Whither Sub-Regional Cooperation? The China-CLMV Trade Perspective

Evelyn S. Devadason, University of Malaya, Malaysia

Abstract

Recent debates advocate that closer sub-regional trade cooperation may be an excellent start to stronger regional cooperation. The study investigates this proposition for the case of CLMV countries that remain less integrated into the ASEAN region. In this respect, the China-CLMV bilateral trade flows are examined prior to detailing the role of China as a core trade partner to the periphery of CLMV in enhancing trade expansion within the context of intra-ASEAN regional and intra-GMS sub-regional synergies. The key findings of the study are: First, there are negative effects of China-CLMV trade collaboration, whereby the export potential particularly for agricultural products is clearly underexploited. Second, China' trade relations with CLMV indicate that import integration lags behind export integration. The Chinese import potential of CLMV's manufactures in particular is underexploited, plausibly reflecting the inability of the latter to be part of the regional supply chain. Third, when China's regional and sub-regional influence is considered along the dimensions of an export destination, there are positive gains for CLMV and the magnitude of those gains appear larger within the sub-regional context. Overall, the study points out that though the China-CLMV trade relations remain sub-optimal as it is unbalanced and underexploited, sub-regional membership of CLMV in the GMS is important as benefits can be derived from the Thailand-China synergy, geographical proximity and common border effects.

Keywords: sub-regional cooperation, China, CLMV, gravity model

INTRODUCTION

As the global economic recession weighs on trade, China seeks to further deepen her economic ties with the regional group of ASEAN (Association of Southeast Asian Nations). In China's economic relations with ASEAN, trade occupies the most important position given China's unique potential to drive intra-regional trade (ADB, 2009a). The less developed countries of ASEAN, CLMV (Cambodia, Laos, Myanmar and Vietnam), however have a much lower level of trade cooperation with China (Lwin, 2009) relative to the ASEAN6 (Malaysia, Thailand, Philippines, Indonesia, Singapore and Brunei), giving rise to a two-tiered level of trade integration for ASEAN. Amongst the notable imbalances in the China-CLMV trade are the high import dependence of CLMV on China resulting in overall trade deficits for the former (Kudo, 2007), low degree of participation of CLMV in the regional production networks (Kudo, 2007; 2009), complete industrial structure of China coupled with quality advantage of Chinese products over that of CLMV, low complementary structures between China and CLMV and the small export base[1] of CLMV (Austria, 2004; Hao, 2007; ADB, 2007a; Zhao *et al.* 2008; Lwin, 2009). As such, the average development gap between both parties has widened posing threats for further regional integration for CLMV (Chia, 2006; Sussangkarn, 2006; Poncet, 2006; Hao, 2007; Kimura and Obashi, 2009).

Besides being the lesser effective members of ASEAN, the imbalances in China-CLMV trade also raises the stakes of CLMV to be bystanders in the overall process of regional integration, what more with the complete phasing-in of the ACFTA (ASEAN-China Free Trade Area) in 2010. Trade integration of the "periphery" CLMV

[1] For example, in 2006, the export product range for Cambodia was only 45 as opposed to 1,023 for Singapore (Kimura and Obashi, 2009).

countries with China (and ASEAN) is therefore critical. The CLMV countries, within the context of the economic system[2], however have another platform to enhance trade cooperation with China (more specifically the Yunnan Province), which is the GMS (Greater Mekong Sub-region)[3] initiative. This raises a question: Is sub-regionalism then a better idea to deepen China-CLMV relations, particularly in the medium term?

While some opine that CLMV should be considered within the broader context of her trade relations with the other countries in the region (see also Poncet, 2006) and plausibly outside the region (see Tumbarello, 2007), progress in China-CLMV trade specifically has been noted within the sub-regional GMS cooperation. Some complementarities in China-CLMV trade have been realized recently[4], implying potentials for a higher degree of trade integration (Poncet, 2006). Arising from differences in factor endowments and price structures (Kudo, 2007b) in the rich agricultural GMS area, Yunnan's foreign trade with CLMV is largely based on border trade (Zhu, 2009). The share of LMV in total trade of Yunnan was 22 per cent in 2007 (Ishida, 2009). Following which, the plausible route for CLMV to increase trade integration with China may involve different modalities of economic cooperation under the auspices of GMS and ASEAN respectively based on type of trade and product mix. Further, the China-CLMV sub-regional cooperation may also be relevant to generating substantive intraregional trade[5] (ADB, 2007c; 2009), specifically in *final demand for goods* (instead of parts and components that characterize intra-Asian trade) within the region, necessary to minimize the risks of global downturns that weaken external demand.

In this respect the paper examines China-CLMV bilateral trade flows for the period 1992-2008 using a modified gravity model (Mulapruk and Coxhead, 2005). In examining China-CLMV trade flows, this paper also explores the role of the former as core trade partner to the periphery of CLMV in enhancing trade expansion within the context of intra-ASEAN and intra-GMS synergies. The basis for this, respectively, is that China has positioned itself at the core of the ASEAN region's production networks while she is an active participant (Zhu, 2008) within the GMS area with the strongest in comprehensive economic plan and records highest economic growth (Hao, 2007). This places China in the lead position in regional and sub-regional cooperation over the long term (Hao, 2007). Specifically, the paper addresses the following two key questions: (1) Does the influence of China on CLMV differ from that of the ASEAN6? In trade with CLMV, does the influence of China differ across trade in agricultural commodities vis-à-vis manufactured products? (2) Can China play a more catalytic role through bilateral trade with CLMV *via* ASEAN membership or the GMS area?

WHY SUB-REGIONAL COOPERATION?

Proponents of regionalism consider it a building bloc towards multilateralism, and not a substitute to the latter. The standard arguments for regionalism is that it is far simpler, efficient and provides for trade creation (Joongi, 2003) based on preferential treatment accorded to members of the agreement, whilst recent debates explain that regionalism in this region is not an economic domino effect but more specifically is best understood as being a 'political domino' effect at work (Ravenhill, 2009). Though the debates on regionalism and its possible threats to multilateralism continue, regionalism in Asia remains here to stay.

[2] In this paper, sub-regional is defined to comprise GMS members, whilst regional refers to AFTA (ASEAN Free Trade Area, born in 1992), conceived under the ASEAN (born in 1967) framework. It should also be noted that the CLMV countries are latecomers to AFTA, with Vietnam's accession in 1995, followed by Laos and Myanmar in 1997 and finally Cambodia in 1999.

[3] The GMS programme, initiated by the Asian Development Bank (ADB) in 1992, comprises CLMV, Thailand and the Yunnan Province of China. In 2005, the Guangxi Zhuang Autonomous Region joined the GMS.

[4] Though the GMS was inaugurated in 1992, the impacts of the cooperation are still unfolding as the period 1992-1996 (First Stage) saw the creation of GMS principles, fact finding and project formation while the period 1994-2001 (Second Stage) was the implementation stage of the listed projects (Ishida, 2007).

[5] Apart from that, the extensive margin (newly exported products) is overwhelmingly large for latecomers with limited number of exported products and small value of exports. Within the CLMV, the importance of extensive margin growth has been observed for Cambodia and Vietnam (Kimura and Obashi, 2009).

The leading regional trade agreement in Asia is AFTA. Intra-ASEAN trade has grown (albeit modest) but it cannot be explained by regionalism[6], as the crux of AFTA is competitiveness (production based for multinationals and their value chains) of ASEAN countries in global trade and not the promotion of intra-ASEAN trade (see also Cuyvers *et al.,* 2005; Pelkmans, 2009). With the enlargement of the AFTA membership to include CLMV countries post mid-1990s, the group became even more diverse. Regionalism appeared more delusionary for ASEAN as a whole and the CLMV countries in particular as they remain less integrated (Gavin, 2006) with the bloc. Ironically though, the export patterns of CLV[7] countries imply that they [especially Cambodia, see Kagami, 2009; lesser extent Laos (Kagami, 2009; Lwin, 2009)] are more integrated with the global economic system instead of the region (Hoang and Liao, 2002; Chia, 2006; Sussangkarn, 2006).

Therefore, to take full advantage of AFTA and the new ACFTA, CLMV needs to increase its trade momentum through other means (besides regionalism) and close the development gap with ASEAN6 and China. Can sub-regional cooperation then provide the means for CLMV to deal with integration issues at the regional level?

The GMS represents sub-regional economic cooperation in mainland Southeast Asia, that is of market integration[8] (ADB, 2004; Menon, 2005; unlike that of ASEAN which is institutional based), and therefore does not render itself inconsistent with regionalism in relation to CLMV's membership in AFTA or the ACFTA. The development of the GMS is considered specifically important to build closer China-CLMV relationship as the CLMV constitute 66 per cent of the total area of the Mekong basin. Specifically, the focused initiatives (as discussed below) of the GMS allow for transformation of the economic geography of CLMV through improved connectivity and subsequently better trade opportunities with Yunnan. Further, increasing direct integration with Yunnan *via* the GMS may provide the CLMV economies the avenue to further integrate with the other original ASEAN member economies (Menon, 2005; Sussangkarn, 2006), and with China as a whole.

While intraregional trade of the GMS only represents 12 per cent of total trade compared to the rest of the world (Pham, 2007), it has supposedly witnessed dynamic growth and is considered the most effective development scheme in the region (Ishida, 2007) and the fastest growing sub-region in the world (ADB, 2004, Aparna, 2007). It has a combined population of 276 million (calculated from ADB, 2009) and is predominantly agrarian[9] in nature (Zhu, 2008). The dynamism of the sub-region is its strategic location and diversity, which provides opportunity to leverage economic complementarities. Specifically, differences in economic development and factor endowments between economies imply opportunities for exchanges[10]. At the extremes is Laos, the least developed of the GMS economies and Yunnan the most economically advanced (apart from Thailand, the most developed and largest market) of the GMS (ADB, 2004). Alternatively, countries like Myanmar and Laos can also tap on the China-Thailand synergy as both the core economies have expressed strong intention to develop their mutual relationship through the former (Tsuneishi, 2009).

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[6] A vast majority of intra-ASEAN trade is conducted on a most-favoured nation (MFN) and not preferential tariffs (Cuyvers *et al.,* 2005; Gavin, 2006; Ravenhill, 2009) and the bloc remains export-dependent on external markets. Thus intra-ASEAN trade has not occurred at the expense of extra-ASEAN trade (Tumbarello, 2007). Some studies even attest to the negligible and non trade-creating effects of AFTA [Soloaga and Winters, 2001; Clarete *et al.,* 2002; Dee and Gali, 2003: cited from Tumbarello, (2007], notwithstanding other findings of a significant increase in intra-regional trade resulting from AFTA [Frankel and Wei, 1997; Elliott and Ikemoto, 2004; Gosh and Yamarik, 2004: cited from Tumbarello (2007)].

[7] Myanmar is not included as her share of intra-ASEAN trade in total trade is now approximately 50 per cent of both exports and imports (Lwin, 2009). Myanmar has shifted her trade focus to the neighbouring countries with the imposition of trade sanctions by the United States and European countries. However, it should be noted that in the recent past, the other GMS members have also increased their trade dependence on themselves (Fujimura, 2008).

[8] Market integration relies on non-official institutions that provide regional public and quasi-public goods, which reduce transaction costs associated with the international movement of goods, services and other production factors.

[9] However, there is growing diversification with the rise of commercialized agriculture and the expansion of labour intensive agro-processing activities (ADB, 2004, 2007b). Further, some CLMV countries have shifted into labour intensive commodities (light consumer goods and resource based industries); the shift is palpable for Cambodia given her garment industry (ADB, 2007c).

[10] Vietnam and Thailand are said to have a similar trade and industrial structure (Nguyen, 2002; Kagami, 2009), as the former's exports have gradually shifted from raw materials to light manufacturing, agricultural and aquacultural products.

The main thrust of the GMS is to improve the transport infrastructure (Ishida, 2005; Fujimura, 2008), which is also important to activate production networks and capture trickle down effects by CLMV [Kimura and Obashi, 2009; Kudo, 2009; see also Kimura and Kobayashi (2009) for results on the expected dispersion (sometimes known as linked agglomeration, when the agglomeration leaps out of the network to connect with remote places *via* an efficient logistic network) of activities from the core to the periphery of Cambodia with improvement in infrastructure and trade facilitation based on a Geographical Simulation Model], since intra-GMS exchanges are mainly that of border trade. Border trade, is promoted through economic corridors (introduced in 1998) which include cross-border transportation agreement (CBTA, took effect in 2003) to facilitate the cross-border movement of vehicles and special economic zones[11] (Ishida, 2007; Kudo, 2009) to improve the business environment. The initial corridors comprise East-West, North-South and Southern Economic corridors[12], which connect major cities in the GMS area. Thus, the economic corridors have provided additional transport option (roads) for companies to transport goods between China and ASEAN and within ASEAN (Ishida, 2009). Further to transport infrastructure, the GMS also supports a range of 'soft infrastructure' (other trade-related transaction costs) measures from improving procedures for customs clearance, increasing transparency and enhancing technical skills to improve the various regulatory systems (ADB, 2004; Menon, 2005; Strutt *et al*., 2008). Strutt *et al.* (2008) show proof from their CGE simulations that reduction in trade time is essential to increase exports within the GMS area and provide opportunities for the diversification of exports.

To some extent, the CLV countries have benefited from the sub-regional integration approach as they have shown greater linkages with China and Thailand[13] (Hoang and Liao, 2002; Sussangkarn, 2006; Ishida, 2009; Tsuneishi, 2009). An empirical study by Fujimura and Edmonds (2006) concludes that trade in major commodities within the GMS is positively influenced by the level of cross-border infrastructure (see also Fujimura, 2008). As such, the Chinese and Thai trade with CLMV had increased by 449 per cent and 371 per cent respectively between the 2000 and 2007 (Kagami, 2009). For example, China has emerged as a major supplier of consumer and capital goods to Myanmar through border trade and subsequently provide the market for primary and agricultural products (Kudo, 2006). This is as expected given the aid contribution by China (see Kudo, 2006; Zhu, 2008) and the fact that CLM countries in particular require close proximity to promote their bilateral trade (Lwin, 2009). Setting aside those perceived benefits are some shortcomings that prevail.

Despite the flexible arrangements and potentials of the GSM area, the China-LMV border trade is still characterized by small-scale and limited varieties. For example, small-scale border trade occupies 80 per cent and 66 per cent of the Myanmar and Laos trade with Yunnan respectively (Ishida, 2009). Following from this, recent statistics reveals that the Yunnan Province has the smallest trade share with other GMS countries (Zhu, 2008) but the shares are considerably high for smaller economies such as Myanmar and Laos (ABD, 2007a). Poncet's (2006) study confirms that though Yunnan has close and privileged trade relations with Laos and Myanmar, reflecting the success of the GMS initiative, Yunnan's export bias to Myanmar had declined steadily over the period 1988-1999. Further with the less diversified economies of the CLMV, the development of the economic corridors may tip the trade imbalances in favour of China (Kudo, 2006). In addition to this, Kudo (2009) explains that the enhanced transport connectivity may also not be equally beneficial to the individual CLMV countries, citing Lao's neglected position in the East-West Economic Corridor with increased traffic flow between Bangkok and Hanoi.

Apart from the CLMV perspective, Yunnan also faces her own challenges as pointed out by Zhu (2008). Amongst them is her weak economic strength, lack of coordination within the Province and competition pressure from inland and coastal areas. Other problems in the GMS cooperation relate to the policy framework such as the

[11] As at November 2007, 18 special economic zones were approved by the Cambodian government, many of which are located in border areas (Kudo, 2009).

[12] New economic corridors have been added (i.e. Southern Coastal Sub Corridor, Northern Sub Corridor and New Route of the North-South Economic Corridor) while some parts of the North-South Corridor have changed (Ishida, 2007).

[13] Lwin's (2009) study indicates that Cambodia and Myanmar have not reached their trade potential with Thailand whilst Laos and Myanmar have not reached their trade potential with China. This however implies that trade within the GMS is yet to be exploited to the full potential.

CBTA. The CBTA as pointed out by Ishida (2009) is yet to take effect in some borders for three reasons: First, lack of dissemination of the documents to officials at border check points; Second, lack of coordination within the related ministries of the countries concerned; Third, contradictions between the CBTA and domestic regulations.

Though the GMS area is a right step in the direction to deepen CLMV's trade integration and some gains are already evident, the challenges that remain, if not adequately addressed, may stall the complete realization of the China-CLMV trade potentials and CLMV's integration at the sub-regional and regional levels.

CLMV AND THE REGION: SUBOPTIMAL TRADE PATTERNS

CLMV only represents a small total trade share of China-ASEAN trade (Table 1). The China-CLMV trade shares (particularly the shares of agricultural products in total imports of China from CLMV have grown substantially) are higher for primary and agricultural products relative to manufactures based on the latest data. This is not surprising as the agriculture sector accounts 32 per cent, 42 per cent, 44 per cent and 20 per cent of Gross Domestic Product of the Cambodia, Laos, Myanmar and Vietnam respectively based on 2007 data (Lwin, 2009). As such, China has an overall trade surplus with CLMV (see also Kagami, 2009) though suffers deficits with ASEAN6 (see also Hao, 2007), but in the case of primary and agricultural products, China records deficits even with CLMV. The unbalanced trade performance between China and CLMV is even more pronounced for Myanmar (Kudo, 2006).

Table 1: CLMV Trade Statistics

	Exports			Imports			Total Trade		
Product	1992	2000	2008	1992	2000	2008	1992	2000	2008
China-CLMV Trade Shares (% of China-ASEAN trade)									
All Products	8.76	12.86	16.19	2.31	2.84	2.25	6.81	8.49	10.25
Manufactures	12.10	12.93	15.74	2.96	0.88	1.92	8.85	6.79	9.59
Agricultural	3.82	12.53	21.30	5.71	13.77	10.91	4.96	13.41	13.21
China-CLMV Trade Shares (% of China-GMS trade)									
All Products	32.02	49.89	54.34	32.86	20.36	16.83	32.30	33.60	36.51
Manufactures	35.22	49.46	53.03	30.08	4.07	7.48	34.52	28.42	34.38
Agricultural	22.47	52.19	68.43	33.72	43.79	38.69	29.25	45.81	45.77
CLMV Trade Shares (% of intra-ASEAN trade)									
All Products	7.91	13.01	24.62	5.38	8.27	14.13	6.84	11.04	19.69
Manufactures	7.40	9.57	21.16	0.75	3.01	7.62	4.78	6.97	15.36
Agricultural	9.10	25.88	30.79	13.17	22.48	21.80	11.02	24.26	26.01
CLMV Trade Shares (% of intra-GMS trade)									
All Products	25.35	33.70	41.94	21.04	17.61	14.27	23.71	25.81	29.43
Manufactures	28.30	35.50	44.10	26.45	3.68	7.00	28.07	22.56	29.95
Agricultural	17.05	26.87	29.76	19.91	35.65	26.89	18.94	32.73	27.85

Note: The statistics on China-GMS and intra-GMS trade may underestimate the trade shares of China-CLMV as the data is not Yunnan Province specific.
Source: Calculated from UN COMTRADE.

Amongst the CLMV, China's trade with Vietnam at USD11.8 million in 2008 is by far the largest. Bilateral trade grew by 1.34 per cent per annum between 1992 and 2008, and China has emerged as a leading trade partner of Vietnam (see also Do and Ha, 2009). By product, China's exports to CLMV are mainly that of

machinery, iron and steel and textiles, whilst she imports raw materials from the latter (Poncet, 2006; ADB 2007a; Kagami, 2009), reflecting a vertical (inter-industry) type of trade expansion (Fujimura, 2008). Since the CLMV (to a lesser extent Vietnam) countries are relatively import dependent on China, concessions were made by China in the agricultural sector under the Early Harvest Plan (EHP) to make it possible for CLMV to increase her exports to China (see also Gavin, 2006). China further granted a special tariff program, comprising zero tariffs on specific products, to CLM. These preferences however have yet to result in any marked increase of CLMV exports to China [Hao, 2007; Ravenhill (2009) cites that the provisions under the EHP yield limited results as it covered trade of a total value of less than USD1 million], though the former has a comparative advantage in agricultural products.

In the context of China-GMS trade, agricultural products again dominate China-CLMV relations particularly from the import side. There is however a significant decline in the import share of manufactures from CLMV within the GMS area. Conversely China has substantially increased her export shares of both agricultural and manufactures to CLMV between 1992 and 2008. China-CLMV bilateral trade reflects better trade integration from the export relative to the import perspective. In short, the China-CLMV trade relationship appears unbalanced (in favour of China) in the context of the ASEAN region and the GMS sub-region.

CLMV's position is further examined in the context of regional and sub-regional trade shares. The CLMV's contribution to trade at the sub-regional GMS level though higher than that to the ASEAN region still does not dominate intra-GMS trade. Despite the growing export shares of CLMV in intra-regional and intra-sub-regional trade, interestingly at the sub-regional level, the share of manufactures is at present larger than that for agriculture. However the opposite holds true when considering her intra-regional and intra-sub-regional import shares of manufactured products. In fact, the CLMV share of imports of manufactures from within the GMS has declined sharply.

Summarizing the above patterns imply that China-CLMV trade is operating on a sub-optimal level given the small trade shares of CLMV relative to ASEAN6 and the lower level of trade integration from the import perspective. Further, apart from the regional contribution, the small trade shares of CLMV even within the sub-regional level further signify her lack of dynamism.

REGIONAL AND SUB-REGIONAL INTERDEPENDENT ROLE OF CHINA

Modified Gravity Model

The gravity equation[14] is employed for analyzing the evolution of China-ASEAN trade flows and the role of China in influencing CLMV trade at the regional (intra-ASEAN) level and the sub-regional (intra-GMS) levels. The first baseline set of estimations examine China's bilateral trade with the ten ASEAN countries. To measure the impact of China's influence on CLMV, a dummy variable[15] is introduced. It takes the value of one if the partner is Cambodia, Myanmar, Laos or Vietnam. To distinguish China-CLMV trade from that of China-ASEAN6, the trade flows are disaggregated between agricultural and manufactured products for CLMV and ASEAN6 respectively. A group of dummy variables are gain introduced for this purpose. The China-ASEAN trade flows are estimated in log-linear form (except for the dummy variables)[16]:

$$\ln X_{i,j} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln N_i + \beta_4 \ln N_j + \beta_5 \ln DST_{i,j} + \beta_6 DUM_{ADJi,j} + \beta_7 DUMCLMV_{i,j} + \varepsilon_{ij} \quad (1)$$

[14] Tinbergen (1962) and Poyhonen (1963) were the first authors applying the gravity equation to analyze international trade flows. Until the 1970s, theoretical support for this model remained weak. Thereafter, various theories emerged to explain the model based on solid microeconomics foundation such as constant elasticity of substitution preferences and product differentiation (Anderson, 1979), monopolistic competition and the Hecksher-Ohlin model of inter-industry trade (Bergstrand, 1985, 1989) and increasing returns to scale (Helpman and Krugman, 1985).

[15] The interpretation of the dummy variable for specific partners is as follows (Poncet, 2006): A positive and statistically significant coefficient for a dummy variable implies that trade flows exceed the normal level; that is the level predicted by the countries' economic sizes and the distance between them. Conversely, a negative and statistically significant coefficient implies that the trade flows fall short of the predicted level.

[16] Since the equations are linear in logarithms, the estimated coefficients of the continuous variables are elasticities.

$$\ln X_{i,j} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln N_i + \beta_4 \ln N_j + \beta_5 \ln DST_{i,j} + \beta_6 ADJ_{i,j} + \beta_7 DUMCLMV_{AGRI\ i,j} + \beta_8 DUMASEAN6_{AGRI\ i,j} + \varepsilon_{ij} \quad (2)$$

$$\ln X_{i,j} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln N_i + \beta_4 \ln N_j + \beta_5 \ln DST_{i,j} + \beta_6 ADJ_{i,j} + \beta_7 DUMCLMV_{MANU\ i,j} + \beta_8 DUMASEAN6_{MANU\ i,j} + \varepsilon_{ij} \quad (3)$$

where subscripts i and j refer to the exporting and the partner (importing) country respectively. The other variables are defined below:

X[17] = bilateral exports between i and j. X is alternated with M (bilateral imports between i and j).
GDP = real gross domestic product (GDP). The variable GDP_i is alternated with $GDP_{i,t-1}$ (a one-year lag) for equations (1) and (2) to address endogenous determination of current trade levels and current GDP (see Edmonds *et al.*, 2008).

N = population. The variable N is alternated with PGDP (GDP per capita).
ADJ = common border between i and j (dummy variable equal to one if i and j share a border and 0 otherwise)
DST = distance between economic centres of i and j
DUMCLMV = dummy variable equal to one if the partner country is CLMV and 0 otherwise
$DUMCLMV_{AGRI}$ = dummy variable equal to one if it is agricultural trade with CLMV and 0 otherwise
$DUMASEAN6_{AGRI}$ = dummy variable equal to one if it is agricultural trade with ASEAN6 and 0 otherwise
$DUMCLMV_{MANU}$ = dummy variable equal to one if it is manufactures trade with CLMV and 0 otherwise
$DUMASEAN6_{MANU}$ = dummy variable equal to one if it is manufactures trade with ASEAN6 and 0 otherwise

ε = error term that picks up other influences on bilateral trade
α = constant term

The second set of estimations illustrates China's influence on CLMV through intra-regional trade and intra-sub-regional trade flows. A dummy variable (DUMCLMV) is introduced to separately identify the ASEAN6-CLMV trade flows from that of intra-ASEAN6 in the regional context. For the sub-regional perspective, DUMCLMV distinguishes ASEAN6-CLMV trade flows from that of intra-CLMV. The basic equation is augmented (see Mulapruk and Coxhead, 2005) and the following are estimated for intra-ASEAN and intra-GMS[18] (excluding China's bilateral trade with other GMS members) trade flows:

$$\ln X_{i,j} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln N_i + \beta_4 \ln N_j + \beta_5 \ln DST_{i,j} + \beta_6 DUM_{ADJi,j} + \beta_7 \ln X_{i,CHINA} + \beta_8 \ln X_{CHINA,j} + \varepsilon_{ij} \quad (4)$$

$$\ln X_{i,j} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln N_i + \beta_4 \ln N_j + \beta_5 \ln DST_{i,j} + \beta_6 DUM_{ADJi,j} + \beta_7 \ln X_{i,CHINA} * DUMCLMV + \beta_8 \ln X_{CHINA,j} * DUMCLMV + \varepsilon_{ij} \quad (5)$$

$$\ln X_{i,j} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln N_i + \beta_4 \ln N_j + \beta_5 \ln DST_{i,j} + \beta_6 DUM_{ADJi,j} + \beta_7 \ln X_{i,CHINA} * DUMCLMV_{nett} + \beta_8 \ln X_{CHINA,j} * DUMCLMV_{nett} + \varepsilon_{ij} \quad (6)$$

Finally, the intra-GMS (including China's bilateral trade with other GMS members) trade flows are estimated as follows:

$$\ln X_{i,j} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln N_i + \beta_4 \ln N_j + \beta_5 \ln DST_{i,j} + \beta_6 DUM_{ADJi,j} \quad (7)$$

$$\ln X_{i,j} = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln N_i + \beta_4 \ln N_j + \beta_5 \ln DST_{i,j} + \beta_6 DUM_{ADJi,j} + \beta_7 DUM_{China\text{-}CLMV} \quad (8)$$

[17] Exports and imports are used as the dependent variable, rather than total bilateral trade because it permits to identify export and import diversion separately (Tumbarello, 2007) and is a more direct performance indicator for trade reforms. However, the gravity model is reported to perform consistently better with export data than with import data as the former is reported fob (freight on board) with the latter includes cif (cost, insurance and freight) (Fitzpatrick, 1984).
[18] The study employs trade data of China for intra-GMS instead of the Yunnan Province given the lack of Provincial level statistics.

where
$X_{i,CHINA}$ = exports of country i to China
$X_{CHINA,j}$ = exports of China to country j

DUMCLMV = dummy variable equal to one for ASEAN6-CLMV and intra-CLMV bilateral pairs and 0 otherwise for the regional case. For the sub-regional context, dummy variable equal to one for Thailand-CLMV and 0 otherwise.
$DUMCLMV_{nett}$ = dummy variable equal to one for ASEAN6-CLMV and 0 otherwise (including intra-CLMV trade) for the regional case. For the sub-regional context, dummy variable equal to one for intra-CLMV trade and 0 otherwise.
$DUM_{China\text{-}CLMV}$ = dummy variable equal to one if the bilateral pair is China-CLMV and 0 otherwise
all other variables are as defined above.

The GDP, PGDP, N, DST and ADJ are standard arguments of the gravity model. The GDP variable is a proxy for country size (market size and production/ trading capacity; see Tinbergen, 1962; Poyhonen, 1963). The postulated signs for β_1 and β_2 are positive since a large country is more likely to achieve economies of scale, increase exports and simultaneously possess the capacity to absorb imports. All equations use N and PGDP[19] interchangeably. Generally, the coefficient on N is expected to bear a negative sign as a large country is considered to be less open to trade. Further explanations for this is that a country with a large population implies a large domestic market and a more diversified range of output that would result in less dependence on international specialization. Conversely, a country with large population may be able to capture economies of scale in production and therefore trade more. Hence the expected sign of the coefficient on N is ambiguous (Brada and Mendez, 1983; Garman and Gilliard, 1998; Cheng and Wall, 2005). PGDP[20] measures the income level and/ or purchasing power of a country and is expected to relate positively with bilateral trade volumes. Broadly speaking, PGDP also captures better trade-related infrastructure and trade facilitation measures.

Though DIST is no longer an issue with technological advancement, geographical distance remains important for considerations of transport costs, transaction costs (Bergstrand, 1985; Edmonds *et al.*, 2008) and timeliness in delivery (see also Rojid, 2006; Athukorala, 2008) and is included in the estimations. Similarly ADJ captures additional advantages of proximity. Thus the expectations are for $\beta_5 < 0$ (Tinbergen, 1962; Poyhonen, 1963) and $\beta_6 > 0$.

The most important explanatory variables for the second set of estimations on intra-regional and intra-sub-regional trade flow is $X_{i,CHINA}$*DUMCLMV (and $X_{i,CHINA}$*$DUMCLMV_{nett}$) and $X_{i,CHINA}$*DUMCLMV (and $X_{CHINA,j}$*$DUMCLMV_{nett}$). Following a similar reasoning of that of Mulapruk and Coxhead (2005), but with a different interpretation, the study considers the partner country j as ASEAN member countries themselves and not third markets outside ASEAN. The inclusion of these variables in the study therefore capture the role of China in influencing CLMV trade *via* two confounding effects of an (a) expansion in export supply to China by the exporting country i; and (b) expansion in import sourcing from China by the importing country j. If an increase in exports from i to China crowds out exports from i to j, then $\beta_7 < 0$. However, if an increase in exports from i to China promote exports from i to j, then $\beta_7 > 0$. The variable $X_{CHINA,j}$ in turn indirectly measures the comparative advantage between China and i through the exports of the former to j. If China has a comparative advantage over i, then exports from China to j will bear a negative impact on exports from i to j and $\beta_8 < 0$. Conversely, $\beta_8 = 0$ when country i possesses a comparative advantage over China.

For a detailed description of the construction of variables and the various data sources, see Appendix 1. The above estimations are conducted in a panel setting for the bilateral trade flows as listed in Appendix 2 spanning the

[19] The specification with PGDP is often used to estimate aggregate exports whereas that which includes N is often used to estimate bilateral exports for specific sectors (Martinez and Nowak, 2003).
[20] All specifications are also estimated using PGDP and N (apart from the combination of GDP with PDGP and GDP and N). Breuss and Egger (1997) point out that using PGDP instead of absolute GDP avoids high co-linearity often present between absolute GDP and N (see also Garman and Gilliard, 1998, Smith, 1999; Sandberg *et al.*, 2006).

period 1992 - 2008. There is missing data[21] for some bilateral pairs and the study does deal with zero trade values in logs by using ln(1+ X_{ij}) for some bilateral pairs. The analysis is conducted for the full sample of aggregate exports [agriculture (SITC 0-4) and manufactures (SITC 5-8)] and aggregate imports (for the baseline estimations only).

Does Sub-Regional Membership Matter for CLMV?

Table 2 reports the regression estimates[22] for China-ASEAN trade flows. For all specifications, the Breusch-Pagan Lagrangian Multiplier (LM) tests indicate that the Generalized Least Squares (GLS) Random Effects (RE)[23] model is more appropriate than the ordinary least squares (OLS, pooled model). The two basic explanatory variables (GDP and N)[24] in terms of exports in Table 2 have the expected signs and are statistically significant at the 1 per cent level. From the import perspective, only the population size of the partner country matters for China. However, distance and border are not significant for all specifications.

For equation (1), the coefficients for DUMCLMV are negative and significant (albeit weak) for both export and import flows. This illustrates negative effects of China-CLMV collaboration. China's exports to CLMV is significantly lower than the normal level at 13 per cent [exp(-2.018) = 0.13] whilst her imports from the latter is 5 per cent lower than the normal. The export and import potentials are clearly underexploited in the China-CLMV case. The Chinese exports of agricultural trade to CLMV are also underexploited given her deficits in agricultural trade with the latter (as discussed in the previous section). This is however less of an issue when compared to agricultural exports to ASEAN6. China's exports of agricultural products to CLMV are only 6 per cent lower than the normal level relative to that of ASEAN6 at 25 per cent. The opposite holds true in the case of China's exports of manufactures to CLMV and ASEAN6. The results indicate positive effects of export collaboration between China and ASEAN, at 4.8 times and 8.7 times greater than the normal level for CLMV and ASEAN6 respectively. Conversely, China's imports of manufactures are significantly lower than the normal level at 11 per cent.

Table 2: Gravity Equation Estimates for China-ASEAN Trade Flows

	Dependent Variable: $\ln X_{ij}$			**Dependent Variable: $\ln M_{ij}$**		
Variable	(1)	(2)	(3)	(1)	(2)	(3)
$\ln GDP_i$	0.599***	0.597***	0.597***	0.836	0.831	0.833
	0.204	0.205	0.205	1.008	1.013	1.011
$\ln GDP_j$	0.106**	0.122***	0.124**	0.166	0.286	0.245
	0.046	0.046	0.046	0.221	0.214	0.212
$\ln N_i$	7.401**	7.311**	7.296**	12.114	11.555	11.755
	3.011	3.022	3.026	13.896	13.968	13.94
$\ln N_j$	0.681***	0.683***	0.687***	1.360***	1.320***	1.331***
	0.171	0.131	0.134	0.279	0.28	0.272

[21] Where possible, the partner country records are used. The missing values for intra-CLMV trade particularly poses challenges for the estimation and thus the results should be interpreted with caution.

[22] Given the macroeconomic nature of the dataset, the issue of non-stationarity is also considered. The unit root panel test on the levels and first differences are investigated using the Im, Pesaran and Shin (IPS, 2003) test. The IPS is chosen since it allows for a higher degree of heterogeneity in cross-section dynamics and also has a higher power than the Levin and Lin (LL) test. The results confirm that the null of a unit root is rejected for most variables in levels. Thus, most variables are found to be of I(0) process, which is stationary in levels.

[23] The RE model is chosen since the distance variable ($\ln DST_{i,j}$) and contiguity ($DUM_{ADJi,j}$) are invariant across time periods.

[24] The results are robust to the use of various specifications (combinations of GDP and N; GDP and PGDP; PGDP and N), thus the results are reported only for the GDP and N combination.

lnDST	1.147	1.688	1.852	2.051	2.945	2.532
	1.846	1.34	1.375	2.606	2.58	2.495
DUM_{ADJ}	0.863	-0.090	-0.360	1.112	-0.933	-0.058
	1.216	0.74	0.76	1.726	1.393	1.345
DUM_{CLMV}	-2.018*	-	-	-2.920*	-	-
	1.129			1.643		
$DUMCLMV_{AGRI}$	-	-2.738***	-	-	0.614	-
		0.687			1.298	
$DUMASEAN6_{AGRI}$	-	-1.378**	-	-	0.724	-
		0.577			1.087	
$DUMCLMV_{MANU}$	-	-	1.560**	-	-	-2.217*
			0.705			1.253
$DUMASEAN6_{MANU}$	-	-	2.164***	-	-	0.344
			0.592			1.05
No. of observations	340	340	340	340	340	340
Groups	20	20	20	20	20	20
R^2 overall	0.567	0.707	0.693	0.556	0.544	0.567
Breusch-Pagan test (P value)	0.000	0.000	0.000	0.000	0.000	0.000

Note: 1. The above estimations are based on the GLS random effects model, corrected for AR1disturbances.
2. Statistical significance is denoted as ***1%, **5% and *10%.

The results imply that China-CLMV trade integration is non-effective. Trade integration in terms of China's exports to CLMV appears more successful for manufactures vis-à-vis agriculture products, consistent with the industrial development of the former relative to the latter. The Chinese import potential of CLMV's manufactures that is underexploited plausibly reflects the inability of CLMV to be part of the regional supply chain vis-à-vis ASEAN6. Further, China's agricultural imports from CLMV are yet to yield significant positive effects from trade collaboration. Overall, China' relations with CLMV indicate that import integration lags behind export integration.

To scrutinize further China's integration with CLMV, the influence of the former on the latter is examined in the regional and sub-regional context, as shown in Table 3. From the regional perspective, the coefficients of exports from i to China are positive and significant, suggesting that an increase in exports from a member country of ASEAN (i) to China does not crowd out intra-regional exports between ASEAN countries (i to j). Instead, the results imply that China's integration in the region increases the size of the ASEAN member economies export market, consistent with newer theories of international trade which emphasize the important effect of economies of scale. The coefficient for $lnX_{China,j}$ though negative is insignificant. There is therefore no indication that import sourcing from China by ASEAN countries reduces export expansion within the latter. The results accord with the fact that though China has become an important export destination and an import source for individual ASEAN countries, this has not reduced intra-regional trade.

When China's regional influence on CLMV specifically is further considered along the dimensions of an export destination, the variable of concern ($X_{i,China}$*DUMCLMV) in equation (5a) of Table 3 consistently indicate that an increase in exports from a member country of ASEAN6 (i) to China does not crowd out exports between ASEAN6 and CLMV countries or intra-CLMV exports (i to j). Nevertheless, the magnitude of the coefficient is smaller implying less of an export expansion of ASEAN6 with CLMV following an increase in exports of the former to China. Instead, import sourcing from China by CLMV reduces export expansion within the latter and with ASEAN6. Similar results are obtained when intra-CLMV flows are not considered [equation (6a)]. This implies that China has a comparative advantage over ASEAN6 and CLMV and there could be some form of trade diversion from sourcing of imports within the region to that from China.

The above results on China's regional influence are compared with the case of her sub-regional influence on CLMV. In the sub-regional context, again export expansion between any GMS member with China increases exports within the member economies. The larger magnitude of the coefficient implies a more catalytic role for China along the dimension of an export destination within the GMS area. However the export expansionary effects with China are not significant in boosting specifically Thailand-CLMV or intra-CLMV exports. This implies the importance of Thailand-China direct synergies to increase the export market size of the other GMS economies. Unlike the regional context however, there is no significant diversion of trade from Thailand or CLMV following import sourcing by individual CLMV countries within the sub-region. More importantly, it is only in the case for intra-GMS that distance and common border[25] significantly matter for intra-sub-regional trade flows. Without the inclusion of China, common border facilitates trade and with the inclusion of China, geographical distance is a barrier for intra-GMS trade. Thus, the membership of CLMV in GMS does matter to the former.

CONCLUDING REMARKS

The China-CLMV relations have indeed come a long way to establish a strategic trade partnership within the GMS, Though, closer sub-regional trade cooperation may be an excellent start to stronger regional cooperation (ADB, 2004, 2007c; Menon, 2005; Chia, 2006), the China-CLMV trade cooperation efforts remain unbalanced and underexploited. The theoretical arguments of the paper drawn from the potentials of sub-regional cooperation and the estimation approach based on an augmented gravity model brings to fore the following message. China-CLMV trade relations have yet to reach their full potential. This is noted even within the context of the GMS sub-regional cooperation. Nevertheless, the GMS area remains promising on the following accounts: (a) The Thailand-China synergies are important for other members of the GMS area; (b) Geographical proximity and common border are trade facilitators within the GMS area.

Table 3: Gravity Equation Estimates for Intra-Regional and Intra-Sub-Regional Trade Flows

	Intra-Regional (Intra-ASEAN)			**Intra-Sub-Regional (Intra-GMS)**				
Variable	(4)	(5a)	(6a)	(4)	(5b)	(6b)	(7)	(8)
$lnGDP_i$	1.468***	1.744***	2.323***	1.498**	0.208	0.608	0.798	0.762
	0.370	0.336	0.336	0.564	0.667	0.687	0.567	0.586
$lnGDP_j$	0.403**	0.344**	0.473**	-0.427	0.444	0.516	-0.030	-0.023
	0.175	0.175	0.179	0.517	0.503	0.515	0.349	0.351
lnNi	0.501*	0.355	0.434	-1.662	7.302***	6.699**	3.591**	4.075*

[25] The differing results on distance and common border effects for intra-GMS trade flows with and without the inclusion of China may plausibly be attributed to the fact that Thailand shares the border with CLM while China with LM (Yunnan borders LMV).

							*	
	0.264	0.280	0.316	2.339	2.309	2.717	1.168	2.273
$\ln N_j$	0.170	0.874***	0.132	2.389*	-0.708	-0.576	1.903**	1.797*
	0.254	0.285	0.278	1.419	1.523	1.560	0.930	1.028
lnDST	-0.527	-1.548	-0.164	2.486	18.436**	19.164**	-6.364***	-4.884
	1.060	1.155	1.203	7.781	7.812	8.067	2.264	6.409
DUM_{ADJ}	1.612	0.267	1.643	5.734**	10.137***	10.874***	0.311	0.770
	1.302	1.423	1.501	2.811	2.710	2.771	1.953	2.702
$\ln X_{i,China}$	1.001***	-	-	2.058***	-	-	-	-
	0.184			0.400				
$\ln X_{China,j}$	-0.127	-	-	-0.313	-	-	-	-
	0.190			0.625				
$\ln X_{i,China}$*DUMCLMV	-	0.800***	-	-	0.593	-	-	-
		0.168			0.570			
$\ln X_{China,j}$*DUMCLMV	-	-1.069***	-	-	-0.244	-	-	-
		0.186			0.623			
$\ln X_{i,China}$*$DUMCLMV_{net}$	-	-	0.481**	-	-	0.110	-	-
			0.243			0.440		
$\ln X_{China,j}$*$DUMCLMV_{net}$	-	-	-0.524**	-	-	-0.489	-	-
			0.268			0.430		
$DUM_{China\text{-}CLMV}$							-	-3.636
								14.701
No. of observations	748	748	748	153	153	153	238	238
Groups	44	44	44	9	9	9	14	14
R^2 overall	0.620	0.613	0.556	0.598	0.653	0.595	0.553	0.555
Breusch-Pagan test (p-	0.000	0.000	0.000	0.424	0.653	0.684	0.000	0.000

value)		

Note: 1. The above estimations are based on the GLS random effects model, corrected for AR1disturbances (except for equations (4), (5b) and (6b) in column 2).
2. Statistical significance is denoted as ***1%, **5% and *10%.

REFERENCES

1. ADB (2004). 'The Mekong Region: An Economic Overview,' Asian Development Bank: Manila, Philippines. Downloaded from: http://www.adb.org/Documents/Reports/MREO/2004/Economic_Overview.pdf
2. ADB (2007a). 'Background Paper: Greater Mekong Subregion, Mobilizing Aid for Trade: Focus Asia and the Pacific,' Asian Development Bank: Manila, Philippines. Downloaded from: http://aric.adb.org/pdf/a4t/Background%20Paper%20-%20GMS.pdf
3. ADB (2007b). 'The Mekong Region Trade: Trends, Patterns and Policies,' Asian Development Bank: Manila, Philippines. Downloaded from: http://www.adb.org/Documents/Reports/Mekong-Region-Trade/the-mekong-region-trade.pdf
4. ADB (2007c). Mid-Term Review of the Greater Mekong Subregion Strategic Framework (2002-2012), Asian Development Bank: Manila, Philippines. Downloaded from:
5. ADB (2009a). 'Asian Development Outlook 2009 Update: Broadening Openness for a Resilient Asia,' Asian Development Bank: Manila, Philippines. Downloaded from:
6. http://www.adb.org/Documents/Books/ADO/2009/Update/ado2009-update.pdf
7. ADB (2009b). *Key Indicators for Asia and the Pacific 2009*, 40th Edition, Asian Development Bank: Manila, Philippines.
8. Anderson, J.E. (1979). 'The Theoretical Foundations of the Gravity Equation,' *American Economic Review*, 69(1): 106-16.
9. Aparna (2007). 'Trade Capacity Building and Private Sector Development in the Greater Mekong Sub-Region,' Policy Brief 7/2007, CUTS Hanoi Resource Centre: Vietnam. Downloaded from:
10. http://www.cuts-international.org/HRC/pdf/PB-7-07.pdf
11. Athukorala, P-C (2008). 'China's Integration into Global Production Networks and its Implications for Export-Led Growth Strategy in Other Countries in the Region,' Working Paper No.2008/04, Arndt-Corden Division of Economics, Australian National University: Canberra. Downloaded from: http://rspas.anu.edu.au/economics/publish/papers/wp2008/wp_econ_2008_04.pdf
12. Austria, M.S. (2004). 'Strategies Towards and ASEAN Economic Community,' CBERD Working Paper Series No. 2004-02, Center for Business and Economics Research and Development: Manila. Downloaded from: http://www.dlsu.edu.ph/research/centers/cberd/pdf/papers/Working%20Paper%202004-02.pdf
13. Bergstrand, J.H. (1985). 'The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence,' *Review of Economics & Statistics*, 67(3): 474-81.
14. Bergstrand, J.H. (1989). 'The Generalized Gravity Equation, Monopolistic Competition and the Factor Proportions Theory in International Trade,' *Review of Economics and Statistics*, 71(1): 143-53.
15. Brada, J.C. and Mendez, J.A. (1983). 'Regional Economic Integration and the Volume of Intra-Regional Trade: A Comparison of Developed and Developing Country Experience,' *Kyklos*, 36(4): 589-603.
16. Breuss, F. and Egger, P. (1997). 'Use and Misuse of Gravity Equations in European Integration Research,' WIFO Working Paper 97-03/1997, Austrian Institute of Economic Research: Austria. Downloaded from: http://www.wifo.ac.at/wwa/jsp/index.jsp?fid=23923&id=432&typeid=8&display_mode=2&pub_language=2&language=2
17. Carrere, C. (2006). 'Revisiting the Effects of Regional Trade Agreements on Trade Flows with Proper Specification of the Gravity Model,' *European Economic Review*, 50(2): 223-47.
18. Cheng, I-H and Wall, H.J. (2005). 'Controlling for Heterogeneity in Gravity Models of Trade and Integration,' *Federal Reserve Bank of St Louis Review*, No. 87, 49-64.
19. Chia, S.Y. (2006). 'Integrating the Mekong Region into ASEAN,' paper presented at the Seminar on Accelerating Development in the Mekong Region – The Role of Economic Integration, 26-27 June, Siem Reap, Cambodia, Downloaded from: https://www.imf.org/external/np/seminars/eng/2006/mekong/yue.pdf

20. Clarete, R., Edmonds, C. and Wallack, J.S. (2002). 'Asian Regionalism and its Effects on Trade in the 1980s and 1990s,' ERD Working Paper Series No.30, Asian Development Bank: Manila, Philippines. Downloaded from: http://www.adb.org/Documents/ERD/Working_Papers/wp030.pdf
21. Cuyvers, L., De Lombaerde, P. and Verherstraeten, S. (2005). 'From AFTA Towards and ASEAN Economic Community … and Beyond,' UNU-CRIS Occasional Paper No. O-2005/2, United Nations University-Comparative Regional Integration Studies: Belgium. Downloaded from: http://www.cris.unu.edu/fileadmin/workingpapers/20050310133227.OP%202005%202%20-LC-PDL-SV-ASEAN-2005.pdf
22. Do, T.S. and Ha, T.H.V. (2009). 'Vietnam-China Relations and Building the "Two Corridors, One Economic Circle,"' paper presented at the International Conference on China's Future: Pitfalls, Prospects and the Implications for ASEAN and the World, 5-6 May, Kuala Lumpur. Downloaded from: http://ics.um.edu.my/umweb/ics/may2009/dots.pdf
23. Edmonds, C., Croix, S.L. and Yao, L. (2008). 'China Trade: Busting Gravity's Bounds,' *Journal of Asian Economies*, 19(5-6): 455-66.
24. Fitzpatrick, J. (1984). 'The Geographical Pattern of Irish Foreign Trade: A Test of the Gravity Model,' *Economic and Social Review*, 16(1): 19-30.
25. Fujimura, M. (2008). 'Economic Integration in the Greater Mekong Subregion and Cross Border Transport Infrastructure,' *Journal of Greater Mekong Subregion Development Studies*, 4: 21-41.
26. Fujimura, M and Edmonds, C. (2006). 'Impact of Cross-Border Transport Infrastructure on Trade and Investment in the GMS,' ADB Institute Discussion Paper No.48, Asian Development Bank: Manila, Philippines. Downloaded from: http://www.adbi.org/files/2006.03.dp48.impact.crossborder.gms.pdf
27. Garman, G. and Gilliard, D. (1998). 'Economic Integration in the Americas,' *Journal of Applied Business Research*, 14(3): 1-12.
28. Gavin, B. (2006). 'Regional Trade Agreements in Asia: Implications for the Multilateral Trade System,' UNU-CRIS Occasional Paper No.0-2006/28, United Nations University-Comparative Regional Integration Studies: Belgium. Downloaded from: http://www.cris.unu.edu/fileadmin/workingpapers/20061121105330.O-2006-28.pdf
29. Hao, H. (2007). 'China's Trade and Economic Relations with CLMV,' in *Development Strategy for CLMV in the Age of Economic Integration*, Chap Sotharith (ed.), ERIA Research Project Report No.2007-4-6, Economic Research Institute for Asian and East Asia: Jakarta, pp.171-208. Downloaded from:
30. http://www.eria.org/research/images/pdf/PDF%20No.4/No.4-part2-6-China.pdf
31. Helpman, E. and Krugman, P. (1985). *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition and the International Economy*, MIT Press: Cambridge.
32. Hoang, N. and Liao, J. (2002). 'Economic Effect of Globalization in Developing Countries: An Analysis of Vietnam and China,' manuscript. Downloaded from: http://www.stanford.edu/class/e297c/Economic%20Effects%20of%20Globalization.pdf
33. Ishida, M. (2005). 'Effectiveness and Challenges of Three Economic Corridors of the Greater Mekong Sub-region,' Discussion Paper No. 35, Institute of Developing Economies: Chiba. Downloaded from: http://time.dufe.edu.cn/wencong/IDE-JETRO/035_ishida.pdf
34. Ishida, M. (2007). 'GMS Economic Cooperation and its Impact on CLMV Development,' ERIA Research Project Report 2007 No. 4: Development Strategy for CLMV in the Age of Economic Integration. Downloaded from: http://www.eria.org/research/images/pdf/PDF%20No.4/No.4-part1-4-GMS.pdf
35. Ishida, M. (2009). 'Special Economic Zones and Economic Corridors,' ERIA Discussion Paper Series No. ERIA-DP-2009-16, Institute of Developing Economies: Chiba. Downloaded from: http://www.eria.org/pdf/ERIA-DP-2009-16.pdf
36. Joongi, K. (2003). 'Sub-Regionalism, Regionalism, Trans-Regionalism. Implications for Economic Integration and International Trade Policies,' *Asia Europe Journal*, 1(2): 183-196.
37. Kagami, M. (2009). 'General Overview and Summary,' in *A China-Japan Comparison of Economic Relationships with the Mekong River Basin Countries*, BRC Research Report No. 1, IDE-JETRO: Chiba, pp.1-14. Downloaded from: http://www.ide.go.jp/English/Publish/Download/Brc/pdf/01_overview.pdf
38. Kimura, F. and Obashi, A. (2009). 'International Production Networks: Comparison between China and ASEAN,' ERIA Discussion Paper Series No. ERIA-DP-2009-01, Institute of Developing Economies: Chiba. Downloaded from: http://www.eria.org/pdf/ERIA-DP-2009-01.pdf

39. Kimura, F. and Kobayashi, I. (2009). 'Why is the East Asia Industrial Corridor Needed?' ERIA Policy Brief No. 2009-01, Institute of Developing Economies: Chiba. Downloaded from: http://www.eria.org/pdf/ERIA-PB-2009-01.pdf
40. Kuroiwa, I. (2008). 'Industrial Development Strategy in CLMV,' ERIA Research Project Report 2008 No. 5: Research on Development Strategies for CLMV Countries. Downloaded from: http://www.eria.org/pdf/research/y2008/no5/chapter_1Kuroiwa.pdf
41. Kudo, T. (2006). 'Myanmar's Economic Relations with China: Can China Support the Myanmar Economy?' IDE Discussion Paper No.66, Institute of Developing Economies: Chiba. Downloaded from: http://www.ide.go.jp/English/Publish/Download/Dp/pdf/066.pdf
42. Kudo, T. (2007). 'Border Industry in Myanmar: Turning the Periphery into the Center of Growth,' IDE Discussion Paper No.122, Institute of Developing Economies: Chiba. Downloaded from: http://www.ide.go.jp/English/Publish/Download/Dp/pdf/122.pdf
43. Kudo, T. (2009). 'Border Area Development in the GMS: Turning the Periphery into the Center of Growth,' ERIA Discussion Paper Series No. ERIA-DP-2009-15, Institute of Developing Economies: Chiba. Downloaded from: http://www.eria.org/pdf/ERIA-DP-2009-15.pdf
44. Lwin, N.N. (2009). 'Analysis of International Trade of CLM Countries,' IDE Discussion Paper No. 215, Institute of Developing Economies: Chiba. Downloaded from: http://www.ide.go.jp/English/Publish/Download/Dp/pdf/215.pdf
45. Martinez-Zarzoso, I. and Nowak-Lehmann, F. (2003). 'Augmented Gravity Model: An Empirical Application to Mercosur-European Union Trade Flows,' *Journal of Applied Economics*, 6(2): 291-316.
46. Menon, J. (2005). 'Building Blocks or Stumbling Blocks? Regional Cooperation Arrangements in Southeast Asia,' ADB Institute Discussion Paper No.41, Asian Development Bank Institute: Tokyo. Downloaded from:
47. http://www.adbi.org/files/2005.11.dp41.regional.cooperation.seasia.pdf
48. Mulapruk, P. and Coxhead, I. (2005). 'Competition and Complementarity in Chinese and ASEAN Manufacturing Industries,' paper presented at China Center for Economic Research, Peking University, November 18. Downloaded from: http://www.aae.wisc.edu/coxhead/papers/gravity_wp-4.pdf
49. Nguyen, T.T. (2002). 'Vietnam's Trade Liberalisation in the Context of ASEAN: Vietnam's Trade Regime,' ASEAN Business Case Studies No.21, Downloaded from: http://webh01.ua.ac.be/cas/PDF/ASEAN22.pdf
50. Pelkmans, J. (2009). 'The ASEAN Economic Community: Dilemma's of a Shallow Trading Club,' UNU-CRIS Working Paper No.W-2009/5, United Nations University-Comparative Regional Integration Studies: Belgium. Downloaded from: http://www.cris.unu.edu/fileadmin/workingpapers/W-2009-5_The_Asean_Community__Dilemma_s_of_a_shallow_trading_club.pdf
51. Pham, A. (2007). 'Border Trade in the GMS: Ground Realities and Future Options,' Policy Brief 6/2007, CUTS Hanoi Resource Centre: Vietnam. Downloaded from: http://www.cuts-international.org/HRC/pdf/PB-6-07.pdf
52. Poncet, S. (2006). 'Economic Integration of Yunnan with the Greater Mekong Subregion,' *Asian Economic Journal*, 20(3): 303-17.
53. Poyhonen, P. (1963). 'A Tentative Model for the Volume of Trade between Countries,' *Weltwirtschaftliches Archiv*, 90(1): 93-99.
54. Ravenhill, J. (2009). 'The "New East Asian Regionalism": A "Political Domino" Effect?' UNU-CRIS Working Paper No. W-2009/11, United Nations University – Comparative Regional Integration Studies: Belgium. Downloaded from: http://85.10.198.45/fileadmin/workingpapers/W-2009-11.pdf
55. Rojid, S. (2006). 'COMESA Trade Potential: A Gravity Approach,' *Applied Economics Letters*, 13(14): 947-51.
56. Sandberg, H.M., Seale, J.L.JR. and Taylor, T.G. (2006). 'History, Regionalism, and CARICOM Trade: A Gravity Model Analysis,' *Journal of Development Studies*, 42(5): 795-811.
57. Smith, P.J. (1999). 'Are Weak Patent Rights a Barrier to US Exports?' *Journal of International Economics*, 48(1): 151-77.
58. Soloaga, I. and Winters, A. (2001). 'Regionalism in the Nineties: What Effect on Trade?' *North American Journal of Economics and Finance*, 12(1): 1-29.

59. Strutt, A., Stone, S. and Minor, P. (2008). 'Trade Facilitation in the Greater Mekong Subregion: Impacts of Reducing the Time to Trade,' *Journal of Greater Mekong Subregion Development Studies*, 4: 1-20.
60. Sussangkarn, C. (2006). 'CLMV and East Asian Integration,' TDRI Quarterly Review, 21(4): 3-10, Thailand Development Research Institute: Bangkok. Downloaded from: http://www.tdri.or.th/library/quarterly/text/d06_1.pdf
61. Tinbergen, J. (1962). *Shaping the World Economy: Suggestions for an International Economics Policy*, The Twentieth Century Fund: New York.
62. Tsuneishi, T. (2008). 'Development of Border Economic Zones in Thailand: Expansion of Border Trade and Formation of Border Economic Zones,' IDE Discussion Paper No. 153, Institute of Developing Economies: Chiba. Downloaded from: http://www.ide.go.jp/English/Publish/Download/Dp/pdf/153.pdf
63. Tsuneishi, T. (2009). 'Border Trade and Economic Zones on the North-South Economic Corridor: Focusing on the Connecting Points between the Four Countries,' IDE Discussion Paper No. 205, Institute of Developing Economies: Chiba. Downloaded from: http://www.ide.go.jp/English/Publish/Download/Dp/pdf/205.pdf
64. Tumbarello, P. (2007). 'Are Regional Trade Agreements in Asia Stumbling or Building Blocks? Implications for the Mekong-3 Countries,' IMF Working Paper No. WP/07/53, International Monetary Fund: Washington D.C. Downloaded from: http://www.imf.org/external/pubs/ft/wp/2007/wp0753.pdf
65. Zhao, L., Malouche, M. and Newfarmer, R. (2008). 'China's Emerging Regional Trade Policy,' *Journal of Chinese Economic and Foreign Trade Studies*, 1(1): 21-35.
66. Zhu, Z. (2008). 'China's Opening-Up Strategy and its Economic Relations with ASEAN Countries – A Case Study of Yunnan Province,' Visiting Research Fellow Monograph Series No.435, Institute of Developing Economies, JETRO: Japan. Downloaded from: http://www.ide.go.jp/English/Publish/Download/Vrf/pdf/435.pdf
67. Zhu, Z. (2009). 'China's Economic Aid to CLMV and its Economic Cooperation with Them,' in *A China-Japan Comparison of Economic Relationships with the Mekong River Basin Countries*, BRC Research Report No. 1, IDE-JETRO: Chiba, pp.69-106. Downloaded from: http://www.ide.go.jp/English/Publish/Download/Brc/pdf/01_chinaseconomic.pdf

Appendix 1: Variable Construction and Data Source

Variable	Variable Construction	Data Source
X	Value of bilateral exports in US$ measured at constant (1990) price. Exports are deflated by the US consumer price index.	Exports (at fob price, US$) compiled from UN COMTRADE database.
GDP	Real GDP (at 1990 price). GDP is deflated by the US consumer price index.	International Financial Statistics, IMF. Asian Development Bank.
PGDP	Real GDP per capita (at 1990 price). Real GDP divided by population.	International Financial Statistics, IMF. Asian Development Bank.
N	Population.	International Financial Statistics, IMF. Asian Development Bank.
DST	Bilateral great-circle distance between major cities of each country.	CEPII database.
ADJ	A binary dummy variable which takes the value 1 for countries which share a common land border and 0 otherwise.	CEPII database.
RER	$RER_{ij} = NER * (P_j/P_i)$ where NER = nominal bilateral exchange rate index P_j = price level of country j proxied by the producer price index P_i = price level of country i proxied by the GDP deflator RER is at 2000 price.	International Financial Statistics, IMF.

Appendix 2: Bilateral Country Pairs

China-ASEAN	**Intra-ASEAN**	**Intra-GMS**
China-ASEAN6	**Intra-ASEAN6**	**Intra-CLMV**
China-Malaysia	Malaysia-Singapore	*Cambodia-Laos*
China-Singapore	Malaysia-Thailand	*Cambodia-Myanmar*
China-Thailand	Malaysia-Philippines	*Cambodia-Vietnam*
China-Philippines	Malaysia-Indonesia	*Laos-Myanmar*
China-Indonesia	Malaysia-Brunei	*Laos-Vietnam*
China-Brunei	Philippines-Singapore	*Myanmar-Vietnam*
	Thailand-Singapore	
China-CLMV	Thailand-Philippines	**ASEAN6-CLMV**
China-Cambodia	Thailand-Indonesia	Thailand-Cambodia
China-Laos	Thailand-Brunei	Thailand-Laos
China-Myanmar	Philippines-Indonesia	Thailand-Myanmar
China-Vietnam	Philippines-Brunei	Thailand-Vietnam
	Indonesia-Singapore	
	Singapore-Brunei	**China-CLMV**
	Indonesia-Brunei	China-Cambodia
		China-Laos
	ASEAN6-CLMV	China-Myanmar
	Malaysia-Cambodia	China-Vietnam
	Malaysia-Laos	China-Thailand
	Malaysia-Myanmar	
	Malaysia-Vietnam	
	Singapore-Cambodia	
	Singapore-Laos	
	Singapore-Myanmar	
	Singapore-Vietnam	
	Thailand-Cambodia	
	Thailand-Laos	
	Thailand-Myanmar	
	Thailand-Vietnam	
	Philippines-Laos	
	Philippines-Myanmar	
	Philippines-Vietnam	
	Indonesia-Cambodia	
	Indonesia-Laos	
	Indonesia-Myanmar	
	Indonesia-Vietnam	
	Philippines-Cambodia	
	Brunei-Cambodia	
	Brunei-Laos	
	Brunei-Myanmar	
	Brunei-Vietnam	

Note: There is missing data for 12 bilateral pairs (in italics): (a) Intra-ASEAN6: Indonesia-Brunei; (b) ASEAN6-CLMV: Philippines-Cambodia; Brunei-Cambodia; Brunei-Laos; Brunei-Myanmar; Brunei-Vietnam. (c) Intra-CLMV: Cambodia-Laos; Cambodia-Myanmar; Cambodia-Vietnam; Laos-Myanmar (no data); Laos-Vietnam; Myanmar-Vietnam.