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September 2020

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Keywords: China shocks; ASEAN; Trade creation effect
JEL Classification: F15; F53

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Assessing the Impact of China Shocks on the Trade Creation Effect in ASEAN[§]

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Abstract: Policymakers in ASEAN countries are concerned that an explosive increase in imports from China has dampened intra-ASEAN trade. This study empirically examines the effect of imports from China on intra-ASEAN trade. We employ a two-step approach. First, we estimate the product-level gravity equation with the full set of fixed effects on intra-ASEAN trade. Second, we regress the estimates of importer-product-year-fixed effects on the share of imports from China that constitute all imports in addition to intra-ASEAN tariffs. As is consistent with the concern above, we found that from 2000 to 2015, increases in ASEAN imports from China reduced intra-ASEAN trade by 20%. Such an increase in imports from China is equivalent to the rise of intra-ASEAN tariffs by 20%.

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1. Introduction

Member countries of the Association of Southeast Asian Nations (ASEAN) have devoted much effort to increase regional trade within ASEAN since the 1990s. The ASEAN free trade area (AFTA) entered into force in 1993 among six ASEAN countries, including Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Later, Vietnam would join in 1995, followed by Laos and Myanmar in 1997, and Cambodia in 1999. The AFTA contributed to reducing or eliminating tariff rates in ASEAN trade by introducing the common effective preferential tariff within ASEAN. Furthermore, to pursue the goal of establishing a single market and production base with a free flow of goods, ASEAN member states (AMS) signed the ASEAN Trade in Goods Agreement (ATIGA) in 2009, which entered into force in 2010. All scheduled tariff reduction or elimination was subsequently completed in 2018. Preferential tariff rates among the AMS are zero on almost all products.

However, AMS policymakers are concerned that an explosive increase in imports from

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China has dampened regional trade in ASEAN. Figure 1 depicts the changes over time both in intra-ASEAN trade and in imports from China to ASEAN member countries. The share of imports from other AMS as a percentage of total imports in ASEAN decreased slightly from 0.25 in 2000 to 0.22 in 2017. On the contrary, the share of imports from China drastically increased from 0.05 to 0.23 during the same period. In 2017, ASEAN imports from China finally exceeded intra-ASEAN trade. Furthermore, the trade creation effect of regional trade agreements is often quantified by estimating gravity equations. Magee (2008) estimated the coefficient for the AFTA dummy variable as −0.398, though insignificant. Such a negative (and insignificant) coefficient was also detected in Baier et al. (2019). These kinds of figures and evidence create a doubt in the AMS as to whether or not the AFTA/ATIGA played a significant role in increasing regional trade. Perspectives regarding this doubt may continue to change due to anti-globalization in the future.

=== Figure 1 ===

This study empirically examines how imports from China affect intra-regional trade in ASEAN through a two-step approach. We first estimate the product-level gravity equation with the full set of fixed effects for intra-ASEAN trade from 2000 to 2015. We do not include any independent variables other than those fixed effects that include country pair-product fixed effects, exporter-product-year fixed effects, importer-product-year-fixed effects, and country pair-year fixed effects. Among them, importer-product-year-fixed effects incorporate the effects of all product-year-specific elements that affect each ASEAN country's imports from other AMS. Thus, in the second step, we regress importer-product-year-fixed effects on the share of imports from China that make up all imports in addition to applied tariffs against the AMS. As a result, we found that the rise in imports from China significantly dampened intra-ASEAN trade, consistent with the concern above. Specifically, our rough calculations indicate that this increase is equivalent to a 20% rise in intra-ASEAN tariffs.

Despite many studies on the effects that regional trade agreements (RTAs) have on trade, none have examined how the imports from third-party countries dampen the trade creation effects of RTAs. The trade creation effects, i.e., the positive impact of RTAs on trade between member nations, have been investigated by many researchers (e.g., Baier and Bergstrand, 2007).[1] Furthermore, some studies examine the heterogeneity in trade creation effects according to country characteristics (e.g., Baier et al., 2019; Cheong, Kwak, and Tang, 2015; Vicard, 2011). These studies explore income similarity, geographical proximity, or cultural proximity between member countries. We do not shed light on the role of these characteristics between RTA members but focus on trade relationships with nonmember

[1] The meta-analyses on the trade creation effects are available in Cipollina and Salvatici (2010), Kohl (2014), and Afesorgbor (2017).

countries, i.e., China. There are also several studies that look at trade diversion effects, i.e., the negative effects of RTAs on trade between an RTA member and nonmember countries (Magee, 2008; Eicher, Henn, and Papageorgiou, 2012; Dai, Yotov, and Zylkin, 2014; Yang and Martinez-Zarzoso, 2014). However, our interest lies in the negative effects of trade with nonmember countries on trade between RTA members.

Related literature looks at the so-called "China shocks." Due to the rapid economic growth of China and its joining of the World Trade Organization in 2001, many countries in the world have experienced a dramatic increase in imports from China. Many studies have shown that the surge in imports from China has led to a decrease in jobs (e.g., Autor et al., 2013; Acemoglu et al., 2015; 2016; Pierce and Schott, 2016; Bloom et al., 2016; Asquith et al., 2019; Hayakawa et al., 2020). Some studies have also investigated the effects of import penetration from China on the social (Pierce and Schott, forthcoming; Autor et al., forthcoming) and political landscape (Autor et al., 2016). Against this backdrop, we investigate the impacts of this phenomenon on regional trade. Naturally, we found that China shocks had negative effects on intra-ASEAN trade.

The rest of this study is organized as follows. Section 2 presents our empirical framework. We report our estimation results in Section 3. Finally, Section 4 offers concluding remarks for this paper.

2. Empirical Framework

This section explains the empirical framework used to examine the impacts of imports from China on intra-ASEAN trade. As mentioned in the previous section, our empirical analysis consists of two steps.[2] The first step involves estimating the gravity equation with the full set of fixed effects for intra-ASEAN trade. That estimation is given as follows:

$$\ln X_{ijpt} = \delta_{ijp} + \delta_{ipt} + \delta_{jpt} + \epsilon_{ijpt}, \quad (1)$$

where X_{ijt} is export values of product p from ASEAN country i to ASEAN country j in year t. The time-invariant country pair-product fixed effects (δ_{ijp}) control for the effects of geographical distance, historical ties, and cultural similarity (e.g., language or religion) between two countries. The exporter-product-year fixed effects (δ_{ipt}) include the effects of the exporter's technology, factor prices, and supply capacity. ϵ_{ijpt} is a disturbance term.

In equation (1), we cannot directly examine the role of imports from China because those imports have the same dimension as importer-product-year fixed effects (δ_{jpt}). Namely, their role is included in the estimation of δ_{jpt}. If imports from China supplant those from the AMS, the increase of the former imports results in a decrease in importer-product-year fixed effects. These types of fixed effects encompass not only the effect of imports from China, but also the effects of some other elements. The typical element is the

[2] As for the two-step approach in the gravity analysis, see Head and Mayer (2015, Section 3.7).

demand size. In addition, due to our having restricted study observations to within ASEAN, those characteristics include AFTA/ATIGA tariff rates against the AMS. The decrease of ATIGA tariffs will increase the importer-product-year fixed effects and thus imports from the AMS.

In the second step, we break down the importer-product-year fixed effects into the elements mentioned above by estimating the following equation.

$$\widehat{\delta_{jpt}} = \beta_1 \times \ln(1 + Tariff_{jpt}) + \beta_2 \times China\ \ share_{jpt} + \theta_{jp} + \theta_{jt} + \theta_{pt} + \varepsilon_{jpt}. \quad (2)$$

The dependent variable is the estimate of importer-product-year fixed effects in the first step. $Tariff_{jpt}$ refers to the AFTA/ATIGA tariff rates of product p in ASEAN country j during year t. $China\ \ share_{jpt}$ is the share of imports from China that make up total imports of product p in country j during year t. We normalize the magnitude of imports from China by imports from the rest of the world. It is expected that the higher share of imports from China decreases the importer-product-specific time-variant characteristics that shape intra-ASEAN trade.

We again control for importer-product, importer-year, and product-year fixed effects (i.e., θ_{jp}, θ_{jt}, and θ_{pt}). For example, product-year fixed effects will control for export capacity or competitiveness in China. Supply shocks in China (e.g., rises in productivity) have common impacts on intra-ASEAN trade among the AMS. Furthermore, we expect that these three types of fixed effects jointly control for the demand size. Also, these fixed effects reduce the risk of endogeneity bias. For example, unobservable demand shocks in each country have an impact on both imports from ASEAN and those from China. Furthermore, the direction of bias from omitting such shocks is unclear. It depends on which imports increase more. If those from China increase more than those from ASEAN, the error term in equation (2) results in a positive correlation with *China share*. In this case, β_2 suffers from upward bias and therefore underestimates the negative effect. Our set of fixed effects is expected to control for such unobservable shocks. In sum, our identification strategy relies on the remaining variation at an importer-product-year level in the share of imports from China.

Our data sources are as follows. We obtain the trade data from the CEPII.[3] It is called the "BACI" database and offers an updated version of the data provided in Gaulier and Zignago (2010). The database offers disaggregated data on bilateral trade flows for more than 5000 products and 222 countries. The data are available at the six-digit level of the harmonized system nomenclature. Thus, we define this level as a product. Furthermore, for the purposes of our research, we restrict the countries studied to only the ten members of the AMS. We obtain AFTA/ATIGA tariffs by utilizing the data on tariffs from the World Integrated Trade Solution database,[4] and insert the most favored nation rates or other available preferential tariff rates if a product is not eligible to the AFTA/ATIGA regime.

[3] http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=37

[4] http://wits.worldbank.org/WITS/

Based on the data availability of tariffs, we set our study years to the period of 2000–2015.

There are two empirical issues. First, since most of our study countries (i.e., ASEAN countries) are developing countries or least developing countries (LDC), there would be too many zero-valued trades if we were to use balanced panel data. Thus, as specified in equation (1), we do not include observations with zero-valued trade, do take a log of trade, and estimate equations (1) and (2) using the ordinary least square (OLS) method rather than the Poisson pseudo maximum likelihood estimation technique. Second, the fixed effects are estimated with errors. Nevertheless, following Head and Mayer (2014, pp. 159), we simply estimate equation (2) through the OLS method. Furthermore, following Baier et al. (2019), we compute the robust standard errors in the second step estimation.

3. Empirical Results

This section reports our estimation results. We do not report the results from the first step, i.e., the gravity estimation, because those include only the results in fixed effects. The number of observations in this step was 1,087,741. R-squared indicates 0.8895. The simple average of importer-product-year fixed effects is depicted by years in Figure 2. It fluctuated around −0.01 during our period of study. We also show the simple average share of imports from China among importer-product-level observations in addition to the average of logged AFTA/ATIGA tariffs. Notice that these averages are computed only among the observations used in the estimation above (i.e., they do not include those with zero-valued trade). Nevertheless, we can see the opposite trend between these two averages. While the share of imports of the AMS from China rises, the intra-ASEAN tariffs decrease over time. Figure 3 shows the simple average of importer-product-year fixed effects by importers. It indicates the smaller estimates in the three LDCs (Cambodia, Laos, and Myanmar), which seem natural given that those countries have smaller demand sizes.

=== Figures 2 & 3 ===

Using the estimates of the fixed effects in the first step, we estimate equation (2) using the OLS method. The results are shown in column (I), Table 1. Both coefficients are estimated to be significantly negative. The importer-product-year fixed effects in intra-ASEAN trade are increased by the reduction of ATIGA tariffs and are decreased by the rise of the import share from China. To illustrate the relative magnitude of the impacts during our study period more clearly, we show the contribution of each element to intra-ASEAN trade by multiplying the coefficient for each variable by its sample average (shown in Figure 2). The results are depicted in Figure 4 and show much greater impacts on the import share from China. From 2000 to 2015, the tariff reduction contributed to an increase in intra-ASEAN

trade of 3%, while the imports from China reduced trade among ASEAN members by 20%. Since the log-difference of tariffs between 2000 and 2015 is 0.034, we can roughly estimate that the increase in imports from China is equivalent to a 20% rise (=0.034*0.2/0.03) in intra-ASEAN tariffs.

=== Table 1 & Figure 4 ===

Next, we estimate equation (2) for various subsets. First, column (II) in Table 1 shows the results when we exclude Brunei and Singapore, which are high-income countries. Both coefficients are again significantly negative. The absolute magnitude in the tariff coefficient decreases considerably, while the absolute magnitude in the coefficient for $China\ share$ does not change significantly. This result indicates that the relative effect of China shocks becomes larger than that found in column (I). Second, in columns (III) and (IV), we divided the study observations by year. Specifically, we separate those in 2010, which is the year when the original members of AFTA (i.e., six countries listed in Section 1) completed their tariff elimination/reduction under the ATIGA regime. Naturally, the coefficient for tariffs becomes insignificant after 2010, as there were no further tariff changes in those six countries. However, *China share* maintains a negative effect on intra-ASEAN trade.

We also estimate equation (2) for differentiated products and homogeneous products separately. We classify products based on the liberal and conservative classification of differentiated products developed in Rauch (1999).[5] The results are shown in Table 2. All results show the negatively-significant coefficients for both *Tariff* and *China share*. The differences in the coefficients between two kinds of products are clearer for the tariffs. The absolute magnitude is much larger in differentiated products than in homogenous products. This result is somewhat surprising, as we would expect the opposite magnitude relation if we were to suppose that the tariff coefficient is related to the elasticity of substitution. The more important result in our study is that even in differentiated products, the negative effects of China shocks are as large or larger than those in homogenous products.

=== Table 2 ===

Finally, we introduce the share of imports from Japan, another key exporter, to ASEAN. The estimation results are shown in Table 3. Both the share of imports from China and the share of imports from Japan have significantly negative coefficients. All results indicate that both the coefficients are almost the same magnitude. Thus, in terms of marginal

[5] This information is available at a four-digit level of the standard international trade classification (SITC). We use the converter table between SITC and HS to map each six-digit code of the HS to a four-digit code of the SITC, which is available at the following website:
https://wits.worldbank.org/product_concordance.html

effects, imports from both sources have the same effects on intra-ASEAN trade. However, during our study period, the sample average of the share of imports from Japan decreased by 7.7%. Thus, the contribution based on the result in column (I) indicates that the decrease in imports from Japan contributed to an 8% increase in intra-ASEAN trade. The decrease in imports from Japan are owed, at least in part, to the increase in imports from China. However, since the latter increase is much greater than the former decrease in absolute terms, the net effect of imports from non-ASEAN countries on intra-ASEAN trade becomes negative.

=== Table 3 ===

4. Concluding Remarks

This study empirically examined how imports from China affect intra-ASEAN trade. Since the 1990s, ASEAN countries have devoted significant effort toward increasing intra-ASEAN trade by forming AFTA and ATIGA. As a result, as of 2018, preferential tariff rates among the AMS are zero on almost all products. However, policymakers in AMS are concerned that an explosive increase in imports from China has dampened intra-ASEAN trade. Consistent with their concerns, we found that from 2000 to 2015, the tariff reduction contributed to a 3% increase in intra-ASEAN trade, while imports from China reduced trade among ASEAN member countries by 20%. Indeed, the increase in imports from China is equivalent to a 20% increase in intra-ASEAN tariffs. Our findings indicate that China shocks have completely undone any benefits accrued from trade liberalization within ASEAN. Obviously, this result does not mean that the elimination of intra-ASEAN tariffs is useless. Without their elimination, intra-ASEAN trade would be significantly smaller. As there remains no room to reduce intra-ASEAN tariffs further, one of the measures bearing future consideration will be to eliminate non-tariff measures.

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Table 1. Estimation Results

	(I)	(II)	(III)	(IV)
ln (1 + Tariff)	-0.484***	-0.286***	-0.302***	-0.173
	[0.059]	[0.061]	[0.077]	[0.174]
China share	-0.996***	-0.997***	-0.984***	-1.029***
	[0.014]	[0.016]	[0.021]	[0.022]
Sample	All	Outliers	<2010	>2009
Number of obs.	338,389	265,140	199,565	135,173
R-squared	0.1023	0.155	0.2468	0.3626

Notes: This table reports the estimation results through the OLS method. ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively. The robust standard errors are reported in parentheses. In all specifications, we control for country-product, country-year, and product-year fixed effects.

Table 2. Differentiated Products versus Non-differentiated Products

	(I)	(II)	(III)	(IV)
ln (1 + Tariff)	-0.306***	-0.705***	-0.280***	-0.668***
	[0.087]	[0.078]	[0.092]	[0.075]
China share	-0.940***	-1.021***	-0.917***	-1.024***
	[0.027]	[0.016]	[0.029]	[0.016]
Classification	Liberal	Liberal	Conservative	Conservative
Goods	Homogenous	Differentiated	Homogenous	Differentiated
Number of obs.	123,911	214,478	110,325	228,064
R-squared	0.0919	0.1112	0.0887	0.1117

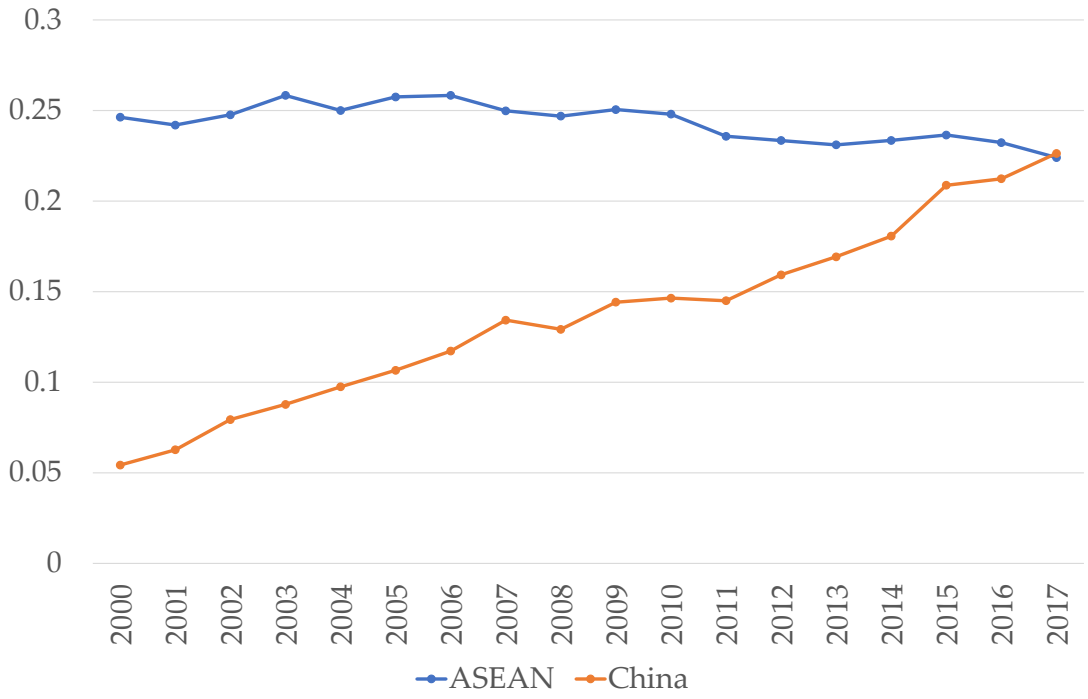
Notes: This table reports the estimation results through the OLS method. ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively. The robust standard errors are reported in parentheses. In all specifications, we control for country-product, country-year, and product-year fixed effects. We follow the classification of differentiated products in Rauch (1999).

Table 3. Estimation Results with Japan Share

	(I)	(II)	(III)	(IV)
ln (1 + Tariff)	-0.451***	-0.254***	-0.254***	-0.142
	[0.058]	[0.061]	[0.076]	[0.173]
China share	-1.084***	-1.095***	-1.073***	-1.114***
	[0.014]	[0.016]	[0.021]	[0.023]
Japan share	-1.052***	-1.087***	-1.046***	-1.047***
	[0.021]	[0.024]	[0.027]	[0.042]
Sample	All	Outliers	<2010	>2009
Number of obs.	338,389	265,140	199,565	135,173
R-squared	0.1127	0.1661	0.2563	0.3684

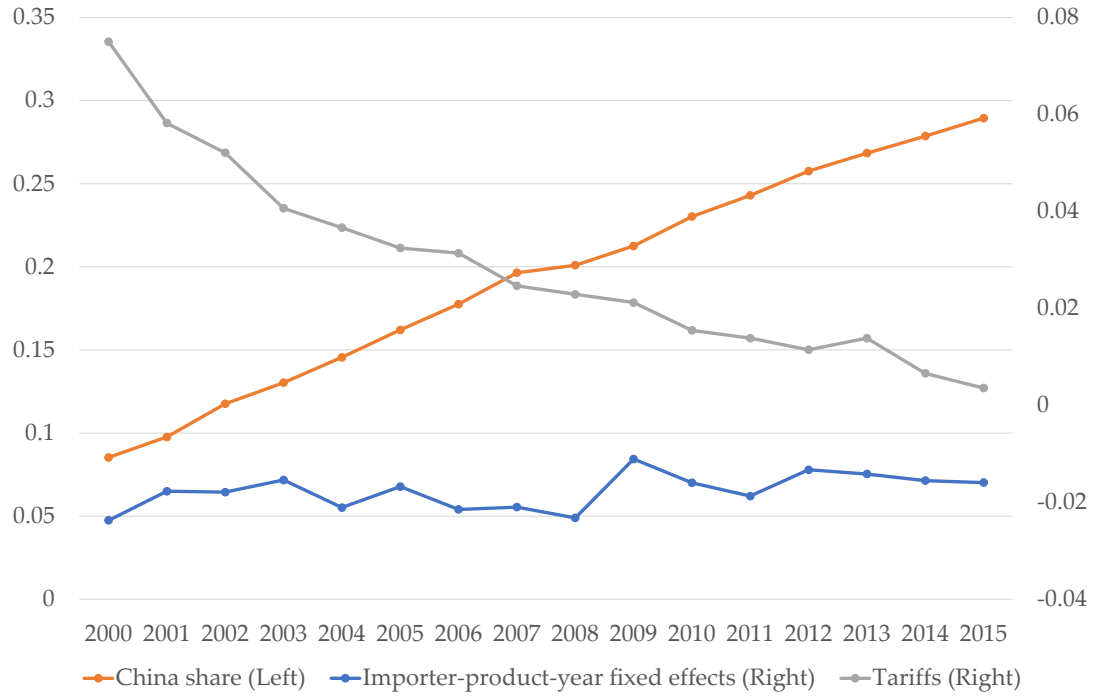
Notes: This table reports the estimation results by the OLS method. ***, **, and * indicate the 1%, 5%, and 10% levels of statistical significance, respectively. The robust standard errors are reported in parentheses. In all specifications, we control for country-product, country-year, and product-year fixed effects.

Figure 1. Shares of Intra-ASEAN Trade and Imports from China in ASEAN



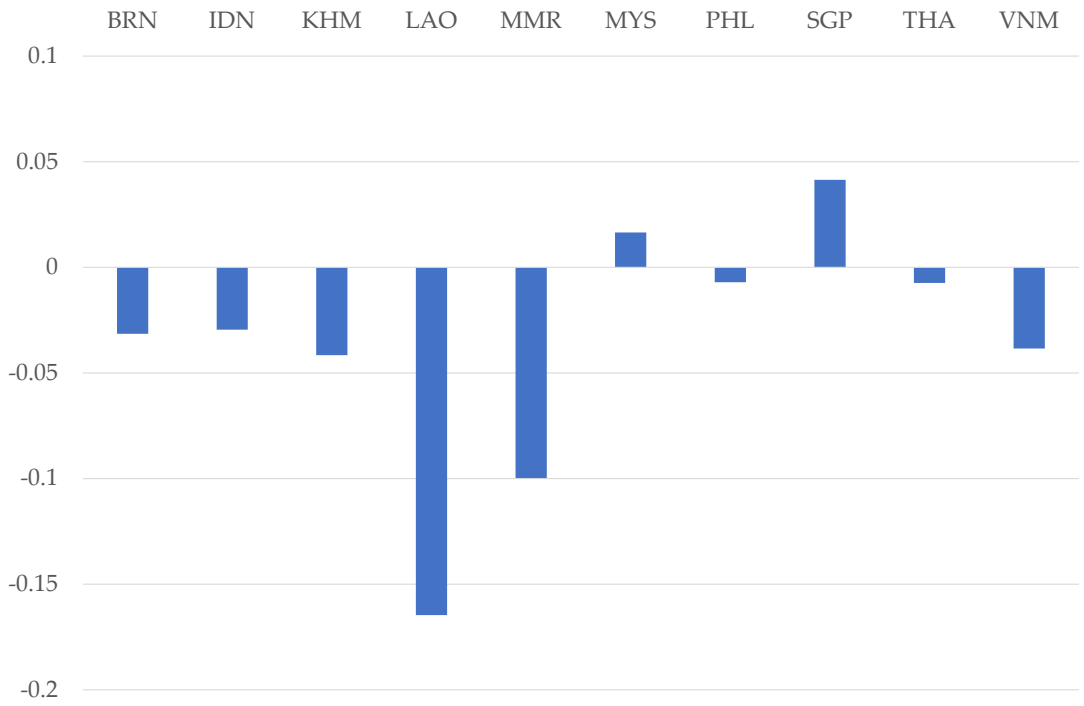
Source: Author's compilation.

Figure 2. Average Import Shares from China and Average Importer-product-year Fixed Effects



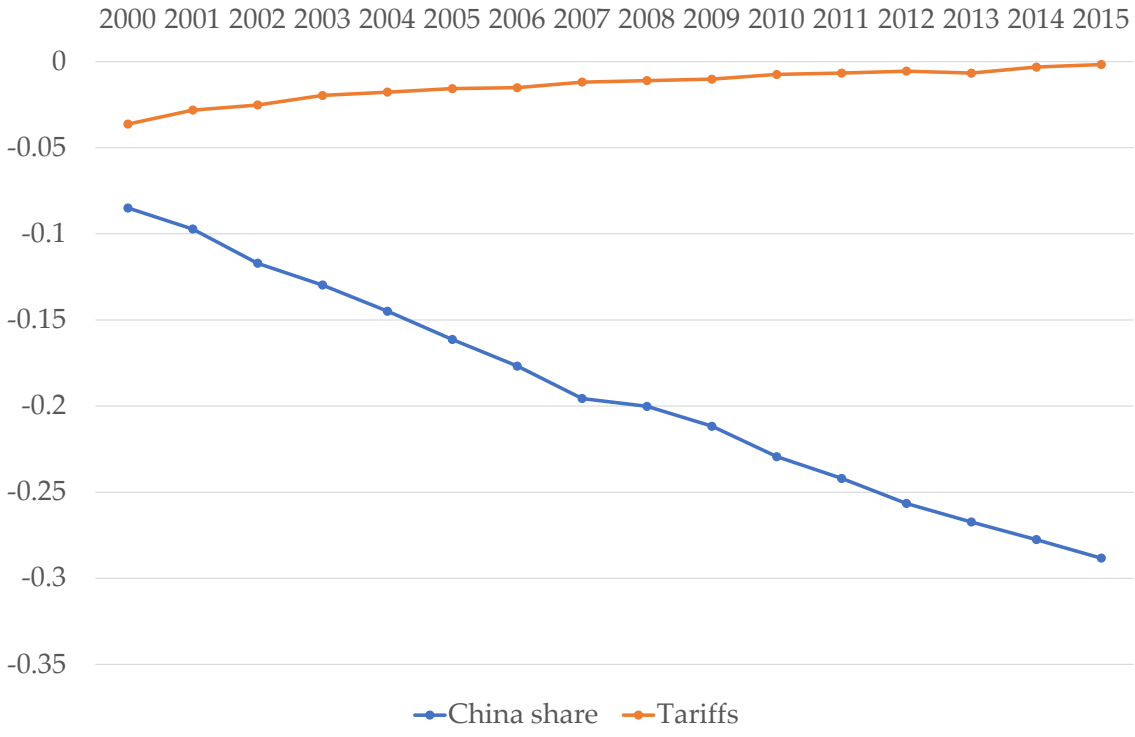
Source: Author's estimates.

Figure 3. Average Importer-product-year Fixed Effects by Importers



Source: Author's estimates.

Figure 4. Impacts of Imports from China and ATIGA Tariffs on Intra-ASEAN Trade



Source: Author's estimates.

Note: These figures are computed by multiplying the coefficient in Column (I) in Table 1 by the corresponding average shown in Figure 2.