Global Economic Crisis: Enter the Dragon

Dinda, Soumyananda

Chandragupt Institute of Management Patna

2011

Very Preliminary Draft

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Soumyananda Dinda

Chandragupt Institute of management Patna, Bihar, India

March 2011

Abstract

China is emerging as a giant in Asia as well as in the world economy. Now China is a major economic hub in the world. China has double role in international trade – first it attracts inputs from the East and South East Asia region and secondly pushes the products in international market with a comparative advantage in price competition. This is possible because China is economically integrated with region and the world as a whole. This paper attempts to measure the economic integration issue. The economic integration can be measured as the degree of association among nations, i.e., correlation. The paper observed a strong integration in the region in terms of tariff cut for reducing trade barriers and promote the smooth flow of trade. Co-integration technique provides the economic integration of China's export to the US and its import from East and South East Asia region.

Key Words: Economic Integration, Co-integration, Correlation, Double Engine of Growth, Export, Import.

JEL *Classification*: C1, F1, R3

Address for Correspondence: Department of Economics, Chandragupt Institute of management Patna, P. R. Hindi Bhawan, Chhajjubagh, Patna -800001, Bihar, India. E-mail: s.dinda@cimp.ac.in, sdinda2000@yahoo.co.in, and sdinda@gamil.com Ph #: +91 612 2200489, Fax: +91 612 2200453

Introduction

Recently most of the Asian economies recover from the global economic crisis which started in 2008. China plays a crucial role in the post crisis era in the international and at the regional

level. With huge trade surplus, China is already 'making a room' in the world economy (Rodrik 2010) and ready to rescue the world economy and dominate the world business. Now, none can deny China in the global arena and especially in the East and South East Asia region. China acts as a global player in the supply driven economy which is based on the strong production network in Asia region. This is popularly known as 'factory Asia'. China is the most important strategic and decisive player in this factory. China is highly integrated in economic activity within the East and South East Asia region and rest of the world. Truly, China is the regional engine of economic development, which is observed its deep involvements in the international production networks (IPN), especially for automotive industry.

China pushes the products into the world market and simultaneously pulls other Asian economies. China is the main engine of growth that drives the economic activities of South East Asia. Chinese growth engine pulls the demand for inputs from South East Asia to produce goods in *factory Asia* while it pushes these products competitive way to the rest of the world especially to the developed countries. During the crisis, China adopted some stimulus package to boost up its internal domestic demand which helped to raise the regional trade sharply. China acts as double engine[1] of growth.

The global economic crisis[2] 2008 originated in the developed economies and automatically they have traded the crisis with the rest of the world. The wave of economic crisis spread out widely and affects the whole world causing significant decline in trade, employment and production. Obviously export markets disintegrate quickly and export –led growth economies search alternative way outs. One of their efforts was to generate internal demand and took several stimulus packages to boost up their economies. Within short period (around middle of

[1]One engine pulls Asian nations and promotes regional growth while other engine pushes regional products to the rest of the world.

[2]This is different from the Asia crisis 1997. It originated in Asia and exported it way out of crisis to the developed economies and they absorbed it. So, developed world were part of solution for the Asian crisis 1997.

2010) most of Asian economies return to their pre-crisis level of trade (monthly data) and financial flows look more stable than in the months before the crisis. From the Asia's perspective, it looks as exports were again used as an engine to pull their economies out of crisis. In this context, China plays a vital role in creation of internal demand and increase import from Asian countries. China maintains its high growth rate in 2010.

There are several trade performance indicators to assess the relative position of China and sub regions in global economy with an objective of offering some ideas on the role of trade in Asia's recovery from the crisis. All these trade performance indicators are readily available in several reports, for example APTIR 2010.

There are numerous academic and policy papers, seminar and conference materials, dedicated to find the linkage of country level trade to global or regional trade performance. There is only few studies address China's economic integration with the world economy. Countries become economically integrated because of certain motivations or economic incentives. Integration among the nations may be political, economical, religion or cultural interest. For any reason countries are integrated in this globalized world. Here integration means togetherness or closeness among nations and formation of association based on mutual interest and benefits. So, integration can be measured in term of degree of association between two or more defined variables. The paper measures the economic integration using the correlation that is the measurement of degree of association among the economic variables under certain conditions. Finally statistical co-integration test measures the co-movement or move together jointly on the time path. This study mainly focuses on the economic integration of China in the East and South East Asia region and the world as a whole. Here China is at the centre and plays a pivotal role in the post crisis period. This paper especially investigates how China is economically integrated in the East and South East Asia region and rest of the world.

From literature it is clear that Asian economies are mainly integrated in the production network. The production network is successful possibly because of the trade liberalization policies and several regional trade agreements. Trade liberalization facilitates smooth movement of goods, and services and resources among these countries. China import inputs for their productions and exports the world market. Truly China acts as a pivotal role in the East and South East Asia in the formation of production network. Few literatures focused on the role of trade policy or liberalization in creating the international production network. The concept of production network is based on the global value chain system. It underlines the notion of sequential and interconnected structure of economic activities[3], with each link in a value chain and adding value in the process (Henderson et al. 2002). Value chain may include a wide-range of related and dependent activities within or between chains. It is common for a producer of an intermediary input to be involved in several value chains, which can span within- and across- geographic boundaries. This implies that the activities are not only done within the boundary of a single firm – as in the traditional Porter's conception of value chain – but also are done by more than one firms located in more than one countries or region. This large interconnected system of value chain has become known as Global Value Chain (GVC) (Kuroiwa and Toh 2008). Kuroiwa and Toh (2008) viewed IPN as a complement to GVC. It reflects the accelerated fragmentation in knowledge-intensive activities of some value chains, which had become the modularisation, allows the activities to be separated from the value chains and to be performed at different location (Ernst and Luthje 2003). Production network is not only integrating firms and parts of the firms but also national economies. Kimura and Ando (2005), define IPN to consist of vertical production chains that are extended across countries within a region as well as distribution network across the world.

[3] More specifically, Porter divides all of the activities in a value chain into two big groups: primary and support. Primary activities include research-and-development, manufacturing, marketing, and logistics services; while support activities include finance, human resource management, and technology development and procurement.

Now this production network integrates most of the nations in the East and South East Asia that is well known. Intuitively everybody accept this production integration especially auto parts industry in this region. This production integration is possible because of regional free trade agreement and trade liberalisation policies. These policies help to integrate not only production system but also financial integration and as a whole market integration in the region as well as the world. This production network system integrates the national capital markets with the world capital market. The result is the huge flow of foreign direct investment (FDI) towards these nations. This FDI flow over time gradually brings all nations closer in the production front removing national boundary. The characteristic of this region is that the market is integrated through production network. So FDI flow is very important factor that promotes economic integration in the region.

For a measure of regional integration in East Asia, one would need information on intra-regional capital flows in East Asia relative to inter-regional flows between East Asia[4] and the rest of the world. Reliable data on intra-or inter-regional capital flows are not available. This balance of payment characteristic together with underdevelopment of financial markets suggests that the level of financial transactions including bank lending and trade in regional securities between different countries in East Asia is likely to have been relatively small, in particular when a large Japanese bank lending to direct investment in other East Asian countries are excluded. Furthermore, since the outbreak of the 1997-98 crisis, Japanese banks lending and FDI to other East Asian countries have fallen dramatically. So Korea's and Taiwan's FDIs moved to other East Asian countries. Singapore's FDI data are rather sketchy, but its FDI to Malaysia and Indonesia declined during the post crisis period from 1997 to 1999. As a result, it would be reasonable to assume that intra-regional financial flows in East Asia have been smaller than inter-regional flows between East Asia on the one hand and

[4] East Asia as it is defined to include the ASEAN members, Taiwan, Hong Kong, China, Korea, and Japan has always been a net saver to the rest of the world.

North America and Europe on the other. This feature of inter regional capital movements have become more visible with the increase in current account surpluses of Indonesia, Malaysia, Korea, and Thailand and provides a piece of indirect evidence that East Asian countries have forged tighter financial links with North America and Europe than with their neighbouring economies in the process of financial liberalization.

The economic integration can be measured as the degree of association among nations. So the basic criteria are the correlation coefficient bilaterally and multilaterally under certain conditions. Alternatively the level of integration can be measured in terms of conditional correlation and finally co- integration among nation in trade and FDI flows.

Data and Methodology

In this study the economic integration is measured in terms of trade flows using monthly data on export and import of China during December 2005 to July 2010. China's export to the US is the integration of China with the world. This supply is possible with huge input demand which China imports from the region i.e., the East and South East Asia.

For this study data source is the CEIC. Monthly Data on China's export to the US and China's import from Asia8 Countries (Asia8 export to China) are taken from CEIC. Time period is December 2005 to July 2010. Using the monthly trade data (from CEIC) on export and import this paper examines the co- integration relationship between China's export to the US and its import from major eight Asian economies (Asia8 hereby). Asia8 is consisting with South Korea, Hong Kong, Singapore, Malaysia, Thailand, Indonesia, Philippines and Taiwan. Basic statistical measure of integration or association is correlation among the variables. In this context this study measures the correlation coefficients for China and Asia 8 countries. The economic integration should be measured as the degree of association among the same variable within the region. Hence, the major criteria are the correlation coefficient bilaterally and multilaterally and finally co- integration among nations in trade, finance and FDI flows.

Results and discussion

Major international trade barrier or obstacle is the tariff rate. We start our analysis using primary information on the trends on tariff rates over time. With limited data Table 1a provides the basic information on tariff rate cut in the East and South East Asia. Table 1b shows the correlation matrix which suggests that the strong association among nations in reducing tariff rate in last two decades. This measure of correlation is likely to be more reliable, if countries are on a fixed exchange rate system. When exchange rate regimes vary from country to country as in East and South East Asia, the correlation of financial prices between countries may not be a good indicator of financial integration[5]. Fig 1a suggests that all the Asian nations converge towards zero tariff rates in the region. Over time the strength of association is improves as the value of the correlation coefficient increases towards one suggesting strong linear relation among them. It is clear from fig 1b. All these primary observations suggest that China is economically integrated within the region and over time its integration become stronger and stronger.

Reduction on trade cost: Trend on tariff cuts: Given the extent to which the East Asian countries have managed to liberalize their capital account transactions in recent years, one might expect that financial markets of these economies may have become more closely linked with one another than in the past. The investment policy response was essentially many policy packages with an objective to attract foreign direct investment (FDI). It is worth mentioning that the 'targeted' countries' FDI policy was so aggressive, reflecting the rather tight competition among the countries for the alternative manufacturing relocations and other countries' businesses. Kimura (2006) noted that in response to the fear of losing FDI, ASEAN countries even took a radical approach of 'accepting everybody', instead of making selection, for their FDI policy approach. As for trade policy, many Asian countries, and these

[5] Before the 1997 crisis, most of the East Asian countries pegged their currencies to the U.S. dollar and managed their dollar exchange rates to fluctuate within a relatively narrow band.

are East and South East Asian countries in particular, cut unilaterally their tariffs rate (see Table 1a), which is often viewed as 'race to the bottom' (Baldwin 2006).[6] Moreover, according to Baldwin, some of this tariff cut came in the form of duty-drawback and duty-free treatment for the establishments in economic processing zone; but, not only that, over the time countries realised the large benefit of giving lower trade cost by switching from special treatments to lowering applied MFN tariff rates, and as the result, many of these countries continuously cut their tariff, unilaterally, in the past two decades (see Table 1a).

The *race-to-the-bottom* in the unilateral tariff cut and liberal FDI policy essentially means reduction in trade costs. This aligns with some studies which argue that the reduction in cost for trade is what matters for the formation of production network. The Yi (2003) model also indicates that tariff reduction produces non-liner effect[7] on the traded of the vertically specialised goods. This is because the effect of tariff reduction in the second round (of further tariff reduction) becomes much higher when the vertically and fragmented production mechanism is established from the first round of tariff reduction.

The integration of China into the global economy in general and East Asia in particular has further deepened international production fragmentation to unprecedented levels (Haddad, 2007; Athukorala, 2007). At the turn of the decade, China's processing exports (exports that are produced from processing and/or assembly of imported inputs) accounted for nearly half of its total exports. In 2006, 51.5% of China's intra East Asian trade was in machinery products, of which more than half was trade in parts and components. The rate of annual growth in parts and components with its East Asian partners between 1993 and 2006 was a staggering 22.7% (Kimura and Obashi, 2008).

[6] Kuchiki (2005) mentioned some anecdotal evidence on the 'race-to-the-bottom' unilateral tariff cuts.

[7] Yi (2003), for example, theoretically shows the propagation effect of tariff reduction. In particular, lower tariffs reduce the cost of producing vertically specialised goods by more than regular goods (Yi 2003); moreover, this propagation effect, according to Yi's model, increases as the number of production stages increases.

The changes in the industrialization strategies of developing Asian countries and their subsequent adoption of deeper liberalisation of FDI and trade policies[8] have initiated and developed production networks within East Asian region. China becomes the central attractor in the region and pulls up the Asian8. Asia8 exports to China to fulfil its input demand. Within the region trade cost is also low due to cut in tariff rates. With low production cost (the cheap inputs: labour and raw materials) China pushes the comparatively low price products in the international market. China acts as a double engine – one pull all the inputs and other one push the products in the rest of the world at lower price. The US represents the international market in this study.

Let examine the China's regional and global integration. Here we assume the US is the rest of the world. We examine China's export to the US and China's import from Asian8 countries. Fig 1 depicts the China's export to the US and Asia8 export to China during December 2005 – July 2010.

[8] Incentives in the form of liberalization policies ensure that costs of relocation for MNC are less than the benefits. Therefore these countries have relied on incentives to attract foreign MNCs to establish production locally and gradually integrated with the regional production network.

Fig 1: China export to US and import from Asia 8 economies

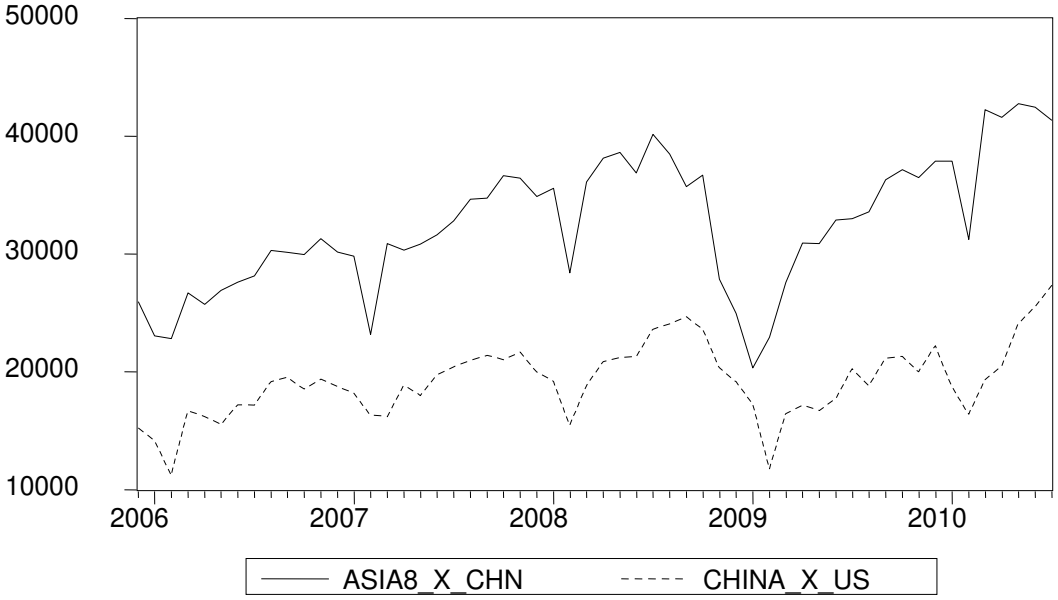

Fig 1 suggests that there is a co movement between China's export to the US and China's import from Asia8 nations. So China's export to the US is closely associated with its import from Asian countries and both China's export and import move together over time. The degree of association or correlation between China's export and import is high and the correlation coefficient is 0.80 (See 2nd column last row of Table 1). Table 1 provides the pair wise correlation coefficient matrix. Second column shows the correlation between China's export to the US and China's import from Asian countries. All these nations have strong association with China's export except Philippines. Rest of the columns (3 -10) describe the degree of association or closeness among nations which are exporting to China (i.e., China's import) in the region. Fig 2 also supports these high degrees of association among china's importing countries from the East and South East Asia. These degrees of association measurement are valid for only China's import related economic integration. China is one of the important growing business hubs in this region[9]. Fig 2 shows that the trade pattern from

[9] Other most important business hubs are Hong Kong and Singapore.

China to the US and that of Asia8 countries in East and South East Asia region to China are very similar. It is clearly visible that there is a co- movement among Asia8 towards China and China to the US.

Now we examine this co- movement using co-integration techniques. We conduct unit root tests to judge the variables are stationary or non-stationary. Panel A in Table 2 suggest that China's export to the US and China's import from Asia8 nations is non-stationary. The augmented Dickey Fuller (ADF) and Philips Perron (PP) tests suggest that both the variables follow integration of order one, i.e., I(1).

Here LR test indicates two co-integrating equations at 5% significance level. The estimated long run equilibrium (i.e., co-integrating) relationship between China's export to the US and China's imports from Asia8 countries is $ChnXUS_t - 0.3412 * ChnMAsia8_t - 8181.02 = 0$. It is true that China integrates the East and South East Asia with the rest of the world. This economic integration was successful only through adaptation of liberalisation policies which actually promoted to develop production network in the region.

Using vector error correction model (VECM) we observe that all the error correction coefficients are negative and statistically significant. This suggests that if there is any divergence from equilibrium relationship it will come back to the long run equilibrium relation. The error correction coefficient values are the speed of convergence to the co-integrating relation. The speed of error correction in case of China's export to the US is very high (84.8%) while China's import from Asia8 is just in time. So the speed of China's import from Asia8 is faster than that of China's export to the US.

Vector error correction model (VECM) also provides the vector autoregressive (VAR) structure. From this estimated VAR structure we observe that China's export to the US follows autoregressive (AR) but China's import from Asia8 follows AR (1) and also depends on China's export to the US (Table 3). So in terms of causality in the Granger sense china's

export to the US is the cause of China's import from Asia region. Here, Granger causality is unidirectional running from supply (export to the US) to demand (import from Asia). In other words, the world demand stimulates to raise China's supply to the rest of world. This China's supply creates the demand for inputs in the region. This induced demand actually integrates the nations within region and involves in production network through trade liberalisation.

Let r_t and r_t^* denote the change of China's export to the US and change of China's import from Asia8 countries, respectively. From Table 3, on the basis of statistical significance the estimated VAR structured equations can be written as, $r_t = 0.349 r_{t-3} + \varepsilon_{1t}$ and $r_t^* = 0.929 r_{t-1} - 0.857 r_{t-1}^* + \varepsilon_{2t}$ where ε_{1t} and ε_{2t} are white noise error terms with zero expectations. These equations take specific form depending on the statistical significance of individual parameters of VECM. Thus, the change of China's export to the US follows autoregressive form but statistically significant autoregressive lag is three month. The change of China's import from Asia8 countries is also autoregressive form and also depends on the change of China's export to the US. Both statistically significant lags are at one month. If there is any disturbance in the export it affects export as well as import, but if any shock in import it affects only import, not export. So, the direction of causality is China's export to the US to China's import from Asia8. In other words, Asia8's export to China will be affected if China's export to the US is disturbed.

Conclusion

As we mentioned that this study measures the economic integration using the concept of the correlation coefficient and co-integration technique. The economic integration is measured as the degree of association between nations that is the correlation. The paper observed a strong integration in the region in terms of tariff cut for reducing trade barriers and promote the smooth flow of trade. Co-integration technique provides the economic integration of China's export to the US and its import from East and South East Asia region. China is emerging as a

giant in Asia as well as in the world economy. China is a major economic hub in the world and plays important role in the international economy. From the findings it is clear that China has double role in international trade – first it attracts inputs from the East and South East Asia region and secondly pushes the products in international market with a comparative advantage in price competition. This is possible because China is economically integrated with region and the world as a whole.

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Table 1: Pair wise Correlation Coefficients

	CHINA_X_US	HONGKONG_X_CHN	INDONESIA_X_CHN	KOREA_X_CHN	MALAYSIA_X_CHN	PHILIPPINES_X_CH	SINGAPORE_X_CHN	THAILAND_X_CHN
	1	2	3	4	5	6	7	8
CHINA_X_US	1							
HONGKONG_X_CHN	0.85	1						
INDONESIA_X_CHN	0.57	0.63	1					
KOREA_X_CHN	0.70	0.80	0.86	1				
MALAYSIA_X_CHN	0.67	0.75	0.83	0.93	1			
PHILIPPINES_X_CH	0.31	0.29	0.06	0.21	0.05	1		
SINGAPORE_X_CHN	0.70	0.73	0.67	0.84	0.75	0.49	1	
THAILAND_X_CHN	0.66	0.77	0.88	0.92	0.90	0.14	0.74	1
Asia8	0.80							

Table 2: Unit root test

A: Unit Root Test				
Variables	ADF		PP	
	Level	1st Difference	Level	1st Difference
Chnxus	-3.05	-3.514**	-3.03	-10.8***
ChnmAsia8	-2.71	-3.904**	-2.945	-9.15***

B: Co-integration Test				
Null Hypothesis	Eigen value	LR	Critical Value at 5% level	Critical Value at 1% level
Ho: r = 0, Vs H1: r <=1	0.329107	26.86775***	15.41	20.04
Ho: r = 1, Vs H1: r <=2	0.119858	6.511291**	3.76	6.65

Note: '***' and '**' indicate the level of significance at 1% and 5%, respectively.

Table 3: Vector Error Correction Model

Standard errors &		
Cointegrating Eq:	CointEq1	
CHINA_X_US(-1)	1.000000	
ASIA8_X_CHN(-1)	-0.341159***	
	(-6.32559)	
C	-8181.018	
Error Correction:	D(CHINA_X_US)	D(ASIA8_X_CHN)
CointEq1	**-0.847982*** **	**-1.477829*** **
	(-3.61379)	(-3.57686)
D(CHINA_X_US(-1))	0.249117	**0.928865** **
	(1.02242)	(2.16511)
D(CHINA_X_US(-2))	0.274864	0.153068
	(1.19690)	(0.37855)
D(CHINA_X_US(-3))	**0.349111** **	0.104860
	(2.02271)	(0.34505)
D(ASIA8_X_CHN(-1))	-0.104462	**-0.856720*** **
	(-0.72678)	(-3.38517)
D(ASIA8_X_CHN(-2))	-0.095727	-0.236224
	(-0.62947)	(-0.88220)
D(ASIA8_X_CHN(-3))	-0.048681	-0.071128
	(-0.41121)	(-0.34124)
C	139.7563	421.3637
	(0.58792)	(1.00671)
R-squared	0.382601	0.357382
Adj. R-squared	0.284378	0.255147
Sum sq. Resids	1.23E+08	3.82E+08
S.E. equation	1673.660	2946.900
Log likelihood	-455.4253	-484.8439
Akaike AIC	-455.1176	-484.5362
Schwarz SC	-454.8174	-484.2360
Mean dependent	205.2308	281.7115
S.D. dependent	1978.451	3414.524
Determinant Residual Covariance		1.19E+13
Log Likelihood		-930.4586
Akaike Information Criteria		-929.7663
Schwarz Criteria		-929.0909

Note: t-statistics in parentheses

Fig 2: China exports to US & imports from Asia8 region

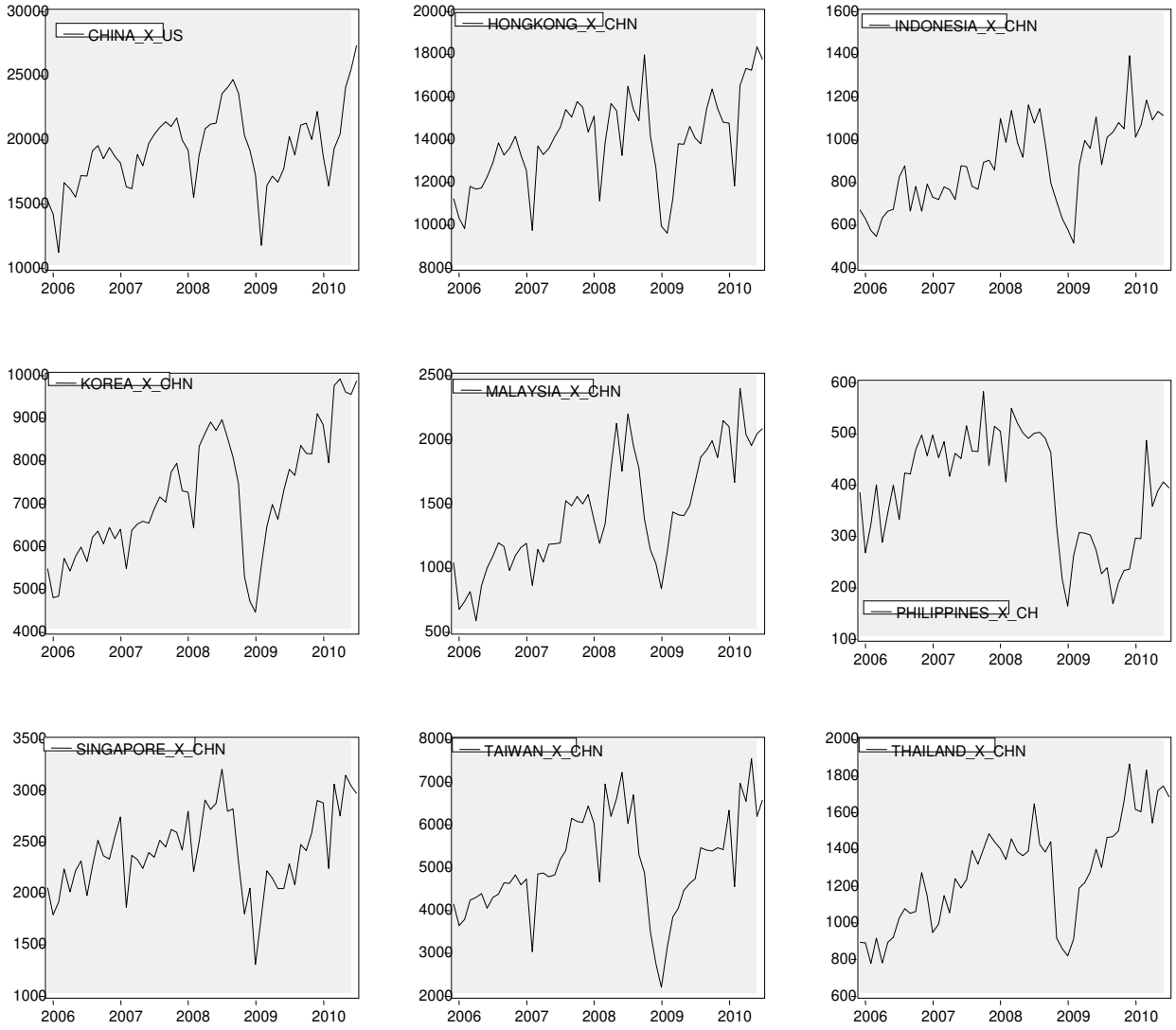

Table 1a: Unilateral tariff cuts in East and South East Asia, 1991-2003 (in %, average applied tariff)

	China	Thailand	Malaysia	Republic of Korea	Indonesia	Taiwan Province of China	Philippines	Singapore
1989	43	40	14	14	23	10	28	0
1992	42	40	14	11	21	6	19	
1995	35	20	14	8	16	6	19	0
1999	16		12	8	11	6	9	
2000	16	16	12	8	9	6	7	
2001	15	15	9	8	7	6	7	0
2002	13	14	9	8	7	6	5	0
2003	11	14	9	8	7	5	4	0

Note: years are approximate since not all nations report data every year, but tariffs change slowly so data for adjacent years has been substituted where needed.
Source: UNCTAD database. Average applied import tariff rates of non-agricultural and non-fuel products from world.

Fig 1a: Trend in tariff cuts in Asia

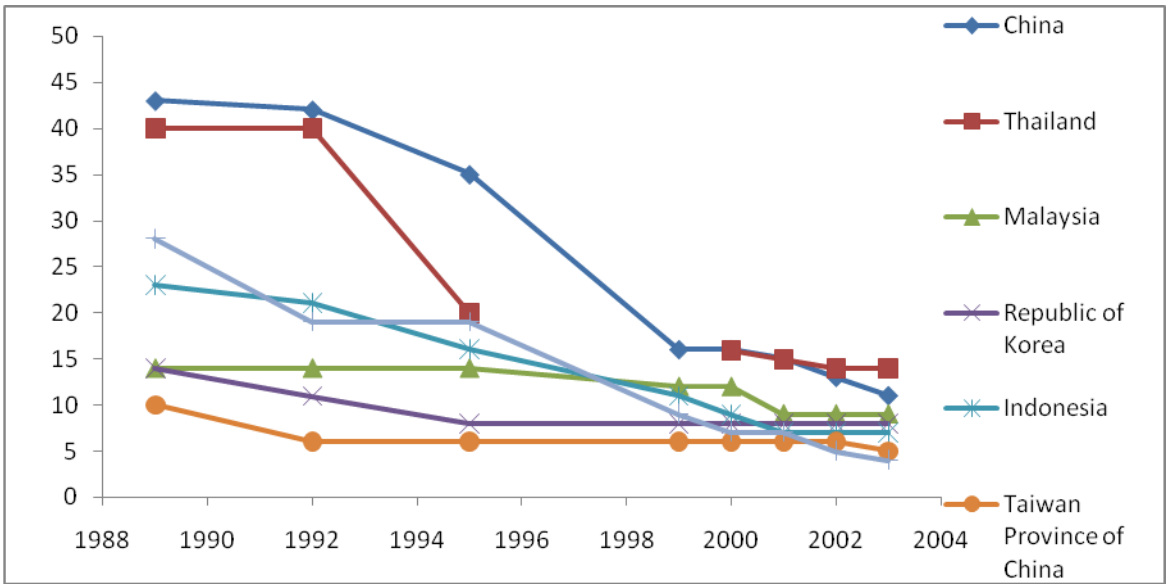

Table 1b: Correlation Matrix of bilateral tariff cuts in East & South East Asia region

	China	Thailand	Malaysia	Republic of Korea	Indonesia	Taiwan Province of China	Philippines
China	*1*						
Thailand	*0.914*	*1*					
Malaysia	*0.875*	*0.772*	*1*				
Republic of Korea	*0.793*	*0.917*	*0.588*	*1*			
Indonesia	*0.979*	*0.951*	*0.890*	*0.854*	*1*		
Taiwan Province of China	*0.621*	*0.669*	*0.494*	*0.877*	*0.683*	*1*	
Philippines	*0.963*	*0.874*	*0.856*	*0.848*	*0.967*	*0.780*	*1*

Fig 1b: Trend in the degree of association in tariff cuts in East & South East Asia region