Re-assessment of Bilateral and Unilateral Trade Effects of ASEAN FTAs: A Theory-Consistent Structural Gravity Estimation

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This paper reinvestigates the bilateral and unilateral effects of five ASEAN free trade agreements (FTAs) by applying a theory-consistent structural gravity model that remains untouched in the existing literature. The findings suggest that ASEAN-China and ASEAN-Australia-New Zealand FTAs led to a decrease in the international trade among member countries and between member and non-member countries in relation to their internal trade. The ASEAN-Korea, ASEAN-Japan, and ASEAN-India FTAs did not have any significant impact on the member countries and non-member countries' trade.

I. Introduction

Following the global trend of regional trade integration, ASEAN (a regional organization comprising ten countries in Southeast Asia) emerged focusing mainly on inter-governmental economic, political, and socio-cultural co-operation.[1] Theory suggests the significance of trade integration in promoting economic development and reducing socioeconomic disparities. Considering such significance, ASEAN signed free trade agreements (FTAs) or closer economic partnership with the countries outside the region.[2] A list of FTAs signed and enforced by ASEAN is presented in Table 1.

Apart from these FTAs, ASEAN countries are also negotiating some other FTAs with Russia, the United States, Canada, the EU, and East Asia. These FTAs are expected to increase ASEAN's competitiveness as a production base in the global market through the removal of tariffs and non-tariff barriers and attract more foreign direct investment. Therefore, it seems important to answer the question of whether these FTAs really have any trade gains for member countries.

The present study aims to investigate the potential benefits of ASEAN's involvement in these FTAs. It attempts to empirically examine the trade effects (bilateral and unilateral effects) of FTAs signed and enforced by ASEAN, and thereby contribute to the ASEAN economic integration literature. The empirical analysis undertaken in this study is based on Viner's theory of economic integration. Viner (1950) conceptualized the terms called trade creation and trade diversion to evaluate the effects of Regional Trade Agreements (RTAs) under the preferential trading framework. In line with the theory, several studies provide evidence in support of the viability and feasibility of several FTAs and their impact on trade (Baier et al., 2019; Larch et al., 2021; Yamanouchi, 2019).

Using a panel data for the period 2000-2016, the study finds that ASEAN FTAs have not contributed towards deeper trade integration within ASEAN and its member countries with China. Korea, Japan, Australia, New Zealand, and India. The international trade between ASEAN member countries declined after the signing of these FTAs. Moreover, there is no evidence that these FTAs lead to greater openness towards non-members of the FTAs.

The impact assessment of several FTAs of ASEAN is widely done; however, only a few studies evaluate their impacts on trade flows (or intra-bloc trade flows) simultaneously. The major contribution of our study is that, unlike previous studies (Gharleghi & Shafighi, 2020; Jagdambe & Kannan, 2020; Lee & Park, 2021; Yang & Martinez-Zarzoso, 2014), it assesses the impact of ASEAN FTAs under a theory-consistent structural gravity framework of international trade, which includes intra-national trade flows.[3] Thus, the estimations of this study enable us: (a) to capture the possibility that these trade agreements may promote international trade among member countries by diverting trade away from domestic sales, and (b) to identify unilateral country-specific effects on trade between member and

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1 Association of Southeast Asian Nations. The ten countries comprising ASEAN are Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

2 The nature of FTAs varies as deep, shallow, mega, and new age FTAs.

3 Given data availability, the paper could not estimate the recently signed ASEAN-Hong Kong-China FTA in 2019.

Table 1. ASEAN's FTAs in force

Name of FTAs	Year of signing	Year of entry into force
ASEAN-China FTA	2002	2005
ASEAN-Korea FTA	2006	2007
ASEAN-Japan FTA	2008	2008
ASEAN-Australia-New Zealand FTA	2009	2010
ASEAN-India FTA	2009	2010
ASEAN-Hong Kong-China FTA	2017	2019

Notes: The table lists year of signing and year of entry into force of different FTAs by ASEAN. The source of the table is https://asean.org/our-communities/economic-community#Integration-Global

non-member countries of FTAs, which are not identified in earlier studies.

II. Data, Estimation Model, and Methodology

To perform the empirical analysis, we employ a newly constructed dataset, new release of the International Trade and Production Database for Estimation (ITPD-E).[4] We produce the estimates using panel data over the period 2000-2019. On the country dimension, we employ 106 countries (including all ASEAN countries) for our analysis, and on the sectoral dimension, we focus the analysis mainly on the manufacturing sector.

The study employs theoretically consistent structural gravity estimation of the impact of FTAs on international relative to internal trade. The structural gravity specification of Bergstrand et al. (2015) is augmented with two new variables capturing bilateral and unilateral effects of FTAs of mainly the ASEAN region. The econometric specification of the gravity model for estimating the effects of ASEAN's FTAs is:

$$X_{ijt} = exp[\beta_1 (BRDR_{ij} \times ASEAN_{ijt}) + \beta_2 (BRDR_{ij} \times ASEAN_{i \lor jt}) \times exp[\beta_3 (BRDR_{ij} \times RTA_{ijt}) + \beta_4 BRDR_{ijt} + \mu_{it} + \theta_{jt} + \delta_{ij}] \times \varepsilon_{ijt} \quad (1)$$

where X_{ijt} represents nominal trade flows from exporter i to importer j at time t; $BRDR_{ij}$ is an indicator variable that takes the value one for international trade flows and zero for intra-national flows; and $BRDR_{ij} \times ASEAN_{ijt}$ captures bilateral FTA effects on the trade between ASEAN and its outside partners i.e., China, Korea, Japan, Australia, New Zealand, and India. It takes the value one for international trade between the members of FTAs, and zero otherwise. This variable also measures border effects on trade between ASEAN and its partner countries. The unilateral effect of ASEAN FTAs on trade between their member and non-member countries is captured by $BRDR_{ij} \times ASEAN_{i \lor jt}$. This takes the value one if either an exporter or importer is a member of FTAs signed by ASEAN, and otherwise zero. Therefore, it allows measuring whether concerned FTAs between ASEAN and its partner countries diverted their trade away from a non-member or promoted the trade towards them. The indicator

$BRDR_{ij} \times RTA_{ijt}$ is an interaction term between $BRDR_{ij}$ and RTA_{ijt}, which measures the existence of an RTA between country i and j at time t. Equation (1) also includes variables capturing the general globalization trends, $BRDR_{ijt}$, which is a vector of dummy variables that take the value one for all international, and zero for all intra-national trade flows for year t. Lastly, μ_{it} and θ_{jt} denote exporter-time and importer-time fixed effects, respectively, to control for any unobservable and observable exporter-time and importer-time specific characteristics, and δ_{ij} is being added to the model to account for all time-invariant bilateral trade costs.

Equation (1) is estimated with the Pseudo Poisson Maximum Likelihood (PPML) estimation technique to account for heteroskedasticity and utilize the information contained in the zero trade flows (Santos Silva & Tenreyro, 2006). The estimations have been done for all the FTAs of ASEAN individually.

III. Results and Discussion

The main results are presented in different columns of Table 2. Column (1) reports the results obtained for international trade flows. Column (2) presents the results estimated for intra-national trade flows controlling for globalization trends. The last column adds the term capturing unilateral effects of FTAs on trade between members of FTAs and non-member countries. The table shows the estimates for all the FTAs signed by ASEAN, separately in different sections. It provides estimates for ASEAN-China, ASEAN-Korea, ASEAN-Japan, ASEAN-Australia-New Zealand, and ASEAN-India FTAs.

For ASEAN-China FTA, the estimates suggest that the impact of the FTA is statistically insignificant, if intra-national trade flows are not accounted for. However, the inclusion of intra-national trade flows results in a significant estimate of the partial trade effect of signing FTA on member as well as non-member countries' trade. Thus, the presence of intra-national trade flows turns out to be of major importance for the quantification of bilateral and unilateral trade effects of the FTA. In addition, the negative coefficient estimates of $BRDR_{ij} \times ASEAN_{ijt}$ and $BRDR_{ij} \times ASEAN_{i \lor jt}$

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4 For more details, see Borchert et al. (2022).

Table 2. Comparing bi- and unilateral trade effects of ASEAN's FTAs through gravity model estimates

	(1) w/o intra-national trade	(2) w/ intra-national trade	(3) Unilateral FTA effect
Panel A: ASEAN-China FTA			
$BRDR_{ij} \times RTA_{ijt}$	0.071	0.079	0.086
	(0.047)	(0.074)	(0.075)
$BRDR_{ij} \times ASEAN_{ijt}$	0.044	-0.198**	-0.441***
	(0.086)	(0.100)	(0.131)
$BRDR_{ij} \times ASEAN_{i \vee jt}$			-0.212***
			(0.048)
Panel B: ASEAN-Korea FTA			
$BRDR_{ij} \times RTA_{ijt}$	0.075	0.074	0.079
	(0.049)	(0.073)	(0.081)
$BRDR_{ij} \times ASEAN_{ijt}$	0.041	-0.046	-0.075
	(0.048)	(0.096)	(0.163)
$BRDR_{ij} \times ASEAN_{i \vee jt}$			-0.029
			(0.077)
Panel C: ASEAN-Japan FTA			
$BRDR_{ij} \times RTA_{ijt}$	0.077	0.067	0.057
	(0.048)	(0.069)	(0.064)
$BRDR_{ij} \times ASEAN_{ijt}$	-0.070	0.087	0.310
	(0.059)	(0.140)	(0.268)
$BRDR_{ij} \times ASEAN_{i \vee jt}$			0.224
			(0.152)
Panel D: ASEAN-Australia-New Zealand FTA			
$BRDR_{ij} \times RTA_{ijt}$	0.071	0.076	0.089
	(0.047)	(0.072)	(0.076)
$BRDR_{ij} \times ASEAN_{ijt}$	-0.052	-0.180*	-0.229**
	(0.056)	(0.100)	(0.114)
$BRDR_{ij} \times ASEAN_{i \vee jt}$			-0.155**
			(0.072)
Panel E: ASEAN-India FTA			
$BRDR_{ij} \times RTA_{ijt}$	0.068	0.072	0.072
	(0.048)	(0.073)	(0.073)
$BRDR_{ij} \times ASEAN_{ijt}$	-0.080	-0.149	-0.150
	(0.068)	(0.104)	(0.144)
$BRDR_{ij} \times ASEAN_{i \vee jt}$			-0.001
			(0.057)
No of Observations	177754	178999	178999

Notes: The table is organized into different panels along with different columns. Each panel presents the estimations for several FTAs of ASEAN. Panel A, B, C, D, and E report the results for ASEAN-China, ASEAN-Korea, ASEAN-Japan, ASEAN-Australia-New Zealand, and ASEAN-India FTA, respectively. All the estimates include exporter-time, importer-time, and pair fixed effects, which are excluded for brevity. Estimates of column (2) and column (3) include varying impacts of international borders over time but are not included for brevity. Standard errors are multi-way clustered by the exporter, importer, and time and given in parentheses. The data for the manufacturing sector is constructed by summing the data for all individual industries within the manufacturing sector. Lastly, *, ** and *** denote significance at 10%, 5% and 1% levels, respectively.

reveal that signing the FTA caused a decline in international trade flows between member countries by 36% (exp ((-0.441)-1)) *100) and between member and non-member countries of ASEAN-China FTA by 19% (exp ((-0.212)-1)) *100) relative to their internal trade. This signifies a stronger effect of international borders on trade between ASEAN and its partner country (i.e., China). Another finding that comes out from the estimates is that controlling for unilateral effect leads to an increase in the estimates of bilateral effects (i.e., from -0.198 to -0.441), suggesting its major importance for the quantification of the bilateral effect of the FTA. Moreover, the results also show that ad-

ditional barriers to trade between member countries are larger as compared to the barriers to trade between member and non-member countries of ASEAN-China FTA (as shown in Column 3 of Panel A). The results for trade effects of the ASEAN-Australia-New Zealand FTA are qualitatively similar to the results of the ASEAN-China FTA. The bilateral and unilateral trade effects of signing the FTA between ASEAN, Australia, and New Zealand are negative and significant. This suggests that international trade declined by 20% (exp ((-0.229)-1)) *100) relative to the domestic sales (as shown in Column 3 of Panel D). Further, international trade between member and non-member countries of ASEAN-Australia-New Zealand FTA relative to their internal trade also declined by 14% (exp ((-0.155)-1)) * 100) after the signing of the FTA. These results signify stronger international border barriers between member and non-member countries of ASEAN-Australia-New Zealand FTA. The plausible reason for the negative intra-block as well as inter-block effects might be low margins of preference, administrative delays, and high compliance costs associated with non-tariff measures, such as rules of origin and local content requirements.

In the case of ASEAN-Korea, ASEAN-Japan, and ASEAN-India FTAs, their unilateral and bilateral trade effects are statistically insignificant in all the specifications. Thus, it is evident that these FTAs do not contribute to an increase in international trade between their member countries as well as between their member and non-member countries relative to their intra-national trade. The reason behind the insignificant impact of these FTAs appears more methodological, as it is consistent with the study by Ahcar-Olmos and Rodríguez-Barco (2020), which find that inclusion of time-varying fixed effects in country-pair specifications make the significant impact of several RTAs insignificant.[5]

IV. Conclusion and Policy Implications

The present study probes the trade promoting potential of FTAs signed and enforced by ASEAN. It estimates both bilateral and unilateral effects of the FTAs by applying a theory-consistent structural gravity model. The results suggest that there is no significant evidence of trade creation or trade diversion in the case of the ASEAN-Korea, ASEAN-Japan, and ASEAN-India FTAs. The study finds both bilateral and unilateral effects of the ASEAN-China and ASEAN-Australia-New Zealand FTAs. Overall, the results depict higher unobserved trade barriers (other than bilateral trade costs variables, such as distance, contiguity, language, colony, etc., and FTAs) on international trade between ASEAN member countries and their FTA partners (namely China, Australia, and New Zealand) relative to their internal trade. Moreover, in the case of ASEAN-China and ASEAN-Australia-New Zealand FTAs, the results reveal that the partner countries of the FTAs face significantly higher trade barriers with each other as compared to the trade barriers faced between member and non-member countries of the FTAs. It is also evident from the results that inclusion of intra-national trade flows is imperative for the identification of bilateral and unilateral trade effects of the FTAs. The results suggest ASEAN countries should remove other significant trade barriers to fully utilize the welfare and trade gains of their FTAs.

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5 The estimation of same specification with time-invariant fixed effects results in significant intra and inter-block trade effects. The estimation is available upon request.

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