a common goal which is to reach a sound regional economic growth in East Asia. A sound trading partner within the region is prerequisite for ensuring sustainable market in the future.

3.2 Payoff scheme

As we have defined that the players are aiming regional target (economic growth) as their common goal, we can now set the payoff for each countries. The Payoff scheme is taken from the work of Robert Barro (1996) on GDP determinants. He finds that GDP is enhanced by higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in the terms of trade. A year after, Edwards (1997) suggests adding productivity as one of influential variable for GDP. Many recent studies including Hansen and Rand (2004), Agrawal and Khan (2011) also include FDI as one of GDP determinants. Furthermore, Grossman and Helpman (1991) and Feenstra (1995) show that FTA is also enhancing the signatory country's economy. The macroeconomic data is taken from World Development Indicators (WDI) while the FTA data is taken from the UNESCAP Trade Agreement database. The data is ranging from the year of 1998 to 2007 in a way that it can match the emerging FTA which mostly took part within this period.

The paper employs a panel data model to generate the payoff schedule. There are several reasons for the increasing interest in panel data sets. An important one is that their use may offer a solution to the problem of

bias caused by unobserved heterogeneity, a common problem in the fitting of models with cross-sectional data sets. A second reason is that it may be possible to exploit panel data sets to reveal dynamics that are difficult to detect with cross-sectional data. The static panel data model is specified as follows:

$$GDP_{it} = \beta_1 \text{Wage}_{it} + \beta_2 Governance_{it} + \beta_3 FTA(CJK)_{it} + \beta_4 Tax_{it} + \beta_5 FDI_{it} + \varepsilon_{it}$$

(1)

Where GDP_t, $Wage_t$, $Governance_t$, FDI_t, Tax_t are Gross Domestic Product, monthly wage, governance indicator, FDI inflows and Tax rate for CJK and ASEAN4 at time t. The monthly wage is used to measure labor productivity within the East Asian region. We expect to have a positive and significant impact of labor productivity on regional GDP. Along with productivity, we also expect to have positive and significant impact of FDI inflows on GDP. Tax rate is rather ambiguous since it could create positive and negative impact to GDP, although the latter is more common.

Governance is measured by the six governance indicators following the work of Kaufmann (2003). These indices describe various aspects of the governance structures of a broad cross section of countries, including measures of Voice and Accountability, Political stability, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. In general, the Governance index provides explanatory power to explain the capability and quality of governance from each member country. The better indicator a country has the more it has the chance to enhance the regional welfare.

$FTA(CJK)_t$ is the key variable in this paper that explains China, Japan and Korea FTA to ASEAN countries. The variable is taken from the number of FTAs for each country. The coefficient (incremental) value of the FTA of China, Korea and Japan to the GDP will serve as a corresponding value for the payoff matrix.

3.3 Response Function

In some cases, we cannot decide player's best response function. Thus said, Nash Equilibrium cannot be decided. Fortunately for this FTA

game, we have an alternative that is called Baldwin's domino effect. The interest to become a hub for Regional Trade Agreement (RTA) will create Baldwin's (2006) domino effect that is expected makes the most of East Asian countries join the RTA. The big signings in FTA can trigger other countries to have similar signings. This is true even for the countries whose governments that were previously decided the "no FTA" as their politically optimal objective function. We have two major actors here, which are pro-membership (export competing firms) and anti-membership (import competing firms) forces. The model describes a political equilibrium resulting from a balance on the two major forces. The pro-membership will gain preferential access if the nation decides to join the RTA and go through with marginalization if the nation stays out. On the other hand, the anti-membership forces will be marginalized if the nation decides to join while it will win the domestic market if the nation stays out. Naturally, the export competing firms have larger output than the import competing one. Having said this, the shock resulted from nation's decision for not joining the RTA would be bigger for the pro-membership side. This in turn will force the policy makers to join the existing RTA. As the membership expands, the incentive to join the RTA becomes more attractive even for those who previously found the political optimal decision by staying out. The cycle repeats itself until a new political equilibrium membership in RTA is met.

The basic logic is simple, as Baldwin (2006) argues, the decision to join or not to join FTA is a function of a political equilibrium that meets the balance of anti-FTA and pro-FTA forces (Typically the pro-FTA group is made up of exporters who would like better market access; the anti-FTA group is made up of import competing firms and workers employed by them.). Deeper integration among CJK countries is very beneficial to be considered as South East Asian countries benchmark decision. Moreover Baldwin (2006) has the faith that the economic grouping in the North East Asia stimulates exporters in South East Asia to be engaged in greater pro-FTA political activity. The mechanism is as follows; if one of the other nations' government was previously close to indifferent, politically speaking, to signing an RTA with CJK countries then the extra political activity of their exporters may tilt the balance, leading the country to sign an RTA. This can be thought of as one domino knocking down the next one (think of the first RTA signing as someone pushing over the first domino, and the second FTA as the second domino falling). Countries that are out of the scheme will be

marginalized due to the shrinkage of foreign market access. In the political sphere this new disadvantage will result in greater political pressure – pressure on their own governments to negotiate with the existing RTA.

To simulate this logic, the author constructs a simultaneous equation model on RTA/FTA in China, Japan and Korea. Although they have individual action, most of them are influencing each other. The paper employs Vector Auto Regression (VAR) as a part of simultaneous equation model. VAR model is one of the most successful, flexible, and easy to use models for the analysis of multivariate time series. It is a natural extension of the univariate autoregressive model to dynamic multivariate time series. VAR is a statistical model used to capture the linear interdependencies among multiple time series. VAR models generalize the univariate autoregression (AR) models. All the variables in a VAR are treated symmetrically; each variable has an equation explaining its evolution based on its own lags and the lags of all the other variables in the model. VAR modeling does not require expert knowledge, which previously had been used in structural models with simultaneous equations.

The VAR approach assumes all variables in the system are potentially endogenous, so each variable is explained by its own lags and lagged values of the other variables. The author will start by formulating a general VAR model of the relationship between China, Japan and Korea Individual RTA.

$$CFTA_t = \alpha_1 + \sum \beta_{1j} CFTA_{t-j} + \sum \lambda_{1j} JFTA_{t-j} + \sum \gamma_{1j} KFTA_{t-j} + \varepsilon_1 \qquad (2)$$

$$JFTA_t = \alpha_2 + \sum \beta_{2j} JFTA_{t-j} + \sum \lambda_{2j} KFTA_{t-j} + \sum \gamma_{2j} CFTA_{t-j} + \varepsilon_2 \qquad (3)$$

$$KFTA_t = \alpha_3 + \sum \beta_{3j} KFTA_{t-j} + \sum \lambda_{3j} JFTA_{t-j} + \sum \gamma_{3j} CFTA_{t-j} + \varepsilon_3 \qquad (4)$$

The equations above show that all variables are endogenous variables within the simultaneous equation. The variables are influencing each other, as for example the growth of Chinese FTA in year "t" is influenced by the Chinese FTA, Japanese FTA and Korean FTA from previous period. Likewise, the growth of Japanese FTA at year t is influenced by Japanese FTA, Chinese FTA and Korean FTA from

previous period. Furthermore, Korean FTA at year t is influenced by Korean FTA, Japanese FTA and Chinese FTA from the previous period.

3.4 Dominant Strategy

A strategy is dominant if, regardless of what any other countries do, the strategy earns a country a larger payoff than any other. Hence, a strategy is dominant if it is always better than any other strategy, for any profile of other countries' actions. Depending on whether "better" is defined with weak or strict inequalities, the strategy is termed strictly dominant or weakly dominant. If one strategy is dominant, the other is dominated. This paper employs Error Correction Mechanism (ECM) to describe this phenomenon.

According to the Engle-Granger (1987) theorem, if two variables y and x are cointegrated, then the relationship between the two can be expressed as an ECM in which the error term from the OLS regression, lagged once, acts as the error correction term. In this case the cointegration provides evidence of a long-run relationship between the variables, whilst the ECM provides evidence of the short-run relationship. A basic error correction model would appear as follows:

$$\Delta y_t = \chi_0 + \chi_1 \Delta x_t - \tau(u_{t-1}) + \varepsilon_t \tag{5}$$

Where τ is the error correction term coefficient, which theory suggests should be negative and whose value measures the speed of adjustment back to equilibrium following an exogenous shock. The error correction term u_{t-1}, which can be written as: $(y_{t-1} - x_{t-1})$, is the residual from the cointegrating relationship. From this explanation we can say that ECM is a technique to correct short-run disequilibrium to its long run long run equilibrium. The equation of ECM is as follows:

$$\Delta GDPCountryX = \beta_0 + \beta_1 ExportCountryY + \beta_2 u_{t-1} + e_t \tag{6}$$

u_{t-1} is a cointegrated error lag 1, or could be noted mathematically as:

$$u_{t-1} = \beta_0 GDPCountryX_{t-1} + \beta_1 ExportCountry_{t-1} \tag{7}$$

In this equation, $\triangle \mathbf{GDP\ CountryX}$ is the difference in GDP for Japan, Korea and China, while $\triangle ExportCountryY$ is the difference in export from country X to Country Y. As for example, $\triangle \text{GDP Japan} = \beta_0 + \beta_1 \triangle \text{Export China} + \beta_2 u_{t-1} + e_t$ applies for the effect of Japan's export to China on Japan's GDP.

4. Results and Discussion

4.1 Payoff Matrix

Table 1: Payoff Matrices

Japan: Creates			
		China	
		Creates	Withholds
Korea	Creates	3240.14, 4809.101, 5362.959	3194.533, 0, 5679.006
	Withholds	0, 4788.361, 5265.277	0, 0, 1097.702

Japan: Withholds			
		China	
		Creates	Withholds
Korea	Creates	2368.986, 6090.883 , 0	815.0657, 0, 0
	Withholds	0,-82.75891, 0	0, 0, 0

Note: the numbers in the matrices are taken from the coefficient value of the CJK FTA to the GDP after regressing equation 1.

This game scheme yields the payoff matrices in Table 1. Payoffs in the three-player game are given to the row player (Korea), the column player (China), and the matrix player (Japan) respectively. Below is the detailed explanation

i. Japan
If Japan decides to conduct FTA with ASEAN member countries, she will yield several payoffs given other countries' actions. Japan will yield 5362.959 if China and Korea decide the same thing. Japan will have

5679.006 as a reward if Korea decides to create the FTA while China withholds her action. 5679.006 will serve as Japan's payoff if Korea decides to withhold while China creates FTA. If China and Korea withhold from the FTA, Japan will have 1097.702.

On the other hand Japan's action to withhold from FTA with ASEAN member countries will give zero (0) contribution given other countries' actions. Having these facts in mind, we can say that Japan best response function is to create FTA with ASEAN member countries. This is true since it produces the most favorable outcome for Japan, taking other countries' strategies as given. This is also a dominant strategy in view of the fact that creating FTA earns Japan larger payoffs than withholding it.

ii. Korea
Korea's strategy to create FTA with ASEAN member countries, will give her several payoffs given other countries' actions. Korea will take 3240.14 if China and Japan decide to do the same thing. 3194.533 will serve as her reward if Japan decides to create FTA while China withholds her action. Korea will get 2368.986 as her payoff if China decides to do the same while Japan withholds. If China and Japan withhold from the FTA, Korea will have 815.0657.

Alternatively Korea's action to withhold from FTA with ASEAN member countries will give zero (0) contribution given other countries' actions. Since FTA creating strategy to ASEAN member countries produces the most favorable outcome for Korea, taking other countries' strategies as given, we can say that it is the best response function for Korea. This also functions as dominant strategy for Korea in since creating FTA gives better payoffs than withholding it.

iii. China
Following the same scheme, China's strategy to create FTA with ASEAN member countries, will give her several payoffs given other countries' actions. China will get 4809.101 if Korea and Japan are moving along the same line. If Korea withholds while Japan decides to create FTA, China will yield 4788.361 as her payoff. China will have 6090.883 as payoff if Korea chooses to create FTA while Japan withholds. But China will suffer from the game if she is the only country that creates FTA with ASEAN since she will receive -82.75891 as payoff.

Then again China's strategy to withhold from FTA with ASEAN member countries will give zero (0) contribution given other countries' actions. From the payoff matrix, China's best response function and dominant strategy are still ambiguous. It is fair to say this since China's strategy still has the possibility to deviate from creating FTA with ASEAN.

Given the less ideal situation above for China, we cannot decide the Nash Equilibrium yet. It still has the tendency to deviate from *Pareto superior* to *Pareto inefficient* equilibrium that is often associated with strategy traps. Baldwin's domino effect using VAR simulation below will bring the answer.

4.2 Response Functions

From the VAR result in Table 2, we can see that Chinese FTA is influenced by her own FTA in t-1 and Japanese FTA in t-2 while Korean action to conduct FTA does not give significant influence to Chinese FTA strategy. Japanese FTA, on the other hand, is clearly influenced by her FTA in t-1, Chinese FTA in t-1 and Korean FTA in t-2. Implicitly speaking, Japanese put more attention in Chinese FTA rather than Korean FTA. It is stated from the difference in time lag. Korean strategy in conducting FTA is rather unique compared with Japanese and Chinese FTA. Korean FTA is surely neglecting her previous FTA policy and put more focus on Japanese and Chinese action. Chinese FTA in t-1 and t-2 give an abundant dominance for Korean FTA while Japanese FTA gives different influence in t-1 and t-2. Japanese FTA in t-2 boost the tendency of the Koreans to have their FTA with others while Japanese FTA in t-1 stalls the Korean FTA.

From the regression, we can find that China's strategy is relatively dependant with Japan's strategy. Since we already have Japan's best response function, the decision to create FTA with ASEAN countries will be the Nash Equilibrium for China. The analysis of dominant strategy in the next section will serve to complement this finding.

Table 2: VAR Result

Sample(adjusted): 1992 2009			
Standard errors & t-statistics in parentheses			
	CHINA_FTA	JAPAN_FTA	KOREA_FTA
CHINA_FTA(-1)	0.628205	0.948718	0.410256
	(0.26004)	(0.27010)	(0.09456)
	(2.41582)	(3.51246)	(4.33861)
CHINA_FTA(-2)	-0.517094	-0.726496	0.811966
	(0.42724)	(0.44377)	(0.15536)
	(-1.21033)	(-1.63711)	(5.22641)
JAPAN_FTA(-1)	0.088034	0.391453	-0.331624
	(0.19291)	(0.20037)	(0.07015)
	(0.45636)	(1.95364)	(-4.72749)
JAPAN_FTA(-2)	0.873504	0.223932	0.408547
	(0.25506)	(0.26493)	(0.09275)
	(3.42467)	(0.84524)	(4.40483)
KOREA_FTA(-1)	0.191453	-0.663248	-0.294017
	(0.51012)	(0.52986)	(0.18550)
	(0.37531)	(-1.25173)	(-1.58500)
KOREA_FTA(-2)	-0.141880	1.670085	-0.960684
	(0.34976)	(0.36330)	(0.12719)
	(-0.40565)	(4.59701)	(-7.55333)
C	0.084615	0.046154	0.030769
	(0.09355)	(0.09717)	(0.03402)
	(0.90453)	(0.47500)	(0.90453)
R-squared	0.866164	0.914038	0.951648
Adj. R-squared	0.793162	0.867149	0.925275
Sum sq. resids	1.137607	1.227350	0.150427

4.3 Dominant Strategy

In this part, two scenarios are included. In the first scenario, the author used the period when FTAs/EPAs were not a major trend while in the second scenario the author used the period when it has emerged as snowball. From the trade agreement database, we have the most FTAs/EPAs in force after the year of 2005. Therefore, the scenarios are

differentiated by the time period. In the first scenario, the author uses the data from 1985 to 2005. As for the second scenario, the data from 1990 to 2009 is employed.

i. First Scenario
China: The residuals for the relationship between China's GDP with China's Export to Japan and Korea are significant. These suggest that there is an equilibrium error in the short run. The negative signs put the Export for a constant rise to reach the long run equilibrium. In China's case, the adjustment rate or the phase of acceleration for the long run equilibrium is very fast. It can be seen through the absolute value of the equilibrium error coefficients which are 1.09 and 1.33 for China's relationship to Korea and Japan respectively.

Japan: In the short run, there is an equilibrium error for Japan's Export to China with its relation to Japan's GDP. The coefficient of residual gives negative sign (-0.18), which means that Japan's Export to China is below the long run equilibrium. This will only lead to a rise of export for the following periods. But it is important to note that the absolute value of the coefficient (adjustment rate) is very small (0.18). This suggests that Japan's Export to China is moving in a slow phase to reach the long run equilibrium.

As for the relationship between Japan and Korea, the equilibrium error of the export trend is not significant. These suggest that Japan's GDP is adjusting to the change in Japan's export to Korea in the same period of time. In other words, Japan and Korea relationship in terms of export has already reached steady state level.

Korea: Korea's case is somewhat similar to China. The residuals for the relationship between Korea's GDP with Korea's Export to Japan and China are significant. It yields similar explanation with China's case. However, the adjustment rate for the case of Korea is slower than China's but it is still faster than Japan's. It gives the absolute value of 0.23 and 0.48 for Korea's trade relationship to Japan and China respectively.

Table 3: Equilibrium Errors

Dependent Variables Independent Variables	GDP *(Japan)*	GDP *(China)*	GDP *(Korea)*
Equilibrium error for Export to Japan	na	-1.0 9 ***	-0.23 *
Equilibrium error for Export to China	-0.18 ***	na	-0.48 ***
Equilibrium error for Export to Korea	0.0178	-1.33 ***	na

Note: Statistical significance is indicated by *(10%), **(5%), and ***(1%)

From the ECM result in scenario one (see Table 3), we can see that china has the highest coefficient of equilibrium error (1.09 and 1.33) followed by Korea (0.23 and 0.48) and Japan (0.18 and 0.0178). This indicates that North East Asian region is not moving at the same phase to reach the long run equilibrium, which in this case Japan is the slowest one. Although the coefficient of acceleration is usually ranging between 0 and 1, the case of China that has it more than 1 gives an explicit message that the equilibrium errors have an overshooting. So it will accelerate in a very high phase towards long run equilibrium that might pose equilibrium overshooting.

The insignificant value of acceleration rate for the case of Japan trade relationship with Korea is also important point to note since it can be interpreted as an exhausted Korean market for Japanese products (steady state condition). These facts are very crucial since it diminishes Japan's role as the sole leader in the north East Asia. The stalled effect of a country's economic growth in this region will only serve as stumbling blocks in creating East Asian welfare. The rising growth of China and Korea will soon meet its end mimicking the pattern of Japan if no serious action is sited. The absence of an appropriate action will only lead to a shock for the long run equilibrium hence lowering the projected welfare growth. Therefore, in order to strengthen regional welfare and accelerate the phase of adjusting, regional action should take place.

ii. Second Scenario
The majority of FTAs/EPAs that are in force since 2005 has given a considerable impact in the CJK countries constellation. In scenario one, we see Japan as a sick partner for the CJK triangular scheme. But here in scenario two, Japan has been successfully proven in revitalizing their

condition. It can be seen from the change in coefficients of acceleration (0.54 and 0.57) which are getting better compared with the one in scenario one. In particular, we can see the Japan is no longer facing a steady state level with Korea, or to put it in other words, Japanese products have recovered its market in Korea. Korea has also grown well in this scheme with the coefficients of acceleration (0.88 and 1.07) which is bigger than it is in scenario one, hence giving a major boost in welfare. Korea's GDP, as shown by the equilibrium error for export to China, also depicts an equilibrium error that is more than one. This also shows that the coefficient of acceleration is posing an overshoots.

However, the improving condition of Japan and Korea has given a slight shock for China. The fact is clearly described from the decreasing rate for the coefficients of acceleration (0.45 and 0.29). But, the shock is not significant enough if we calculate the overall welfare impact from the FTAs/EPAs that are in force. Table 4 summarizes the ECM result in scenario two.

Table 4. Equilibrium Errors

Dependent Variables	GDP (Japan)	GDP (China)	GDP (Korea)
Independent Variables			
Equilibrium error for Export to Japan	*na*	*-0.45 ***	*-0.88 ****
Equilibrium error for Export to China	*-0.54 **	*na*	*-1.07 ****
Equilibrium error for Export to Korea	*-0.57 **	*-0.29 **	*na*

Note: Statistical significance is indicated by *(10%), **(5%), and ***(1%)

Comparing the first and second scenario, the strategy to create FTA has created a regional difference. FTA creation has been helping the region to reach sustainability. Given this fact, it is fair to say that FTA creation is a dominant strategy for China, Japan and Korea.

4.4 Discussion

As it has been stated in section 4.2, China, Japan and Korea's strategy to create FTA with ASEAN member countries is the Nash equilibrium for this game. In this game, we have found that China, Japan and Korea strategy is interdependence to each other with China giving the most influence to others in making their move. But with the absence of Japan

and Korea, China's strategy will give a negative impact economically given her shallow and unclear FTA/RTA strategy in ASEAN. According to Nakagawa and Liang (2011), China has excluded sensitive sectors and issues that may be difficult to deal with in the short term such as intellectual property protection, dispute settlement mechanisms, special sectoral liberalization, environment, and labor standards. Moreover, they argue that China and ASEAN have placed a wide range of important industrial products (such as automobiles, appliances, chemical products, iron and steel, and textiles) as well as farm goods (such as rice and palm oil) on the sensitive track. China has negotiated more than half of its FTA agreements by placing geopolitical/security/strategic goals over economic considerations (Nakagawa and Liang, 2011).

China's attempt with China-ASEAN FTA (ACFTA) is widely seen as an example of the dominance on geopolitical considerations in its engagement in Southeast Asia region as stated by Nakagawa and Liang (2011). A worrying and uncomfortable region can only be a distraction from a focus on economic development. China also accepts very flexible plan, requested by its FTA partners, to reach FTA. As with China's FTA negotiation with ASEAN members, China agreed to negotiate trade in goods agreement (signed in 2004) separately from trade in services agreement (signed in 2007) to ease the political tensions in some of the ASEAN countries. .

The greater flexibilities demonstrated by China unilaterally also shows that reaching agreements with these countries will meet primarily its political and foreign policy objective and instead of reaching economic target such as GDP growth. In fact, Chinese government officials admitted that geopolitical considerations trump any economic benefit when China is negotiating economic issues with its neighboring countries (Nakagawa and Liang, 2011). This is quite understandable since the rivalry between ASEAN4 members and China has been prolonged for ages. Holst and Weiss (2004) point out China's emergence for creating short and medium term direct and indirect competition between ASEAN and China. They argue that ASEAN and China are experiencing intensified export competition in prominent third markets. This can lead to painful domestic structural adjustments within the ASEAN in the short run. Then again the mind set in viewing the economic opportunity or threat depends on whether China's economy is perceived as complementary or competitive vis-à-vis individual ASEAN

economies and on whether the latter economies are able to exploit their complementary opportunities and overcome the competitive threats.

In constituting East Asian regionalism, leadership plays a very important role. The Korea Herald once posed the crucial question for the future direction of Asian regionalism:" *Which country is capable of taking the lead? It boils down to either China or Japan"* (Korea Herald, 10 October 2002). Sino-Japanese antagonism and aspirations to leadership on both sides have, in consequence, been a major source of structural change in the region, resulting in a dynamic interplay between bilateral FTA and multilateral institutions. This paper argues that it is important for East Asia to give Japan an extensive role in designing East Asian wide FTA given the shallow impact of China's FTA the region. From the payoff matrix we can see that Japanese decision to create FTA, given Chinese and Korean decision, yields superior payoff not only for Japan but also for the East Asian region. Although we must admit that the possibility to have Japan as an ideal leader for East Asia is quite difficult, but it is worth trying given the potential effect for enhancing the regional welfare. Their joint strategy to create FTA will eventually bring the East Asian Region to the next level.

5. Concluding Remarks

The Nash equilibrium in this game happens when China, Korea and Japan are playing the same strategy which is to create FTA with the ASEAN member countries. Although the game is analyzed as backward looking, but what we have learned from it has created a benchmark towards the future FTA policy. In a sense of creating integration in East Asia, there is a need to set up more formal institutional mechanisms for trade. It is rational for such mutually dependent countries in the region to institutionalize de facto integration through the establishment of regional arrangements (Kawai, 2005). The growing significance of China, Japan and Korea market for ASEAN will then serve as the basis for a single East Asian Wide FTA. Eventually, China, Japan, and Korea's FTA will find its way to have a greater grip in East Asia (domino effect).

To wrap up, East Asian Regionalism (EAR) will enable the region to cope with the future challenges of globalization and remain internationally competitive. Moreover, Chia (2007) states that EAR

could help the less developed East Asian economies which would otherwise become marginalized as they lack the attraction of sizeable market and lack negotiating resources. As Bahrumshah (2007) et al argue, regional integration through RTAs is expected widens the markets of the participating member countries. Large and growing markets will create greater confidence for both domestic and foreign investors.

References

Agrawal, Gaurav and Mohd. Aamir Khan, (2011). 'Impact of FDI on GDP: A Comparative Study of China and India,' *International Journal of Business and Management*, Vol 6, No 10.

Asami, Tadahiro. (2002). 'Japan's Strong Leadership Urged to Promote Regional Economic Cooperation in East Asia' *International Finance Journal* No.1085.

Arellano, M. (1995) 'On the testing of correlated effects with panel data', *Journal of Econometrics*, Vol. 59, pp. 87--97.

Baharumshah, Ahmad Zubaidi, Kevin Odulukwe Onwuka, Muzafar Shah Habibullah (2007) 'Is a regional trade bloc a prelude to multilateral trade liberalization? Empirical evidence from the ASEAN-5 economies' *Journal of Asian Economics* Vol. 18 pp. 384–402.

Baldwin, Robert E. and Richard N Clarke. (1987) 'Game-Modeling Multilateral Trade Negotiations' *Journal of Policy Modeling* 9(2):257-284.

Capannelli, Giovanni. (2011). 'Institutions for Economic and Financial Integration in Asia: Trends and Prospects'. ADBI Working Paper 308. Tokyo: Asian Development Bank Institute

Capannelli, Giovanni., J-W. Lee, and Peter. Petri. (2010). 'Economic Interdependence in Asia: Developing Indicators for Regional Cooperation and Integration'. *Singapore Economic Review* 55(1): 125–161.

Chan, Sarah and Chun-Chien Kuo. (2005) 'Trilateral Trade Relations among China, Japan and South Korea:Challenges and Prospects of Regional Economic Integration', *Journal of East Asia,* Vol. 22, pp. 33-50.

Chia, Siow Yue. (2006) 'ASEAN-China Economic Competition and Free Trade Area', Asian Economic Papers, Vol. 4, pp. 109-147

---------------------. (2007) ,Challenges and Configurations of a Region-wide FTA in East Asia', FONDAD Conference.

Doraisami, Anita. (1996) Export Growth and Economic Growth: A Reexamination of Some Time-Series Evidence of the Malaysian Experience ', *Journal of Developing Areas*, Vol. 30, pp. 223-230.

Drysale, Peter. (2006). 'Regionalism in Asia and the Pacific and an Asian Economic Community'. Paper presented in a workshop in ICRIER, New Delhi.

Edwards, Sebastian, (1997). 'Openness, Productivity and Growth: What Do We Really Know?' *NBER Working Paper Series*, Working Paper 5978.

Ekanayake, E.M. (1999) 'Export and Economic Growth in Asian Developing Countries: Cointegration and Error-Correction Models', *Journal of Economic Development,* Vol. 24, pp. 43-56.

Engle, R.F. and C.W.J. Granger. (1987) 'Cointegration and Error Correction: Representation, Estimation and Testing', *Econometrica*, Vol. 55, pp. 251-76.

Robert C. Feenstra, (1995). 'Estimating the Effects of Trade Policy,' *NBER Working Papers* 5051, National Bureau of Economic Research, Inc

Frankel, Jeffrey A. and David Romer. (1999) 'Does Trade Cause Growth?, *The American Economic Review*, Vol. 89, pp. 379-399.

Gander, James P, (2008). 'Dynamic Economic Game Theory and Asian Free Trade Agreements' University of Utah, *Department of Economics Working Paper Series* Vol.18.

Grossman, Gene M. and Elhanan Helpman, (1991).'Trade, Knowledge Spillovers, and Growth' *NBER Working Papers* 3485, National Bureau of Economic Research, Inc.

Hansen, Henrik and John Rand, (2006). 'On the Causal Links Between FDI and Growth in Developing Countries,' *The World Economy*, Wiley Blackwell, vol. 29(1), pages 21-41, 01

Harrison, Ann. (1996) 'Openness and Growth: A Time Series, Cross Country Analysis for Developing Countries', *Journal of Development Economics*, Vol.48, pp. 419-447.

Harrison, Glenn W and E. E. Rustrom, (1987). 'Trade Wars and Trade Negotiations: A Computational Approach,' University of Western Ontario *Centre for the Study of International Economic Relations Working Paper* no. 8714C.

Harvie, Charles and Hyun Hoon Lee. (2002) 'New Regionalism in East Asia: How Does It Relate to the East Asian Economic Development Model', University of Wollongong Department of Economics, Working Paper Series.

Helpman, E., & Krugman, P. R. (1985) 'Market structure and foreign trade'. Cambridge: The MIT Press.

Holst, David Roland and John Weiss. (2004) 'ASEAN and China: Export Rival or Partners in Regional Growth?', Blackwell Publishing Ltd.

Kaufmann, Daniel, Aart Kraay and Massimo Mastruzzi. (2003) 'Governance Matters III: Governance Indicators for 1996-2002', World Bank Policy Research Department Working Paper.

Kawai, Masahiro, (2005) East Asian Economic Regionalism: Progress and Challenges, *Asian Economics*, Vol. 16, pp. 29-55.

Kawai, Masahiro and Ganeshan Wignaraja. (2007) 'Regionalism as an Engine of Multilateralism: A Case for a Single East Asian FTA', ADB Working Paper series on Regional Economic Integration no.14.

Kawai, Masahiro. (2007). 'Evolving Economic Architecture in East Asia'. Discussion Paper No. 84. Tokyo: ADB Institute.

Lucas, R. (1988). 'On the Mechanics of Economic Development,' Journal of Monetary Economics Vol. 2 pp. 3-42.

Nachrowi,Djalal. (2007) 'Ekonometrika Untuk Analisa Ekonomi dan Keuangan [Econometrics for Economic and financial analysis]', Faculty of Economics University of Indonesia.

Nakagawa, Junji and Wei Liang (2011). 'A Comparison of the FTA Strategies of Japan and China and

Their Implications for Multilateralism' RCCPB Working Paper Vol. 11.

Petri, Peter. (2006). 'Is Asia Becoming More Interdependent?' *Journal of Asian Economics* 17(3), 381–394.

Rodriguez, Francisco and Dani Rodrik. (2001) 'Trade Policy and Economic Growth: A Skeptic's Guide to the Cross National Evidence, in *NBER Macroeconomics Annual 2000*.

Soesastro, Hadi. (2006). Regional Integration in East Asia: Achievements and Future Prospects. *Asian Economic Policy Review* 1(2): 215–235.

Soesastro Hadi. (2009). 'East Asia, the G20 and global economic governance'. Available at: http://www.eastasiaforum.org/2009/03/08/east-asia-the-g20-and-globaleconomic-governance/

Stubbs, Richard. (2002) 'ASEAN PlusThree: emerging East Asian Regionalism?', *Asian Survey*, Vol. 42, pp. 440-455.

Tamura, Robert. (1995) 'Regional economies and market integration', *Journal of Economic Dynamics and Control*, Vol. 20, pp. 825-845.

Urata, Shujiro and Kozo Kiyota. (2003) 'The Impacts of an East Asia Free Trade Agreement on Foreign Trade in East Asia', *NBER Working Paper Series 10173*, National Bureau of Economic Research, Cambridge.

Watanabe, Yorizumi. (2008) 'Economic Partnership Agreement (EPA) of Japan and Economic Integration in Northeast Asia', Academic presentation, Graduate School of Media and Governance, Keio University.

Young, Alwyn. (1991). 'Learning by Doing and the Dynamic Effects of International Trade,' *NBER Working Papers* 3577, National Bureau of Economic Research, Inc

Yoshida, Tadahiro. (2004) 'East Asian Regionalism and Japan', *IDE APEC STUDY CENTER* Working Paper Series.