Re-examining the Impact of ACFTA on ASEAN's Exports of Manufactured Goods to China*

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Abstract
There is a relatively large body of literature examining ASEAN–China relations, including assessments of the impact of the ASEAN–China Free Trade Agreement (ACFTA) on ASEAN's welfare and its trade with China. Overall, the results of these studies indicate a positive impact of ACFTA on the region's exports to China. These results differ from firm-level surveys that indicate a low utilization rate of most regional trade agreement tariff concessions, including those provided by ACFTA. Moreover, trade in manufactured goods in the region has been characterized as market-led, and governed by multinationals (MNCs) and their regional production networks. Thus, MNC decisions are the driving force influencing changes in manufactured parts and components trade in the region. This trade is also fostered by duty-free imports in the export enclaves provided by the host economies for these MNCs. In view of the conflicting empirical evidence on the trade effects of regional trade agreements, the objective of this study is to re-assess the impact of ACFTA on ASEAN's manufactured exports to China. In performing this analysis, we separately evaluate the effects of trade in parts and components (P&C) and non–parts and components (non P&C) or final manufactured goods. When we apply gravity estimation methods to individual regressions for these two forms of trade, we find that the determinants of trade are indeed different for the two sectors, and that the implementation of ACFTA had different effects on P&C versus final goods ASEAN exports to China.

1. Introduction

Since the early 1990s the international fragmentation of production has dramatically transformed trade patterns in East

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Asia, including the flows of trade between China and the countries of ASEAN-6[1] (Athukorala 2011). In particular, the integration of China into international production networks has increased parts and components (P&C) trade in the region. Although these production networks are driven by the operations of the region's multinational corporations (MNCs) (Narjoko 2011), the proliferation of free trade agreements (FTAs) in the region, especially since 2000 (Kawai and Wignaraja 2009), may have also contributed to the growth in the region's trade. Study of the ASEAN–China FTA's (ACFTA) contribution to trade is particularly relevant in light of the relatively high share of ASEAN and China in East Asia's P&C trade (Athukorala 2011) and the fact that this FTA, which was signed in 2002, represented China's first foray into FTAs and ASEAN's first extra-regional agreement. By 1 January 2010, this agreement had brought tariffs down to zero for around 7,000 items traded between ASEAN-6 and China through its scheduled 5-year tariff reduction for goods.

The literature on ASEAN–China trade, ACFTA, and its impact can be divided into three groups. The first group examines the competitive and complementary aspects in ASEAN and China's trade relations. For example, Wong and Chan (2002), Holst and Weiss (2004), and Tongzon (2005) find that China's competitiveness in manufacturing has a negative effect on ASEAN's exports, both between members as well as in major developing country markets. The second group uses computable general equilibrium models such as the Global Trade and Economic Analysis or the Global Trade Analysis Project to examine the impact of the ACFTA on member country trade and welfare (see, e.g., Chirathivat 2002; Lee and van der Mensbrugghe 2007; Park, Park, and Estrada 2009). This work finds positive net welfare and trade gains for both ASEAN and China. A specific case study for Vietnam also yielded a similar result, indicating that ACFTA had a positive effect on Vietnam's GDP and exports (Toh and Gayathri 2004). The third strand of the literature uses gravity models (Roberts 2004; Yamashita and Kohpaiboon 2011; Sheng, Tang, and Xu 2012) to measure the effects of tariff reductions on trade creation. In particular, Sheng, Tang, and Xu (2012) extend this literature to capture the effects of tariffs on components trade through the use of an extended gravity model. Their results show that ACFTA led to an increase in the level of bilateral trade between ASEAN countries and China. In contrast, Yamashita and Kohpaiboon (2011) discount the need to estimate the impact of the ACFTA on P&C trade due to low or zero Most Favored Nation (MFN) rates for these goods and consequently a low margin of preference. For this reason, when they estimate the impact of the ACFTA on China's exports of final goods, their work

the discussants and participants at the meeting, which were used in revising the paper. The usual caveats hold.

1 This comprises Brunei, Indonesia, Malaysia, the Philippines, Thailand, and Singapore.

finds that the FTA had a positive though small impact on the trade links between China and ASEAN.

Whereas a number of studies find positive effects associated with ACFTA, the key findings in UNESCAP (2011) come to a very different conclusion. That work, which only uncovers a tenuous link between international production networks and regional trade agreements (RTAs), argues that there are a number of factors that reduce the potency of FTAs. First, because countries in the region seek to attract MNCs to produce in their location, many countries in the region have already engaged in unilateral tariff liberalization over time, which has been accompanied by special provisions for MNCs such as duty-free imports in export processing zones (Narjoko 2011). As noted by Hiratsuka et al. (2009), many ASEAN member states provide investment incentives or tariff reductions on imported materials and parts as part of their strategy to attract inflows of foreign direct investment (FDI). Due to the general liberalization in these cases, firms have much less incentive to utilize FTAs. Second, when firms choose to access the additional tariff benefits that are provided by RTAs they must also comply with the rules of origin (ROOs) stipulated by these agreements. As the degree of product fragmentation increases, however, it becomes increasingly difficult for firms to comply with the ROOs, especially within a single country. Thus, when firms decide whether to use tariff preferences that are provided by RTAs, they need to weigh these compliance costs against the tariff benefits they will achieve. This tariff liberalization benefit, or the margin of preference (MOP), reflects the difference in tariff concessions that are given by the RTA with the MFN rates of the respective countries. Naturally, a small MOP reduces the incentives for a firm to utilize the tariff concessions provided by the RTAs. For example, Wang and Tong (2010) reported that a recent study on the effectiveness of ACFTA in China found that only one-fourth of China's enterprises involved in trade with ASEAN utilized ACFTA's preferential tariff rates. This is due in part to the high compliance costs relative to the small MOP benefits. The low utilization rates were also attributed to the firms' low awareness of the tariff concessions of the agreement. Third, in the case of electronics products such as hard drives, tariffs are already zero in accordance with the Information and Technology Agreement (ITA) under the World Trade Organization (WTO). In sum, for these reasons, it is not surprising that Athukorala and Yamashita (2006) do not find evidence that FTAs can promote vertical specialization and fragmentation trade in East Asia. These contrasting conclusions in this area of research suggest the value of examining the effects of FTAs on final goods and P&C trade separately.

In view of the ongoing debate, the objective of this paper is to re-examine the impact of ACFTA on ASEAN's exports to China in P&C and final manufactured products.

Along the way, we will (1) analyze the trade trends for each of these types of goods between the years 1999 to 2011, by (2) calculating the MOP for P&C and final goods under ACFTA and (3) testing the impact of tariff liberalization generated by the ACFTA on ASEAN's exports of P&C and final goods to China. For reasons of data availability, the ASEAN member states examined in this paper are the ASEAN-5, namely, Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

2. Overview of ACFTA and ASEAN's exports to China

2.1 ACFTA: Salient features

The Framework Agreement on Comprehensive Economic Cooperation between ASEAN and China was signed during the seventh ASEAN–China Summit in Phnom Penh in November 2002 (Appendix 1). This agreement included three components that covered goods, services, and investment. The focus of this paper is in the Trade in Goods Agreement that was put into force in 2005. The elimination of tariffs in this agreement is progressive over time, based on several tracks, namely, Early Harvest Programs (EHPs), normal track, and sensitive track.

The EHP provided accelerated tariff reduction for selected agricultural and manufacturing products,[2] starting on 1 January 2004 and ending in 2006 for members of the ASEAN-6, and ending in 2010 for the newer ASEAN member states, namely, Cambodia, Laos, Vietnam, and Myanmar.

In the case of normal track products, the phase-in of tariff reductions for the ASEAN-6 and China are shown in Table 1. Based on the scheduled tariff changes, the ASEAN-6 and China were required to eliminate their tariffs on the majority of products that were classified as part of the normal track by 2010, and tariffs on all remaining items were to be eliminated by 2012. Firms that wanted to gain access to ACFTA rates were required to comply with the ROO requirement of the agreement, which was set at 40 percent regional value content.

Although the FTA required the removal of all tariffs on the vast majority of products, a small number of products were included in the sensitive track. Inclusion in

2 Although the EHP consisted of products mainly in chapters 1–8 in the Harmonized System of Tariffs, it was negotiated on a bilateral basis between China and the individual ASEAN member states. Hence member states could request that certain products be exempted from the program's coverage under the Exclusion List. Conversely, there was also a request list for the inclusion of certain products not covered by the program but mutually agreed upon by China and the respective ASEAN member states (Yeoh and Ooi 2007). Malaysia, for example, has included some manufactured products in its EHP with China.

Table 1. Tariff reduction phase-in, for ASEAN-6 and China

	ACFTA preferential tariff rate (not later than 1 January)			
X = Applied MFN tariff rate	**2005**	**2007**	**2009**	**2010**
X ≥ 20 percent	20	12	5	0
15 percent ≤ X ≤ 20 percent	15	8	5	0
10 percent ≤ X ≤ 15 percent	10	8	5	0
X ≤ 5 percent	Standstill		0	0
Schedule	Commitments			
July 2005	At least 40 percent of its tariff lines reduced to 0–5 percent			
January 2007	At least 60 percent of its tariff lines reduced to 0–5 percent			
January 2010	Eliminate all tariffs in normal track, except for items provided with flexibility			
2012	All tariffs in normal track eliminated			

Source: *MITI, undated.*

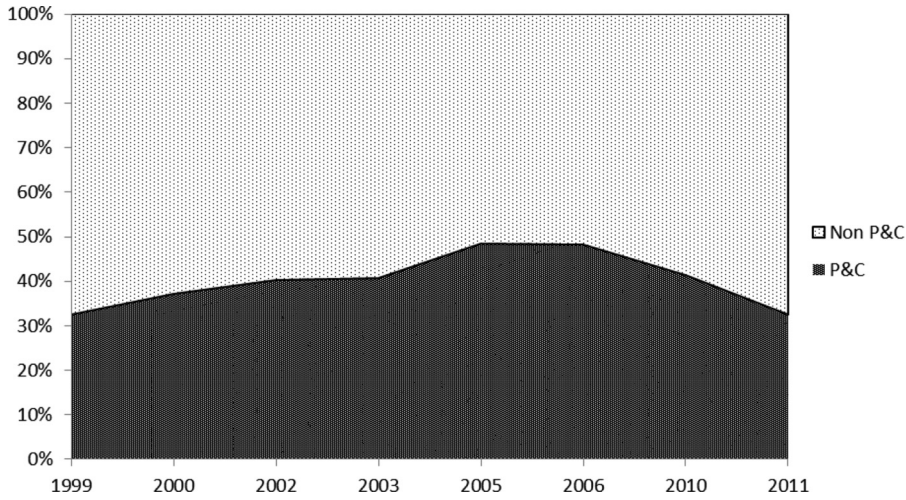
this special track was limited to a maximum of 400 HS6-digit products, and an aggregate trade value that was not allowed to exceed 10 percent of import value, based on 2001 trade statistics (UACT undated). This track was subdivided further into a sensitive list and highly sensitive list. The ASEAN-6 and China committed to reduce applied MFN tariff rates on tariff lines placed in their respective sensitive lists by 20 percent by 1 January 2012, to be followed by an ultimate reduction to 0–5 percent implanted no later than 1 January 2018. An example of products placed on the sensitive list includes automobiles, including parts and components (Narjoko 2011).

2.2 Profile of ASEAN's exports to China

In 2011, China was the top trading partner of ASEAN, following intra-ASEAN trade. Its 2011 share in ASEAN trade of 11.7 percent represented a dramatic increase in its importance, with a rise from its earlier levels of 2 percent in 1993 and 7 percent in 2003. Similarly, China became an important destination for ASEAN's exports, rising from 2 percent in 1993 to 6 percent in 2003 and to 11 percent in 2010. In addition, over this interval the share of China's imports sourced from ASEAN rose from 2 percent in 1993 to 12 percent in 2010.

Following Athukorala (2010)'s definition of P&C goods, the share of P&C goods in total ASEAN-5 exports to China increased progressively from 33 percent in 1999 to 48 percent in 2006 before falling to 41 percent in 2010 (Figure 1). Some of the products included in this P&C trade were covered by the ITA that was signed in 1996. Signatories to the ITA include some members of the WTO, including the ASEAN-5 and later China upon its 2001 WTO entry. To meet its ITA obligations, China eliminated tariffs on two-thirds of the products subject to the ITA by 1 January 2003, and eliminated tariffs on all other ITA products by 1 January 2005. The WTO-ITA

Figure 1. Share of P&C (non-P&C exports) to total trade with China

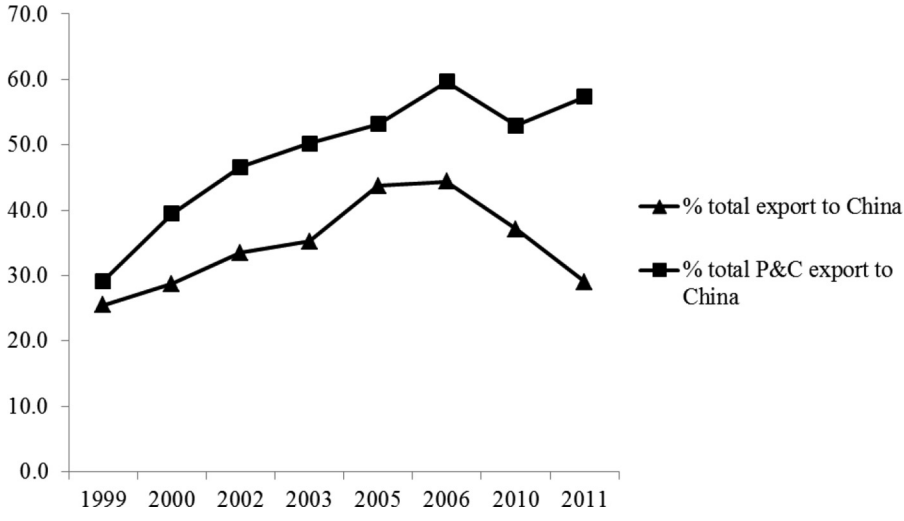


Source: *Authors' calculations based on UNComtrade data.*

covers products such as telecommunications equipment, computer software, hardware and peripherals, semiconductors and electronic components, office machines, semiconductor testing and manufacturing equipment, and analytical instruments. As such, many electrical machinery and machinery items under HS Chapters 84 and 85, as well as some under HS Chapter 90 (i.e., optical and related equipment), were already zero-rated for trade among ITA members, including the ASEAN-6 and China before the implementation of the ACFTA. Consequently, the share of exports of ITA products to total ASEAN-5's exports to China increased progressively from 25.5 percent in 1999 to 44 percent in 2005, before falling to 29 percent in 2011 (Figure 2). The share of ITA goods in P&C exports from ASEAN-5 to China increased from 29 percent in 1999 to 53 percent in 2005, before reaching 57 percent in 2011. This implies slightly more than half of ASEAN's P&C exports to China were already zero-rated due to commitments under the WTO-ITA agreement before the implementation of the ACFTA.

Firms that seek to gain preferential tariffs are required to meet a regional value content of 40 percent. For this reason, exporters generally weigh the cost of compliance against the difference between the MFN tariff rate and the preferential tariff rate or the margin of preference before they decide to make the effort required for the preferential tariff. Hiratsuka et al. (2009) found that a trigger value of 5.3 percent is needed for Japanese companies operating in ASEAN before they elected to use tariff

Figure 2. Export of P&C goods in ITA as a share of total ASEAN and total ASEAN's P&C export to China



Source: *Authors' calculations based on UNComtrade data.*

preferences offered by a FTA. In other words, the MOP had to exceed 5.3 percent before a Japanese firm in ASEAN considered incurring the additional cost of procedures involved in accessing the preferential tariffs of the agreement. To determine whether the ACFTA provided economically interesting tariff incentives, we calculate the share of goods with a MOP in excess of 5 percent for P&C and final goods in ASEAN's exports to China (Table 2). Our calculation reveals that more than 50 percent of the P&C and final goods had a MOP of over 5 percent in 2009 to 2010, which coincided with the last two years in the implementation of the ACFTA. Based on the relatively large share of ITA goods in the ASEAN-6's exports to China, however, as well as the relatively small MOP (i.e., less than 5 percent) prior to 2009, we conjecture that the reduction in tariffs under the ACFTA was of limited importance for parts and components exports as compared to final goods exports to China between 1999–2011. We test this conjecture in the following section.

3. Model, data, and empirical results

3.1 Augmented gravity model

We use two models to examine and compare the impact of ACFTA on the exports of P&C and final manufactured goods from the ASEAN-5 to China. Each model is based on the basic gravity model of bilateral trade, which posits that trade is

Table 2. Share of goods above 5 percent MOP in total P&C and final goods (percent)

	(percent of total P&C or final goods)				
MOP > 5 percent	**2003**	**2005**	**2007**	**2009**	**2010**
P&C	0	0	32	64	79
Final	0	0	27	80	91

Source: *Computed by authors, based on World Bank World Integrated Trade Solution data and data from ACFTA.*

positively determined by the economic mass of the trading partner(s) but adversely affected by the distance that separates them (Tinbergen 1962; Anderson 1979). Theoretical justifications for the gravity model are provided by Linnemann (1966) and Deardorff (1998). The general specification of an augmented gravity model consists of additional exploratory variables that explain distance attributes and other variables of interest that may affect bilateral trade. Therefore, both models will include additional variables to capture specific differences that are relevant for P&C and final manufactured goods trade. Following this structure, the augmented gravity model in this paper is specified as follows.

Model 1: The P&C Model

$$\begin{aligned}\ln Xpnc_{i,China,t} = \alpha + \beta_1 \ln GVO_{i,t} + \beta_2 \ln GVO_{China,t} + \beta_3 ExFinal_{China,t} + \\ \beta_4 \ln \text{Distance}_{i,China,t} + \beta_5 Language + \beta_6 Crisis + \beta_7 \ln Reer_{i,t} + \beta_8 \ln FDI_t + \\ \beta_9 RLC_t + \beta_{10} \ln Tariffpnc_{China,t} + \gamma_1 ACFTA + \gamma_2 ACFTA{*}Tariffpnc_{China,t} + \\ \gamma_3 ACFTA{*}FDI_t + \gamma_4 ACFTA{*}RLC_t + \epsilon_{it} \ldots\ldots\end{aligned} \tag{1}$$

Model 2: The Final Goods (Non-P&C) Model

$$\begin{aligned}\ln Xfin_{i,China,t} = \alpha + \theta_1 \ln GDPci_{i,t} + \theta_2 \ln GDPci_{China,t} + \theta_3 \ln \text{Distance}_{i,China,t} + \\ \theta_4 Language + \theta_5 Crisis + \theta_6 \ln REER_{i,t}s + \theta_7 \ln FDI_t + \theta_8 RLC_t + \\ \theta_9 \ln TariffFin_{China,t} + \sigma_1 ACFTA + \sigma_2 ACFTA{*}TariffFin_{China,t} + \\ \sigma_3 ACFTA{*}FDI_t + \sigma_4 ACFTA{*}RLC_t + \epsilon_{it} \ldots\ldots\end{aligned} \tag{2}$$

where subscripts *i, China,* and *t* represent the individual ASEAN-5 country and their market destination, China in the year *t.* $Xpnc_{i,China,t}$ and $Xfin_{i,China,t}$ (respectively) denote the real exports of manufactured P&C goods and final goods from each ASEAN country *i* to China in year *t.*

Common proxies for economic mass are GDP, population size, and GDP per capita (Kepaptsoglou, Karlaftis, and Tsamboulas 2010). The use of GDP as a proxy for the demand and supply for intermediate goods has been challenged, however, since the supply (or demand) for parts and components is generated by its gross and not its

value-added output[3] (Baldwin and Taglioni 2011). To address this concern, we use the gross value of output of industries in China and the ASEAN countries to represent, respectively, each country's mass variable in Model 1. Theoretically, both β_1 and β_2 are expected to be positive. In other words, within a production network, an increase in output by the destination or origin country increases cross-border demand and supply flows of intermediate goods.

Changes in ASEAN's P&C exports to China may also be driven by increases in demand by China's export partners. Due to vertical specialization, ASEAN's P&C exports to China may be used as intermediate goods that are assembled in China to produce final goods (Hummels, Ishii, and Yi 2001). Therefore, a mass variable to represent China's final goods market, or *third-country effects,* are included in the model. Because third-country effects generally involve demand for China's final goods, we proxy the third-country effects by including measures of China's global exports of final goods. Hence, an increase in the global demand for China's final goods exports is expected to increase ASEAN's exports of P&C ($\beta_2 > 0$).

The regression used for trade in final goods (Model 2) retains the standard gravity model proxy for economic mass. GDP per capita is preferred over the standard GDP indicator because the former represents the purchasing power or the wealth of trading countries. The purchasing power of China indicates the ability to consume imported final goods from ASEAN. A high GDP per capita for ASEAN also implies more resources available to increase the scale of output to export to China. China's per capita income may affect ASEAN exports negatively if import substitution effect has occurred, however; hence, θ_1 is positive and θ_2 is ambiguous.

Although many have argued that geographical distance is increasingly irrelevant due to advances in communications technology (Cairncross 1997), distance in our model captures the effects of trade risks—such as difficulties in learning about foreign legal, administrative, customs, and business practices. The distance variable also captures trade costs associated with time lags such as spoilage, logistics costs, and fuel price shocks. Thus, *Distance* is expected to have a negative effect on exports. In particular, trade in P&C may be more sensitive to trade costs compared with trade in final goods due to its nature of multiple border crossings and the ability to switch suppliers within the global production network (in absence of economic shocks [i.e., crisis]) (Athukorala and Yamashita 2006; Pellan and Wong 2013). Therefore, we expect coefficient β_4 to be negative.

3 The problem arises because GDP is measured on a value-added basis whereas trade is measured on a gross sales basis. Therefore the use of GDP is understated and the true model has to include additional terms for intermediate goods.

The relationship between trade in final goods and distance may be positive, however, when firms exporting to distant locations are more productive than those exporting close to home (Melitz 2003; Chaney 2008; Lawless and Whelan 2008). As fixed-trade costs increase with distance, firms are motivated to optimize sales to cover these costs. Hence, θ_3 is predicted to be ambiguous depending on the net effect from the possible increase in shipment size to cover higher fixed trade costs and the standard negative impact of distance on exports.

To control for cultural distance (disparities) between the trading nations, the model also includes a language indicator, *Language.* A priori, we predict that cultural proximity such as having a common language may facilitate bilateral trade through improved communication and a better understanding of the partner firm's business culture. Therefore, we expect that our estimates of β_5 and θ_4 will be positive. To control for structural breaks due to economic shocks during the 1997–98 Asian financial crisis and the 2008–09 global financial crisis, a crisis variable (*Crisis*) is included.

The gravity model is further augmented with a measure of the exporting country's competitiveness, the real effective exchange rate (*REER*).[4] This variable is a weighted average of the exporting country's currency relative to an index or basket of other major currencies, adjusted for the effects of inflation. A decrease in the variable *REER* indicates that the exporter's currency has depreciated (an appreciation in competitiveness that may be attributed to increased productivity), which is predicted to encourage exports and discourage imports. Thus, we predict that the coefficients β_7 and θ_6 will both be negative.

We include FDI variables in our regressions to capture the investment-trade nexus links that cement trade between China and the ASEAN countries. The challenging question here is to identify the causality of trade and FDI. Although this question has been heavily debated, there is significant consensus among scholars that FDI and trade are complementary (Helpman and Krugman 1986).[5] In Blonigen (2001), complementarity arises when FDI stimulates import of intermediate inputs.

4 The REER provides a measure of "relative price and cost." It aims to assess a country's price- or cost-competitiveness relative to its principal competitors in international markets (Randveer and Rell 2002). REER movements are generally correlated with a country's aggregate external price competitiveness and can be interpreted as changes in technology progress that leads to productivity improvement in goods commonly traded (Catão 2007).

5 In addition to literature surveys, a simple Granger-causality test has been conducted on our variables to examine the direction of causality. We ran two general Granger tests, $Y = f(Y_{t-n}, X_{t-n})$ and $X = f(X_{t-n}, Y_{t-n})$, using an Arellano-Bond linear dynamic panel-data estimator and utilizing a Wald test on the results. Our results suggest that FDI Granger-caused exports of P&C but had dual direction effects in the case of final goods. Including FDI as an explanatory variable is therefore acceptable.

Therefore, we predict β_8 will be greater than 0. However, FDI may also displace imports of the goods that are assembled by FDI firms. In that case, θ_7 is expected to be negative.

MNCs often have an incentive to shift some of their production outside of their headquarter country to reduce their cost of production by capitalizing on locational advantages (Grunwald and Flamm 1985; Dunning 1998).[6] For host countries, knowledge spillovers from FDI may increase productivity, thereby increasing future trade (Ozawa 1992; Liu et al. 2000). The significance of FDI-driven exports of the ASEAN countries has been attributed to the formation of regional production networks (RPNs) (see Athukorala and Hill 1998; Thorbeck and Salike 2011). Therefore we predict that FDI will have a larger effect on P&C trade than the export of final goods, or, $\beta_8 > \theta_7 > 0$.

Following the Ricardian model of trade, relative unit labor costs (*RLC*)[7] represent a key relative price in the standard comparative advantage theory of trade (Edwards and Golub 2004). If labor cost in China's manufacturing sector increases relative to its ASEAN partners, this improves the relative attractiveness of producing and exporting manufactured goods from ASEAN countries. Although this theory was originally applied as a description of final goods trade, relative labor costs should also apply to P&C trade, according to new theories based on the international division of labor. In that case, wage difference provides the incentive to divide production network tasks allocated to China and the countries of ASEAN—thus providing opportunities for cross-border expansion of production sharing systems and the related trade in P&C (Athukorala 2008). Due to international specialization based on relative production costs, both β_9 and θ_8 are expected to be positive.

Our variable *Tariff* examines the relevance of tariff barriers in determining the level of trade. Trade theory postulates an inverse relationship between trade and tariff barriers, β_{10} (or θ_9) < 0. However, to ascertain the impact of tariffs under the ACFTA, a policy dummy, *ACFTA,* has been created to interact with the tariff indicator. A similar explanation applies to the interaction between the ACFTA policy indicator and FDI. Lastly, an interaction between the ACFTA indicator and our variable *RLC* is included to control for any differential impact of relative factor costs under the ACFTA. In sum, the impact of the ACFTA on exports is explained by the change in the responsiveness of trade to tariff liberalization, FDI, and RLC when the ACFTA

6 Another explanation characterizes FDI either as market-seeking, resource-seeking, or as efficiency- seeking. Market- and resource-seeking FDI is considered trade diverting and efficiency-seeking FDI is viewed as trade creating.

7 Although FDI may be influenced by relative costs, a correlations test confirms that there are no multi-collinearity issues.

is in effect. Coefficients on the interaction terms indicate whether the effects of tariff liberalization and FDI on trade were enhanced or diminished when ACFTA was in effect. Appendix 2 provides a detailed discussion regarding the construction and sources of data that were used in the estimation of equations (1) and (2).

Estimation method This study applies its estimating equations to an unbalanced data panel covering ASEAN-5 trade between 1992 and 2011. Our use of a Hausmann test verifies the importance of country-specific fixed effects. To estimate these time-invariant country fixed effects, we use a least square dummy variable estimation model. While implementing our estimation we also accounted for econometric issues related to the treatment of time, and the importance of heteroskedasticity. We use a Wald test that allows us to confirm that there is no need for time-fixed effects. Further, when we study the correlation matrix, we do not uncover any serious multi-collinearity issues between the exogenous variables. The Levin-Lu-Chu test for a panel unit root confirms that the variables are generally stationary. To control for heteroskedasticity, the estimation is done using the heteroskedasticity-robust standard error estimator.

4. Discussion

Table 3 displays the estimation results. For final goods, a 1 percent increase in the GDP per capita of ASEAN countries is found to result in an approximately 7.8 percent increase in exports to China (Model 2). However, because ASEAN's P&C exports to China support the production of final goods that are ultimately shipped to many destinations, P&C exports will not necessarily depend on China's GDP per capita. Consistent with this conjecture, the economic mass variables in the P&C model are both insignificant in determining ASEAN's exports to China, and the impact of the third-country effects is positive and significant in Model 1. Our results show that a 1 percent increase in the global demand for final goods from China increases ASEAN's P&C exports to China by 1.4 percent. This finding is generally consistent with Athukorala and Yamashita (2006), where extra-regional trade in final goods increases regional production network growth based on vertical specialization.

Both models show that distance or trade cost is a significant factor that influences ASEAN manufactured exports to China. For P&C exports (Model 1), a 1 percent increase in trade costs reduces manufactured P&C exports to China by 7 percent. In contrast, the impact of trade cost is found to be significant and positive for final goods exports (Model 2). The negative sign in Model 1 may be due to multiple border-crossing in the value chain in vertical P&C trade as conjectured. In the case of final goods the net effect is found to be positive. Because final goods exports to

China require only single entry, the positive sign may imply that the incentive of breaking into China's massive consumer market supersedes the trade cost factor. Also, as explained earlier, producers may export more to optimize sales to cover these costs (Lawless and Whelan 2008).

Although the use of a common language (Chinese) appears to facilitate trade in both models, it may not be a good proxy for cultural proximity—as P&C trade is in the hands of MNCs, where the common language is likely to be English. This may explain the negative sign obtained for the final goods model (Model 2), as the choice of a suitable proxy was limited. The crisis indicator shows that P&C exports are more strongly affected by the economic crisis than were final goods exports (Models 1 and 2). Unlike final goods, where consumers have the flexibility to substitute across suppliers when making consumption decisions during a crisis, substitutability of specialized components from other sources during a crisis is limited (Jones 2000; Athukorala and Menon 2010). Because the switching of suppliers tends to incur costs, switching decisions are not likely to be instantaneous due to contractual bindings and/or flexibility.

Before the implementation of ACFTA, Model 1 indicates that both FDI and tariff liberalization were important determinants of P&C exports. The interaction term, however, shows that both tariff liberalization and FDI lost their significant link as the main drivers increasing exports of P&C following the implementation of ACFTA. The loss of significance of tariffs following the implementation of ACFTA supports the conjecture in this paper. This finding also supports Yamashita and Kohpaiboon (2011)'s assertion that FTAs may not have an actual impact on trade in components as the relatively small MOP has decreased the importance of tariff liberalization on P&C goods in the ACFTA.

For FDI, the finding of Model 1 may be attributed to sectoral barriers to manufacturing investment as these form one of the major impediments to FDI in ASEAN countries (Thangevalu and Findlay 2011). Instead, differences in labor cost seem to be a major determinant for ASEAN P&C exports to China under ACFTA.

For Model 2, we are unable to establish similar conclusions for final goods in the pre-ACFTA period. Under ACFTA, however, tariff liberalization has significant impact on the final goods sector exports. The positive interaction term between tariff on final goods and ACFTA dummy suggests that tariff liberalization under ACFTA had a greater impact on final goods. Relative labor cost also played an important role in creating exports of final goods to China, athough the relatively large coefficient on RLC under ACFTA for P&C exports as compared with final goods

Table 3. Gravity equation estimates

	Model 1 P&C		Model 2 Final goods
Variables	**Xpnc**		**Xfin**
$lnGVO_{i,t}$	−0.0946 (−0.45)	$lnGDPci_{i,t}$	7.821*** (4.45)
$lnGVO_{China,t}$	0.292 (1.06)	$lnGDPci_{China,t}$	0.790 (0.99)
$lnExFinal_{China,t}$	1.371* (1.55)		
lnDistance	−6.564*** (−16.25)	lnDistance	17.01*** (4.57)
Language	3.019*** (10.27)	Language	−25.09*** (−4.88)
Crisis	−0.335** (−2.23)	Crisis	−0.179 (−1.42)
lnREER	0.356 (0.36)	lnREER	−2.776*** (−3.23)
lnFDI	1.156* (1.94)	lnFDI	−0.651 (−0.98)
RLC	−0.827 (−1.61)	RLC	0.760 (1.41)
Tariffpnc	−0.0730** (−2.47)	TariffFin	0.0258 (1.02)
ACFTA	3.629 (0.51)	ACFTA	7.641 (1.08)
ACFTA × Tariffpnc	−0.132 (−1.43)	ACFTA × TariffFin	−0.129** (−2.62)
ACFTA × lnFDI	−0.711 (−1.13)	ACFTA × lnFDI	−0.909 (−1.59)
ACFTA × RLC	4.249*** (3.96)	ACFTA × RLC	3.471** (2.20)
_cons	16.55 (0.57)	_cons	−104.3*** (−3.81)
N	91	N	96
Hausmann Test: Wald-test	Prob > χ^2 = 0.00 Prob > F = 0.6967		Prob > χ^2 = 0.00 Prob > F = 0.113

Note: *i) Country dummies are included but not reported.*

ii) Variables are estimated in log terms except for time invariant variables, tariff and RLC, because both variables contain meaningful 0 and 1 values that will be removed by the transformation.

**Statistically significant at the 1 percent level; **Statistically significant at the 5 percent level; ***Statistically significant at the 1 percent level.*

suggests that relative labor costs exerted a stronger effect on ASEAN's P&C exports to China. This is consistent with the new international division of labor theory for vertical supply chains that was explained in the previous section.

5. Conclusion

The failure of multilateral liberalization to move forward following the Uruguay Round has led to the emergence of an increasing number of FTAs in the East Asian

region, which have been motivated by the goal of facilitating trade in the region. The main findings in this paper indicate that ACFTA has a stronger effect on final goods exports than it has had on P&C exports from the ASEAN-5 to China. The difference in the effects of FTA on these two forms of trade may be explained by the fact that P&C trade is dominated by MNCs that already enjoy investment incentives such as duty-free imports from free trade zones in ASEAN-5 and China, as well as tariff reductions under the WTO-ITA. Thus, there was less incentive to utilize ACFTA tariff concessions, unless MOP was sufficiently large enough to incentivize firms to undergo the costly and necessary ACFTA procedures involved in the verification of the regional content built into their exports to China. The findings in this paper support the conjecture that tariff liberalization under the ACFTA did not exert a significant effect on P&C exports from ASEAN to China, though it played an important role in the case of final goods exports. Notably, third-country demand for the final goods produced in China had a relatively strong effect on ASEAN's exports of P&C goods to China.

Nevertheless, since MOP has increased in the last two years following the implementation of ACFTA, greater utilization of ACFTA's tariff concessions could be promoted by educating ASEAN-based firms on ROO and the steps they would need to take to comply with ACFTA's regional content requirements. As suggested by Pitak (2012), this would require the respective Ministries of Commerce/Trade to conduct extensive dissemination of information on FTAs to the firms in their respective countries. They would also need to provide FTA consulting services and ROO resolutions for their firms, especially in the case of small- and medium-sized enterprises. Trade associations could also provide their respective members with help in accessing ACFTA's tariff concessions. Use of the ACFTA would also be improved if each member country were to increase their efforts to monitor and collect data on the utilization of FTAs in their respective countries.

It should also be noted that tariff liberalization is only one factor that has the potential to enhance exports. Reduced trade costs would prove especially effective, as is shown by the strength of the distance variable in this study. Further efforts to reduce trade costs in China will also prove important if ASEAN-5 seeks to improve its exports to China. Although ACFTA contains provisions that address import costs such as different trade facilitation measures[8] and the inclusion of non-tariff barriers or

8 Article 4 in the Agreement on Trade in Goods of the ACFTA addresses transparency issues. Similarly, article 7 states that the agreement abides by the provisions of the WTO disciplines on, among others, non-tariff measures, technical barriers to trade, sanitary and phytosanitary measures, subsidies and countervailing measures, anti-dumping measures, and intellectual property rights. Article 8 on quantitative restrictions and non-tariff barriers

non-tariff measures, these provisions lack specificity and hence they are difficult to monitor. Thus, adopting, monitoring, and setting targets for specific trade facilitation measures should be considered as a means of enhancing ASEAN's exports to China (Wong and Pellan 2012).

Appendix 1: Summary of key dates and elements in the ACFTA

2002	Signing of Framework Agreement on Comprehensive Economic Cooperation in November 2002, to establish ASEAN-China Free Trade Agreement (ACFTA).
2004	The Agreements on Trade In Goods and Dispute Settlement Mechanism between ASEAN and China were signed in November 2004.
2004	Early Harvest Program, with preferential tariffs reduced to zero for more than 500 products, for the ASEAN-6 from 2004–06; and from 2004–10 for CLMV.
2005	Elimination of tariffs for more than 7,000 tradable commodities in the Trade in Goods Agreement.
2007	Agreement on Trade in Services of ACFTA, signed in Cebu, the Philippines, 14 January 2007.
2009	Agreement on Investment of of ACFTA, signed in Bangkok, 15 August 2009.
2010	All parties in ASEAN-6 and China to have eliminated their tariffs for tariff lines in the normal track by 1 January 2010. Flexibility given to tariffs on some tariff lines (not exceeding 150 lines) to be eliminated by 1 January 2012.
2012	All parties in ASEAN-6 and China to have eliminated their tariffs for tariff lines in the normal track by 1 January 2010.
2015	All parties in CLMV countries to have eliminated their tariffs for tariff lines in the normal track by 1 January 2015, with flexibility given to 250 tariff lines that will be eliminated by 2018.
2018	All parties in CLMV countries to have eliminated their tariffs for tariff lines in the normal track by 1 January 2018.

Source: *www.asean.org/news/item/asean-china-free-trade-area, accessed 28 February 2013; and UACT (undated).*

Note: *CLMV = Cambodia, Laos, Myanmar, and Laos.*

Appendix 2: Data used in Models 1 and 2

Variable	Variable construction	Data source
Export (*Xpnc* and *Xfin*)	• Value of bilateral manufacturing exports in US$ at constant 2005 price. Deflated by the export price index. • Manufacturing products are based on UNCTAD definition—(SITC 5 to 8, excluding 667 and 6). • List of P&C products are taken from Athukorala (2010), classified by six-digit HS06. Full list are available upon request. • Final goods are Total Exports net of Total P&C.	UNComtrade. Prices are taken from the Economist Intelligence Unit (EIU) database.
Real gross value of output (*GVO*)	• Output from activities of an industrial nature. • Gross value of output based on UNIDO's definition (http://www.esds.ac.uk/international/support/user_guides/unido/indstat.asp) deflated by producer price index.	UNIDO. Producer Price Index is taken from EIU database.
Real export of final goods *(ExFinal)*	• China's total manufacturing exports of final goods to world. This is to proxy for third-country effect. Deflated by China's export price index.	UNComtrade. Prices are taken from the Economist Intelligence Unit (EIU) database.

states that each party undertakes not to maintain any quantitative restrictions at any time unless otherwise permitted under the WTO disciplines. Moreover, "the Parties shall identify non-tariff barriers (other than quantitative restrictions) for elimination as soon as possible after the entry into force of this Agreement. The time frame for elimination of these non-tariff barriers shall be mutually agreed upon by all Parties. The Parties shall make information on their respective quantitative restrictions available and accessible upon implementation of this Agreement" (Agreement on Trade in Goods of the Framework Agreement on Comprehensive Economic Co-operation between the Association of Southeast Asian Nations and the People's Republic of China, page 1). Available at: http://fta.mofcom.gov.cn/dongmeng/annex/xieyi2004en.pdf. Accessed 23 April 2014.

Appendix 2: ***(Continued)***

Variable	Variable construction	Data source
Real GDP per capita *(GDPci)*	• Real GDP at constant market prices, rebased to 2005 constant prices and translated into US$ using the LCU: $ exchange rate in 2005 per population.	EIU database.
Distance	• The great-circle or orthodromic distance is the shortest distance between any two points on the surface of a sphere measured along a path on the surface of the sphere (as opposed to going through the sphere's interior).	BACI data set, http://www.cepii.fr/anglaisgraph/bdd/baci.htm.
Language	• 1 if the ASEAN-5 country has common language with China (Malaysia and Singapore), 0 if otherwise.	BACI data set, http://www.cepii.fr/anglaisgraph/bdd/baci.htm.
Crisis	• Dummy variable for two major economic crises in the timeframe of the research (1997–99) and (2007–08).	
REER	• Real effective exchange rate index (2005 = 100). • Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. • CPI-based REER is used because it contains more information about real variables (trade flows and investment) than other REER indices (Randveer and Rell 2002).	International Monetary Fund, International Financial Statistics.
FDI	• Total Inward Foreign Direct Investment flows into ASEAN countries and China (US$ millions).	UNCTAD, UNCTADstat.
Relative unit labor cost *(RLC)*	• Ratio of UNIT labor cost index (China) / Unit labour cost index (ASEAN countries). • Both indicators are in USD and rebased to 2005 5 100.	Economist Intelligence Unit (EIU) database.
Tariff	• Trade-weighted tariff constructed based on World Bank's World Integrated Trade Solution method: • (Sum of duties collected / Total imports) = 100. • 1992–2004, Trade weighted tariff rate, most favored nation, manufactured products (percent). Data are classified using the Harmonized System of trade at the six- or eight-digit level. Tariff line data were matched to Standard International Trade Classification (SITC) revision 3 codes to define commodity groups. Manufactured products are classified using SITC revision 3. SITC (5–8 excluding division 68). • 2005–2011, trade-weighted average from ACFTA schedule of Tariff Commitments. The HS codes are matched with the SITC codes. Manufacturing products are defined as HS 11 to HS 97 excluding HS 12 to 24, 27, 47, 75, and 77 to 80 for P&C.	World Bank, http://data.worldbank.org/indicator/TM.TAX.MANF.SM.FN.ZS. ASEAN Secretariat, World Bank World Integrated Trade Solution database.
ACFTA	• ACFTA year dummy from 2005–11. • The implementation of tariff liberalization schedule commences in 2005.	

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