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Impact of ASEAN : China free trade area on trade flows

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The Impact of ASEAN–China Free Trade Area on Trade Flows

by

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ABSTRACT: This paper estimates the impact of the ASEAN-China Free Trade Agreement on the trade flows between China and the ASEAN countries. A gravity model with FTA specification is used to estimate the treatment effect of ACFTA. Since there are other unobserved variables that correlate with both the trade flows between China–ASEAN and the decision to form ACFTA, a cross-sectional OLS regression runs the risk of having endogeneity bias due to omitted variables. Therefore, this paper applies a panel regression approach with time and country fixed effects as the main method of estimation. The hypothesis is that ACFTA will increase trade flow between member countries. However, the results indicate that ACFTA correlates with a decrease in exports from China to ASEAN countries, while ACFTA has different effects on individual ASEAN countries.

Key words: Free trade agreements, ACFTA, international trade.

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I. Introduction

Free trade agreement (FTA) aims to reduce trade barriers between participating countries, thus facilitate trade flows. However, the true impact of FTAs has generated much debate because FTAs can create negative effects that are not immediately clear. For example, Soloagaa and Winters (2001) found evidence of trade diversion away from non-members as a side effect of FTAs. Carrere (2006) also found that regional trade agreements resulted in increased intra-regional trade, yet trade with the rest of the world decreased.

One of the engines that drove China's rapid growth in the past decades has been its commitment to international trade (Sun and Heshmati, 2010). Besides its largest trading partners, including the US and the EU, China has also been trading more with other countries in the region (Roberts, 2004).

The Association of Southeast Asian Nations (ASEAN) is a political and economic organization of ten Southeast Asian countries: Indonesia, Malaysia, Philippines, Singapore, Thailand, Bruinei, Laos, Cambodia, Myanmar and Vietnam. The ASEAN-China Free Trade Area (ACFTA) is among the largest FTAs ever established. The Agreement on Trade in Goods was signed in 2004 and implemented on 1 July 2005 by the ASEAN countries and on 20 July 2005 by China. Under this Agreement, the six original ASEAN members (Indonesia, Malaysia, Philippines, Singapore, Thailand, and Bruinei) and China were to eliminate tariffs on 90% of their products by 2010, while Cambodia, Lao PDR, Myanmar and Vietnam, had until 2015 to do so.

Even before the actual execution of ACFTA, some researches had attempted to predict its impact on participating countries. For example, Roberts (2004) predicted that the gain in trade creation would be insignificant. On the other hand, Park, Park and Estrada (2009) found that economic integration would lead to a win–win partnership with substantial tangible benefits for both China and ASEAN. It is still unclear whether ACFTA has a positive impact on trade flows between member countries.

The aim of this paper then is to quantify the trade creation and trade diversion effects associated with ACFTA for China and its trading partners. It will address the question: "to what extent have trade flows between China and ASEAN countries increased or decreased as a result of ACFTA?" The initial hypothesis is that ACFTA has a positive effect on trade flows between China and ASEAN countries.

II. Literature Review

1. Gravity model:

The first Nobel Laureate in Economics, Jan Tinbergan, was also the first to publish an econometric study using the gravity equation for international trade flows (Tinbergan, 1962). The model draws an analogy with Newton's "Law of Universal Gravitation", implying that a mass of goods or labor or other factors of production at origin i, E_i, is attracted to a mass of demand for goods or labor at destination j, E_j, but the potential trade flow X_{ij} is reduced by the distance D_{ij} between them:

$$X_{ij} = \frac{E_i E_j}{D_{ij}}$$

In line with this theoretical specification, attractors should reflect expenditure in the destination as well as supply in the origin. GDP, GNP and population are all measures that have been used to capture these effects, since they all represent the size of an economy (Salvatici, 2013). Per capita GDP (Frankel, 1997) has also been used. In addition to distance, traditional cross-section gravity models also include time-invariant trade impediment measures such as common language dummies, border, and other historical and cultural links (Frankel, 1997).

The gravity equation has become the standard empirical model to study the ex post effects of FTAs on trade flows.[1] The model provides a relevant counterfactual to isolate the effects of FTAs (Aitken, 1973). First, the gravity equation can suggest a normal level of bilateral trade for countries that are about to enter a FTA. Then, dummy variables representing the presence of FTAs can be used to capture the abnormal levels resulting from a trade agreement.

However, one of the earliest criticisms regarding the applications of gravity model is that it lacks

1 See Salvatici, L. (2013) for a 50-year review of the gravity model's application in international trade.

a strong theoretical background to explain the link between trade flows and distance, as discussed in Anderson (1979), and Anderson and van Wincoop (2003). First, it does not include a market-clearing condition (output produced by one country *i* must equal the sum of all purchases by other countries). Second, it does not incorporate the fact that consumers may view goods as substitutes. At the time of its first introduction, prominent models of international trade such as the Ricardian model (which explains trade patterns using differences in technology) and the Heckscher-Olin model (which explains trade patterns using differences in factor endowments) could not provide a foundation for the gravity model.

The power of the gravity equation to empirically explain bilateral trade flows motivates the search for a theoretical explanation. Anderson (1979) is also among the first to provide a theoretical explanation for the gravity equation applied to commodities. In his model, goods are differentiated by country of origin, and consumers have preferences defined over all differentiated products. This structure implied that a country would consume some of every good from every other country. Larger countries would import and export more. Trade costs were modeled as transport costs, thus long distance would increase transport costs and reduce trade flows. Later, Bergstrand (1985) developed further the microeconomic foundation for the gravity equation. He presented empirical evidence to show that the gravity equation was a reduced form from a partial equilibrium subsystem of a general equilibrium model with nationally differentiated products. In his model, similar countries trade differentiated goods since consumers have a preference for variety.

A particularly important contribution to the theoretical foundation of the gravity equation is the research of Anderson and van Wincoop (2003). They show that bilateral trade is determined by relative trade costs: the propensity of country *j* to import from country *i* is determined by *j*'s trade cost toward *i* relative to its weighted average trade costs and to the average resistance to exporters in *i*. Hence, absolute trade costs between country *i* and *j* are not enough to explain trade flows. Indeed, two countries surrounded by other large economies will trade less between themselves than if they were surrounded by oceans. Therefore, Anderson and van Wincoop show that a well-specified and theoretically grounded gravity equation should take the form:

$$X_{ij} = \frac{Y_i Y_j}{Y}\left(\frac{t_{ij}}{\Pi_i P_j}\right)^{1-\sigma}$$

Where Y denotes world GDP, Y_i and Y_j denote the GDP of countries i and j, t_{ij} is the cost for j when importing a good from i, $\sigma > 1$ is the elasticity of substitution, Π_i and P_j are country i's outward and country j's inward multilateral resistance terms. These multilateral resistance terms are low if a country is remote from world markets. In this case, remoteness is determined by physical factors such as distance from large markets, or policy factors such as high tariff barriers or other trade costs. The gravity model is then transformed for empirical estimation, where the regression equation takes the form:

$$ln\, X_{ij} = a_0 + a_1 lnY_i + a_2 lnY_j + a_3 lnt_{ij} + a_4 ln\Pi_i + a_5 lnP_j + \varepsilon_{ij}$$

The main problem with estimating this equation is that the multilateral resistance terms are not directly observable. One method to overcome this problem is using country fixed effects for importers and exporters (Anderson and van Wincoop, 2004). The country binary variables used will capture all constant country-specific characteristics and control for overall level of imports/exports. Using country fixed effects is also one of the best solutions for the endogeneity problem.

2. Endogeneity problem

Many studies assume that FTA is an exogenous right-hand-side variable. However, there are many evidences indicating that FTA is not exogenous. This means FTA is likely to be correlated with some unobserved factors in the gravity equation's error term that also influence trade flows.

To determine the potential correlation between the gravity equation's unobserved error term and FTA, Baier and Bergstrand (2004) analyze the theoretical and empirical determinants of FTAs. They find that two countries are more likely to have a FTA when their GDPs are large and similar, when the distance between them is small, when the distance to the rest of the world is large, and when the difference between their relative factor endowments is wide. However, these factors are also the factors that tend to cause higher trade flows. Thus, there is correlation between FTAs and observable factors that also affect trade flows. The probit functions estimated in Baier and Bergstrand (2004) had pseudo-R^2

value of only 70%, leaving considerable unobserved heterogeneity. They conclude that there is a high probability that FTAs and the unobserved error term in gravity equation are correlated. Hence, an OLS estimation of the gravity equation will suffer from endogeneity bias caused by omitted variables. The effects of FTAs will tend to be underestimated in this situation.

In addition, Magee (2003) find strong empirical evidence showing that countries are more likely to establish preferential trade agreements when they have similar per-capita income levels and capital-labor ratios, and when they are both democracies. This finding gives further evidence to the correlation between FTA and unobservable factors that affect trade flows. Magee then estimates the treatment effect of preferential trade agreements on trade flows when preferential trade agreements formation is modeled as endogenous. He obtains a result similar to that of Baier and Bergstrand (2002). The estimated effect of preferential trade agreements on trade flows increases when choices of preferential trade agreements are treated as endogenous. This indicates that the effects of trade agreements tend to be underestimated in traditional cross-sectional regressions that treat FTA as an exogenous variable.

3. Econometric approaches to solve the endogeneity problem

There have been many attempts to overcome the problem of endogeneity bias when using the gravity model to estimate the effects of FTA. The use of instrumental variable regression is one of the best cross-sectional solutions to the problem of endogeneity bias, and the correct selection of the instrument is critical for this method. Baier and Bergstrand (2002) use a set of instruments that they believed would be correlated with the probability of forming an FTA but uncorrelated with unobservable factors that could affect trade. They first use relative capital-labor ratios, relative factor endowment differences with the rest of the world, and measure of remoteness of continental FTA partners. However, a major limitation is that measures of remoteness and capital-labor ratio are found to be correlated with trade flows, with statistically significant effects. Hence they are likely to be correlated with the gravity equation error term, and are no longer ideal instruments. Baier and Bergstrand (2002) also consider many political factors as instruments, but the same problem emerges as they are also correlated with trade flows.

Magee (2003) also develops an empirical model treating preferential trade agreements as endogenous variables. He uses 2SLS to estimate the effect of endogenous FTA on trade flows. The instruments selected are an index of democracies, GDP similarities, intra-industry trade indices, trade surpluses, and relative factor endowment differences. However, his research faces the same limitation described above, since all of the instruments selected are likely correlated with unobservable factors that affected trade flows.

Another category of proposed solutions utilizes panel data with fixed effects to solve the endogeneity of FTA. Magee (2008) uses country-pair fixed effects to account for historical trade patterns and for aggregate shocks to countries' imports and exports. The fixed effects for each country pair can solve the problem that country pairs with greater than normal bilateral trade are more likely to establish regional trade agreements. By including country pair, exporter-year, and importer-year fixed effects, his model can control for all of the variables normally used in gravity models (such as distance, adjacency, common language...) and many other unobserved variables. The results show that adding the fixed effects reduces the estimated impacts of regional agreements on trade flows.

Head and Mayer (2013) summarize the latest development in using gravity equation to estimate the impact of FTAs. They confirm that so far there has been no suitable instrument for FTA. Lacking appropriate instrumental variables, they also suggest that the next best approach is to use country-pair fixed effects. In light of the papers reviewed thus far, this paper will employ panel data estimation with country and time fixed effects as the main estimation method.

4. Measuring trade creation and trade diversion effect

Aitken (1973) is the first to use the gravity model to measure trade diversion and trade creation in an ex-post assessment for the European Economic Community. He estimates the impact of the European Economic Community (EEC) and the European Free Trade Association (EFTA) on member trade, with the hypothesis that there could be trade diversion caused by members of one bloc trading more with intra-bloc members and less with members of the other bloc. He shows that with the use of dummy variables in the gravity model, one can isolate trade creation and trade diversion effects of a trade agreement. However, he uses the traditional gravity model with cross-sectional regression, which has since been proven to be susceptible to endogeneity bias.

Clausing (2001) evaluates the changes in trade patterns caused by the Canada-United States Free Trade Agreement (CUSFTA). She does not use the gravity model, but instead devises a trade model using import demand and export supply framework. To evaluate whether there is trade diversion, she specifies a regression model where the dependent variable is the percentage change in imports of a particular commodity from the rest of the world. She hypothesizes that if trade diversion was present, the percentage change in imports from the rest of the world would be negatively related to the extent of tariff liberalization with Canada.

Carrere (2006) estimates the effects of seven regional trade agreements on trade flows using a panel specification with random effects that control for the unobservable characteristics of each pair of countries. She shows that the predictions of the effects of regional trade agreements in terms of trade creation and trade diversion are different when estimated using cross-section data versus when estimated using panel data. She defines regional binary variables over the whole period of the regional trade agreements. These variables will only vary when there are changes in membership during the period. Therefore, the random effects model is more appropriate in this specification because the fixed-effects model does not allow the estimation of the effects of trade agreements with fixed membership. Her method of using binary variables to measure trade creation and trade diversion is effective in evaluating the effects for the seven major trade agreements.

5. Past ACFTA studies

In an *ex ante* analysis of the potential effect of ACFTA, Roberts (2004) found that the results of the gravity model exhibited a good fit in explaining trade flows within ACFTA. He uses OLS as the method of estimation and conducted preliminary data analysis to ensure that OLS is appropriate for estimating the model. His model reveals an insignificant effect in terms of the potential trade creation that could result from the integration. Park, Park and Estrada (2009) are the first to conduct both qualitative and quantitative analyses on the potential impacts of ACFTA. In their quantitative analysis, they use a static computable general equilibrium model technique with three economic agents: producer, consumer and trading partners, assuming complete elimination of trade barriers between ASEAN and China. Their results indicate that ACFTA is expected to increase trade among member economies, but it will also divert trade away from nonmember countries. This paper will test if this conclusion is still true with the recent trade flows data and a different method of estimation.

III. Methodology and Potential Contribution

Although there are many studies that have estimated the impact of FTA on trade flows using the gravity model, few have examined the impact of ACFTA. Since the agreements have existed only since 2005, most of the *ex-post* analyses have not had a wide range of data. In addition, previous studies on the impact of ACFTA used the gravity equation with cross-sectional regression. As discussed earlier, this approach is susceptible to endogeneity bias. This paper uses a different estimation method with the latest data.

Furthermore, instead of estimating the effect of all FTAs, this paper proposes an approach that focuses on the impact of ACFTA on China's trade patterns. ACFTA has the features of a natural experiment, with only ten of China's trading partners receiving the treatment. Therefore, this approach takes China's trade flows with its trading partners as the dependent variables, and the presence of ACFTA as the treatment. The ASEAN countries then will act as the treatment group, with the treatment period starting in 2005. The original control group will be all of China's non-ASEAN trading partners.

There are three advantages associated with this approach. First, not all free trade agreements have the same degree of effectiveness. Instead of estimating the aggregate effects of all free trade agreements, this approach allows us to focus solely on the impact of ACFTA on trade flows between China and its trading partners. Second, data will be more consistent as there are no discrepancies that could result when different countries employ different reporting methods. Third, the dataset prepared can be used to create many "experimental" treatment and control groups. For example, instead of including all countries, a group of China's most important trading partners can be used as control group. The use of different control groups can help uncover changes in China's trade patterns. For example, control groups that include China's top 20 trading partners in 1995 and 2000 can be used to test whether ACFTA has diverted trade away from these countries towards ASEAN.

I first consider OLS estimation of the gravity model using standard control variables such as distance, common language, adjacency, population, GDP, and conflict with the assumption that the formation of ACFTA is not correlated with any other unlisted factor that might affect trade flows. However, this is a bold assumption that might not hold true. Therefore, I also use panel data estimation with time and country fixed effects. In total, I use four specifications of the gravity model to provide the estimate for treatment effect of ACFTA.

To evaluate the impact of ACFTA on each member country individually, I also run these regressions for each ASEAN country. Finally, I run pooled regressions for different groups of countries: ASEAN countries, ASEAN countries with China, ASEAN countries that have delayed tariff reduction schedules.

IV. Data

I use panel data of trade flows between ACFTA members (China and 10 ASEAN countries) and 172 trading partners from 1995-2014. The choice of 1995 as the starting point is motivated by two main reasons. First, many ASEAN countries are developing countries, which did not have significant trade flows in the early 1990s. Second, many countries have missing data before 1995, and even those countries with data might have reported inaccurately.

I use three major data sources to create the dataset for empirical estimation. The first source includes data of aggregate exports and imports between ACFTA members and 172 trade partners. Data for both exports (FOB) and imports (CIF) are obtained from the International Monetary Fund's Directions of Trade Database. The second data source provides control variables. Data on GDP, GDP per capita and population are obtained from the IMF's World Economic Outlook Database updated in October 2015.

Additionally, the list of countries sharing a border and the list of countries in conflict with each other over the period from 1995-2014 are obtained from CIA's World Fact Book Database. The third source of data is needed to calculate the distances between countries. This data is obtained from Centre d'Études Prospectives et d'Informations Internationales (CEPII)'s gravity dataset.

Missing observations and zero trade flow cause problem when estimating using the log-linear gravity equation since *ln(0)* is undefined. Solutions to this problem include ignoring countries with zero trade, replacing zero with a small positive number, or using the Heckman selection model to estimate bilateral trade flows. (Haq, 2011). NON of these solutions is perfect; each has its own advantages and disadvantages. Removing zero trade flows out of the sample will potentially result in a loss of useful information. The substitution of a small value to prevent the omission of observations from the model is not precise and there is no guarantee that it reflects the underlying expected values, thus yielding inconsistent estimates. Finally, the Heckman approach to solve sample selection bias has an important limitation: the result is only accurate if we can identify a variable that explains firms' decisions to export or not to export to a certain market but does not affect the volume of trade in total. But such a variable has not been identified. Hence, to overcome the zero-trade problem, I exclude partner countries with zero trade flows, countries that no longer exist as an independent state, and countries that only became independent recently. All remaining countries that trade with ACFTA members in some years during the period 1995-2014 are included. In total, there are 172 trading partners included in the dataset.

Table 1 provides the summary statistics for all China's trade partners, grouped by countries in ASEAN and countries not in ASEAN. Table 2 provides the statistics for individual ASEAN countries. Table 3 provides the statistics for China's top 20 exports destinations.

I use Stata 14.1 as the main software to run regressions for this paper.

variable	mean	sd	min	max
exports	4.44E+09	1.93E+10	0	3.97E+11
imports	4.12E+09	1.62E+10	0	1.94E+11
gdp	262.9168	1115.37	0.016	17348.07
rgdp	330.6456	2652.643	0.017	138475
gdpdeflator	212.9061	942.9803	0.004	21467.49
gdppercap	9446.782	14406.34	100.448	103605.6
gdpcgrowth	4.149375	6.067131	-62.076	147.673
population	28.71125	92.87696	0.009	1275.921
distw	9266.555	3925.976	1168.165	19110.13

Table 1: Summary statistics of trade flows and control variables

partner	exports	imports	gdp	gdppercap	population	distw	adj	comlang	conflict
Brunei	3.30E+08	1.94E+08	10.6492	29139.06	0.35275	3496.266	0	0	0
Cambodia	9.48E+08	9.31E+07	7.59595	551.9338	13.1683	2975.503	0	0	0
Indonesia	1.26E+10	1.18E+10	442.3631	1922.577	221.1374	4684.441	0	0	0
Lao PDR	3.51E+08	2.83E+08	4.28665	692.2819	5.82565	2440.462	1	0	0
Malaysia	1.48E+10	2.45E+10	176.373	6573.982	25.8148	3879.04	0	1	0
Myanmar	2.55E+09	1.50E+09	27.92018	563.6145	48.39953	2887.055	1	0	0
Philippines	7.01E+09	1.01E+10	139.0688	1592.502	84.2474	2613.129	0	0	1
Singapore	1.97E+10	1.46E+10	159.8199	34354.18	4.45135	4097.429	0	1	0
Thailand	1.13E+10	1.69E+10	231.4989	3533.418	64.54865	2986.222	0	0	0
Vietnam	1.36E+10	4.85E+09	73.8529	867.9905	81.7707	2664.699	1	0	1

Table 2: Statistics for ASEAN countries

partner	exports	imports	gdp	gdppercap	population	distw	adj	comlang	conflict
Australia	1.49E+10	2.94E+10	806.5653	37944.61	20.5211	8345.11	0	0	0
Brazil	1.16E+10	1.88E+10	1284.098	6835.197	174.7606	17235.78	0	0	0
Canada	1.27E+10	9.51E+09	1151.152	35094.82	32.1767	10428.4	0	0	0
France	1.37E+10	1.09E+10	2131.398	34834.89	60.72805	8742.565	0	0	0
Germany	3.45E+10	4.08E+10	2897.91	35438.6	81.8801	8031.667	0	0	0
India	1.85E+10	9.33E+09	992.2336	859.7302	1105.383	4204.048	1	0	1
Indonesia	1.26E+10	1.18E+10	442.3631	1922.577	221.1374	4684.441	0	0	0
Japan	8.16E+10	9.80E+10	4729.495	37167.96	127.2335	1974.968	0	0	1
Korea, Republic	4.09E+10	7.88E+10	844.6751	17423.17	48.02185	1168.165	0	0	0
Malaysia	1.48E+10	2.45E+10	176.373	6573.982	25.8148	3879.04	0	1	0
Mexico	9.97E+09	3.48E+09	838.5727	7699.479	106.8791	12411.55	0	0	0
Netherlands	2.75E+10	3.94E+09	653.4453	40016.91	16.2251	8242.414	0	0	0
Russia	1.78E+10	1.76E+10	941.6131	6541.994	144.845	5506.708	1	0	0
Singapore	1.97E+10	1.46E+10	159.8199	34354.18	4.45135	4097.429	0	1	0
Taiwan	1.76E+10	7.11E+10	375.8914	16543.83	22.62085	1490.694	0	1	1
Thailand	1.13E+10	1.69E+10	231.4989	3533.418	64.54865	2986.222	0	0	0
UAE	1.28E+10	3.54E+09	198.9764	35811.95	5.2806	5975.254	0	0	0
United Kingdom	2.23E+10	7.60E+09	2118.502	34747.87	60.56095	8539.15	0	0	0
United States	1.68E+11	6.14E+10	12500.28	42062.24	294.2413	11183.43	0	0	0
Vietnam	1.36E+10	4.85E+09	73.8529	867.9905	81.7707	2664.699	1	0	1

Table 3: Statistics for China's top 20 exports destinations

V. Model Specifications and Preliminary Results

1. Cross-sectional OLS regression:

The equation used for cross-sectional OLS regression is:

$$\ln(EXPORTS_{it}) \text{ or } \ln(IMPORTS_{it}) = \beta_0 + \underset{(+)}{\beta_1(FTA_{it})} + \underset{(-)}{\beta_2(\ln DISTW_i)} + \underset{(+)}{\beta_3(ADJ_i)} + \underset{(+)}{\beta_4(COMLANG_i)} + \underset{(-)}{\beta_5(CONFLICT_{it})} + \underset{(+)}{\beta_6(\ln GDP_{it})} + \underset{(+)}{\beta_7(\ln POPULATION_{it})} + \varepsilon_{it} \quad (1)$$

- $EXPORTS/IMPORTS_{it}$ denote the values of the nominal exports/imports between China and country *i* in year *t*. I run regression first with $\ln(EXPORTS_{it})$ then with $\ln(IMPORTS_{it})$ as dependent variables.
- FTA_{it} is a binary variable assuming the value 1 if China and country *i* are members of ACFTA in year *t* and 0 otherwise. This is the variable used to capture the effect of ACFTA on trade flows. The gravity model predicts that China will trade more with countries in ACFTA, so β_1 is expected to be positive.
- $DISTW_i$ denotes the bilateral distance between China and countries *i.* This is a control variable to capture the effect of distance on trade flows. The gravity model predicts that China will trade more with countries that are closer, so β_2 is expected to be negative.
- ADJ_i is a binary variable assuming the value 1 if China and country *i* are adjacent (i.e., share a land border) and 0 otherwise. This is a control variable to capture the effect of sharing a border on trade flows. The gravity model predicts that China will trade more with countries that share its border, so β_3 is expected to be positive.
- $COMLANG_{it}$ is a binary variable assuming the value 1 if China and country *i* share a common language and 0 otherwise. This is a control variable to capture the effect of having common language on trade flows. The gravity model predicts that China will trade more with countries that share its languages (either Mandarin Chinese or Cantonese Chinese), so β_4 is expected to be positive.
- $CONFLICT_{it}$ is a binary variable assuming the value 1 if China and country *i* are in dispute in year *t* and 0 otherwise. This is a control variable to capture the effect of conflict on trade flows. The gravity model predicts that China will trade less with countries in dispute, so β_5 is expected to be negative.
- GDP_i denotes the nominal gross domestic product in country *i* in year *t.* This is a control variable to capture the effect of economic size on trade flows. The gravity model predicts that larger economies can trade more, so β_6 is expected to be positive.
- $POPULATION_{it}$ measures the population of country *i* in year *t.* This is a control variable to capture the effect of population on trade flows. The gravity model predicts that countries with larger population can trade more, so β_7 is expected to be positive.
- ε_{it} is the random error term.

In this regression, the dependent variable is the natural log of either China's exports to its trade partners or China's imports from its trade partners. The treatment is the presence of ACFTA. This is represented by the dummy variable *FTA*, which takes the value of 1 for the 10 ASEAN countries from 2005 (the year of agreement) onwards and 0 otherwise.

Table 4(1) shows the OLS regression result with *lnEXPORTS* as the dependent variable. Table 4(2) shows the OLS regression result with *lnIMPORTS* as the dependent variable.

VARIABLES	(1) OLS Exports	(2) OLS Imports
fta	1.406***	1.386***
	(0.0847)	(0.110)
lngdp	0.990***	1.335***
	(0.0161)	(0.0249)
lnpop	0.00785	0.0766**
	(0.0220)	(0.0350)
lndistw	-0.155***	-0.640***
	(0.0573)	(0.0958)
adj	0.740***	0.492***
	(0.112)	(0.164)
comlang	1.051***	1.964***
	(0.0985)	(0.120)
conflict	-0.0412	-0.321**
	(0.114)	(0.158)
Constant	17.61***	19.27***
	(0.528)	(0.881)
Observations	3,389	3,203
R-squared	0.750	0.681

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: regression result for equation (1)

In both regressions, the coefficients of *FTA* are positive and statistically significant (at the 1% significance level). This indicates that the presence of ACFTA is correlated with an increase in trade flow between China and its trading partners. The signs of coefficients on the other control variables are as predicted, and they are significant at either the 1% significance level or the 5% significance level.

However, consistent estimation in Equation (1) depends on whether there is correlation between the variable *FTA* and the error term. Since many researches have provided substantial proofs that there are certain unobserved factors that correlate with both trade flows and the decision to form FTA (Magee, 2003, Baier and Bergstrand, 2004), traditional OLS estimate using Equation (1) will likely be biased. The next specification considers estimation with time fixed effects.

2. Panel regression with time fixed effects:

Regression equation with time fixed effects:

$$ln(EXPORTS_{it}) \text{ or } ln(IMPORTS_{it}) = \beta_0 + \beta_1(FTA_{it}) + \beta_2(lnDISTW_i) + \beta_3(ADJ_i) + \beta_4(COMLANG_i) + \beta_5(CONFLICT_{it}) + \beta_6(lnGDP_{it}) + \beta_7(lnPOPULATION_{it}) + \sum_{t=1}^{20} YEAR_t + \varepsilon_{it} \quad (2)$$

Adding time fixed effects control for the natural increase of trade flow over time as China grows and shocks in certain years that affected trade flows with all partners (for instance, the financial crisis that started in 2008 negatively affected the trade flows of China with most countries). Table 5(1) shows regression result with *lnEXPORTS* as the dependent variable. Table 5(2) shows regression result with *lnIMPORTS* as the dependent variable.

VARIABLES	(1) Time FE Exports	(2) Time FE Imports
fta	0.333***	0.603***
	(0.0736)	(0.123)
lngdp	0.825***	1.222***
	(0.0132)	(0.0237)
lnpop	0.146***	0.191***
	(0.0176)	(0.0337)
Constant	17.93***	19.61***
	(0.417)	(0.859)
Observations	3,389	3,203
R-squared	0.853	0.715

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: regression result for equation (2)

The result in Table 5(1) shows that the inclusion of time fixed effects reduces the treatment effect of *FTA* significantly from 1.406 to 0.333. The effect is still positive and statistically significant (at the 1% significance level). Table 5(2) shows a similar pattern: the inclusion of time fixed effects reduces the treatment effect of *FTA* from 1.386 to 0.603. The effect is also positive and statistically significant (at the 1% significance level). This result confirms the fact that the OLS regression does not account for the improvement in China's total trade flow over time. Since ACFTA was introduced recently, the variable *FTA* takes the value 1 for the years when the value of trade flow is also larger. Hence, including time fixed effects separates the treatment effect of *FTA* from the improvement in trade flow over time, thus making the coefficients of *FTA* smaller.

However, time fixed effects still do not account for the endogeneity of *FTA*. Next, I include country fixed effects.

3. Panel regression with country fixed effects:

There is a tradeoff when using country fixed effect. With country fixed effects, some trade determinants can no longer be used in a gravity equation (Head and Mayer, 2013). The list includes:

1. Anything that affects exporters propensity to export to all destinations (such has having hosted the Olympics or being an island).
2. Variables that affect imports without regard to origin, such as country-level average applied tariff
3. Sums, averages, and differences of country-specific variables.

If any variable of these three forms is added to a trade equation estimated with country fixed effects, Stata will still report estimates with standard errors. However the estimates are meaningless. Stata identified them by dropping one or more of the country binary variables, so as to avoid collinearity (Head and Mayer, 2013). Examples of covariates that cannot be used with country fixed effects are size variables and country-level institutional variables (e.g. rule of law). Therefore, I exclude *DISTW, ADJ, COMLANG, CONFLICT* when running regression with time and country fixed effects.

Regression equation with country fixed effects:

$$ln(EXPORTS_{it}) \text{ or } ln(IMPORTS_{it}) = \beta_0 + \beta_1(FTA_{it}) + \beta_2(lnGDP_{it}) + \beta_3(lnPOPULATION_{it}) + \sum_{i=1}^{172} COUNTRY_i + \varepsilon_{it} \quad (3)$$

Table 6(1) shows regression result with *lnEXPORTS* as the dependent variable. Table 6(2) shows regression result with *lnIMPORTS* as the dependent variable.

VARIABLES	(1) Country FE Exports	(2) Country FE Imports
fta	-0.345*	-0.219
	(0.191)	(0.327)
lngdp	2.304***	2.192***
	(0.108)	(0.178)
lnpop	0.816**	1.657*
	(0.404)	(0.845)
Constant	11.00***	7.847***
	(0.592)	(1.329)
Observations	3,389	3,203
R-squared	0.780	0.480
Number of code	172	172

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: regression result for equation (3)

The result in Table 6(1) shows a negative and statistically insignificant (at the 5% significance level) coefficient for *FTA*. The result in Table 6(2) shows a negative and statistically insignificant (at the 1% significance level) coefficient for *FTA*. These results suggest that after accounting for country fixed effects the presence of *FTA* no longer has a positive effect on trade flows. This implies that there is no trade creation effect from ACFTA.

Having country fixed effects without time fixed effects reintroduces the problem that the presence of *FTA* coincides with the increased in trade flows over time. A more complete estimation will include both time and country fixed effects.

4. Panel regression with both time and country fixed effects:

Regression equation with both time and country fixed effects:

$$ln(EXPORTS_{it}) \text{ or } ln(IMPORTS_{it}) = \beta_0 + \beta_1(FTA_{it}) + \beta_2(lnGDP_{it}) + \beta_3(lnPOPULATION_{it}) + \sum_{t=1}^{20} YEAR_t + \sum_{i=1}^{172} COUNTRY_i + \varepsilon_{it} \quad (4)$$

Table 7(1) shows regression result with *lnEXPORTS* as the dependent variable. Table 7(2) shows regression result with *lnIMPORTS* as the dependent variable.

VARIABLES	(1) Time & Country FE Exports	(2) Time & Country FE Imports
fta	-0.448***	-0.317
	(0.117)	(0.305)
lngdp	0.875***	0.548***
	(0.119)	(0.168)
lnpop	-0.146	0.638
	(0.168)	(0.411)
Constant	15.45***	13.46***
	(0.338)	(0.810)
Observations	3,389	3,203
R-squared	0.877	0.563
Number of code	172	172

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: regression result for equation (4)

The result in Table 7(1) shows a negative and statistically significant (at the 1% significance level) coefficient for *FTA*. This result diverges further from the results obtained by equation (1) and (2); it suggests that after accounting for time and country fixed effects, ACFTA actually decreases China's exports to ASEAN countries.

The result in Table 7(2) shows a negative but statistically insignificant (at the 5% significance level) coefficient for *FTA*. This suggests that after accounting for time and country fixed effects, ACFTA does not have a significant effect on China's imports from ASEAN countries.

The results contradict the expectation that ACFTA would reduce trade barriers and improve trade flows between China and ASEAN countries. Possible explanations for these results and further results of the impacts of ACFTA on all ASEAN countries are analyzed next.

VI. Results and Analysis

1. China:

The summary of regression results of different regression specifications for China is produced in table 8a.

VARIABLES	(1) OLS	(2) Time FE	(3) Country FE	(4) Time & Country FE
fta	1.406***	0.333***	-0.345*	-0.448***
	(0.0847)	(0.0736)	(0.191)	(0.117)
lngdp	0.990***	0.825***	2.304***	0.875***
	(0.0161)	(0.0132)	(0.108)	(0.119)
lnpop	0.00785	0.146***	0.816**	-0.146
	(0.0220)	(0.0176)	(0.404)	(0.168)
lndistw	-0.155***			
	(0.0573)			
adj	0.740***			
	(0.112)			
comlang	1.051***			
	(0.0985)			
conflict	-0.0412			
	(0.114)			
Constant	17.61***	17.93***	11.00***	15.45***
	(0.528)	(0.417)	(0.592)	(0.338)
Observations	3,389	3,389	3,389	3,389
R-squared	0.750	0.853	0.780	0.877
Number of countries			172	172

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8a: regression results for China with *lnEXPORTS* as dependent variable

Using panel regression with both time and country fixed effects, the impact of ACFTA on China's exports was negative and significant. This result is surprising and contradicts the original hypothesis that ACFTA would increase trade among members.

To further analyze the impact of ACFTA on China, I run separate OLS regressions for each year that ACFTA was in effect, without time and country fixed effects. Table 8b shows that OLS regression on each individual year starting from 2006 – the year ACFTA went into effect – showed positive results. The coefficients of *FTA* grew larger and more significant over time, which indicated that the impact of ACFTA was getting more positive as tariff reductions gradually took effect. In 2014, for instance, the coefficient of *FTA* is 0.899 – the highest since 2006 – and it is significant at the 1% significance level.

VARIABLES	(1) 2006	(2) 2007	(3) 2008	(4) 2009	(5) 2010	(6) 2011	(7) 2012	(8) 2013	(9) 2014
fta	0.602*	0.378	0.295	0.367	0.581**	0.577**	0.701***	0.844***	0.899***
	(0.319)	(0.281)	(0.299)	(0.267)	(0.257)	(0.232)	(0.205)	(0.199)	(0.207)
lngdp	0.827***	0.808***	0.796***	0.761***	0.789***	0.780***	0.746***	0.742***	0.754***
	(0.0578)	(0.0539)	(0.0546)	(0.0559)	(0.0599)	(0.0621)	(0.0614)	(0.0580)	(0.0607)
lnpop	0.145*	0.133*	0.125*	0.153**	0.126	0.115	0.111	0.151**	0.151**
	(0.0786)	(0.0700)	(0.0757)	(0.0741)	(0.0774)	(0.0744)	(0.0770)	(0.0630)	(0.0653)
lndistw	-0.169	-0.211	-0.219	-0.264	-0.159	-0.206	-0.230	-0.261*	-0.174
	(0.209)	(0.173)	(0.187)	(0.176)	(0.192)	(0.173)	(0.177)	(0.153)	(0.155)
adj	0.216	0.504	0.464	0.357	0.246	0.383	0.351	0.307	0.354
	(0.535)	(0.382)	(0.431)	(0.422)	(0.465)	(0.372)	(0.348)	(0.341)	(0.363)
comlang	1.300***	1.342***	1.280***	1.228***	1.006***	0.915***	0.899***	0.882***	0.872***
	(0.334)	(0.341)	(0.356)	(0.341)	(0.253)	(0.227)	(0.194)	(0.187)	(0.199)
conflict	0.131	0.0903	0.121	0.0584	0.213	0.181	0.139	0.0618	0.151
	(0.344)	(0.325)	(0.321)	(0.319)	(0.317)	(0.280)	(0.266)	(0.273)	(0.292)
Constant	18.44***	19.12***	19.43***	19.85***	19.03***	19.63***	20.09***	20.32***	19.55***
	(1.944)	(1.582)	(1.731)	(1.612)	(1.756)	(1.581)	(1.658)	(1.425)	(1.452)
Observations	172	172	172	172	172	171	171	171	171
R-squared	0.814	0.850	0.832	0.837	0.827	0.829	0.817	0.853	0.858

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8b: OLS regression results for China every year since the implementation of ACFTA (with *lnEXPORTS* as dependent variable)

However, these OLS regressions results might be biased. Without country fixed effects, the potential endogeneity of *FTA* is not accounted for. Hence, the positive coefficients of *FTA* in OLS regressions for individual years might not reflect the true impact of ACFTA on China.

2. ASEAN countries:

I repeat the estimation procedure above with the 10 ASEAN countries to evaluate the impact of ACFTA on the other members besides China. For this pooled regression, instead of having a dummy variable for each country, I use a dummy variable for each country-pair to control for country-pair trade determinants that do not change over time (such as the distance between Vietnam and Japan). Table 9a shows the results for regression with both time and country-pair fixed effects.

VARIABLES	(1) Time & Country-pair FE Imports	(2) Time & Country-pair FE Exports
fta	0.128	-0.106
	(0.102)	(0.0996)
lngdp	0.462***	0.779***
	(0.0997)	(0.0668)
lnpop	0.228**	0.182*
	(0.108)	(0.107)
Constant	13.28***	12.52***
	(0.365)	(0.254)
Observations	21,933	23,940
R-squared	0.183	0.349
Number of pairs	1,395	1,438

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9a: regression results for 10 ASEAN countries (with Time & Country-pair FE)

Under regression with time and country-pair fixed effects using for aggregate data of all 10 ASEAN countries, ACFTA did not have a significant effect. This indicated that as a group the ASEAN countries did not benefit from joining ACFTA. This result also contradicts the hypothesis that ACFTA would increase trade between members.

When including China, the overall impact on exports is negative (with coefficient -0.174) and significant at the 10% significance level as shown in Table 9b. This is due to China's negative and significant coefficient of *FTA* on exports.

VARIABLES	(1) Time & Country-pair FE Imports	(2) Time & Country-pair FE Exports
fta	0.0325	-0.174*
	(0.0997)	(0.0941)
lngdp	0.520***	0.817***
	(0.0885)	(0.0622)
lnpop	0.270**	0.138
	(0.105)	(0.0994)
Constant	13.14***	12.80***
	(0.330)	(0.233)
Observations	25,136	27,329
R-squared	0.224	0.409
Number of pairs	1,567	1,610

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9b: regression results for 10 ASEAN countries and China (with Time & Country FE)

3. ASEAN Countries that Implemented ACFTA Late:

A possible explanation of the ambiguous effect of ACFTA on members' trade might concern the timing of implementation. As stated in the agreement, the six original ASEAN members (Indonesia, Malaysia, Philippines, Singapore, Thailand, and Bruinei) and China were to eliminate tariffs on 90% of their products by 2010, while Cambodia, Lao PDR, Myanmar and Vietnam, had until 2015 to do so. Hence, separating the impact of ACFTA on countries with late tariff reduction schedules might help reveal the true impact of ACFTA. Table 10a provides the regression results for the four ASEAN countries that implemented late tariff reduction.

VARIABLES	(1) Time & Country FE Imports	(2) Time & Country FE Exports
fta	-0.299*	-0.366**
	(0.169)	(0.174)
lngdp	0.546***	0.932***
	(0.129)	(0.120)
lnpop	0.972***	0.261
	(0.369)	(0.182)
Constant	10.31***	10.52***
	(0.981)	(0.507)
Observations	6,461	7,928
R-squared	0.350	0.426
Number of pairs	446	492

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: regression results for 4 late ASEAN countries (with Time & Country FE)

The regression results indicate that ACFTA has a negative and significant impact on the four countries that implemented tariff reduction late. These countries both imported less from and exported less to fellow members of ACFTA. Since these four countries were expected to implement tariffs reduction later, it is possible that that the remaining countries exports more among themselves and less to these four to reap the benefit of early tariff reduction. As a result, these four countries observed a negative impact on imports from fellow members of ACFTA. The negative coefficient of *FTA* for exports could be because these four countries also exported less among themselves. Since Laos, Cambodia and Vietnam are neighbors that shared a common border, they have exported a lot to each other. However, tariff reductions of other countries might divert exports away from within the group to other members of ACFTA.

4. Overall Impact:

The results above introduce the possibility that the impact of ACFTA on each country is different; joining ACFTA might benefit some countries while harming others. To test this, I run regressions for each individual country to measure the impact of ACFTA separately. Table 11 provides a summary of the coefficients of *FTA* for all members when using regression with both time and country fixed effects.

Country	Exports		Imports	
	Coefficient	p-value	Coefficient	p-value
Vietnam	-0.3755204**	0.017	-0.4352021	0.157
Thailand	-0.093685	0.588	0.4704407*	0.074
Singapore	-0.1677107	0.353	-0.4808234**	0.031
Philippines	-0.1343543	0.468	1.060506***	0.000
Myanmar	0.1959278	0.634	0.4855008	0.122
Malaysia	-0.478614***	0.008	0.0726174	0.810
Laos	1.261595***	0.002	0.2924452	0.830
Indonesia	0.1828905	0.141	0.550084**	0.031
Cambodia	-1.419012***	0.000	0.3291671	0.320
Brunei	1.020511	0.098	0.0464885	0.882
ASEAN (without China)	-0.1055913	0.289	0.1280779	0.208
China	-0.4479829***	0.000	-0.3169425	0.301
ASEAN (with China)	-0.1739714*	0.065	0.0324541	0.745

*** p<0.01, ** p<0.05, * p<0.1

Table 11: coefficients of *FTA* for each country (with Time & Country FE)

The results confirm that ACFTA affects each country differently. For example, while ACFTA has a positive impact on Philippines' imports, the impact on Cambodia's exports is negative. One notable observation from the results is that almost all the negative and significant coefficients of *FTA* are associated with exports (from Vietnam, Cambodia, China, and Malaysia). This could mean that ACFTA has a negative impact on the exports of these countries to ACFTA members. On the other hand, most positive and significant coefficients of *FTA* are associated with imports (to Thailand, Philippines and Indonesia). This could mean that these countries import more from ACFTA members after joining.

There are some possible explanations for the ambiguous impacts of ACFTA. An analysis of the detailed tariff reduction schedules of individual countries provided by the Chinese Ministry of Commerce revealed these explanations. First, countries proposed vastly different schedules. For instance, by 2011, Vietnam reported that it still had tariffs on various products ranging from 1% to 60%, while Brunei's schedule guaranteed that it would eliminate 100% tariff by 2012. Second, tariff reductions of a country toward other members are not equivalent. For example, China reported that by 2012 it had completely eliminated all tariffs to Singapore, whereas by 2012, China still maintained tariffs on various products from Myanmar, which ranged from 1% to 65%. Vietnam also provided a list of countries that would not benefit from tariff reduction for each product. Brunei, Myanmar, Cambodia and Indonesia appeared regularly on this list. This means that countries that enjoyed tariff reductions from some destinations might have diverted exports towards these more attractive destinations at the expenses of destinations that have yet to reduce tariffs. Perhaps the impact of ACFTA will phase in over time, when barriers of trade were reduced completely.

We would expect the tariff reduction schedule to affect the impact of ACFTA on each country. But once tariff has been reduced, it is also useful to look at the usage rate of FTA. To eliminate tariff, there is an application procedure that private exporters have to follow. This proves to be a barrier to many private exporter. Survey conducted by the Economic Intelligence Unit – An economic consulting group, revealed that the rate of FTA usage for exporters in ASEAN countries is low, at just 26% on average. In other words, each FTA signed in ASEAN is used, on average, by only one in four exporters. Furthermore, average usage rate of each country differs (Vietnam: 37%, Singapore: 21%, Malaysia: 16%, Indonesia: 42%). This further explains why the impact of ACFTA is different for each country.

VII. Extension

A possible extension is to extend the dataset to measure the trade creation and trade diversion effects of ACFTA. For this, the dataset will need to include country-pairs in which neither country is a member of ACFTA. This will require a much larger dataset of all 38416 country-pairs in the world.

These are the three situations of trade creation and trade diversion:

1. When there is purely trade creation: intra-regional trade increases and imports from the rest of the world (ROW) remain unchanged.

2. When there is purely trade diversion: the increase in intra- regional trade is entirely offset by a corresponding decrease in imports from the ROW.
3. When there are both trade creation and trade diversion, intra-regional trade increases more than imports decrease from the ROW.

To measure trade diversion and trade creation for all 11 countries, the system of binary variables used by Carrere (2006) can be adopted:

1. FTA_b(with coefficient α_b) = 1 if both partners belong to ACFTA (0 otherwise) (this captures intra-bloc trade).
2. FTA_m(with coefficient α_m) = 1 if importing country i belongs to ACFTA and exporting country j belongs to the ROW (0 otherwise) (This captures bloc imports from the ROW).
3. FTA_x(with coefficient α_x) = 1 if exporting country j belongs to ACFTA and importing country i belongs to the ROW (0 otherwise) (This captures bloc exports to the ROW).

If $\alpha_b > 0$: this means there is more intra-bloc trade with ACFTA than without ACFTA. This increase in intra-bloc trade can substitute domestic production or exports from the ROW. Hence, to decide whether this increase in intra-bloc trade corresponds to trade creation or trade diversion, we need to examine the signs of the coefficients α_m and α_x.

If $\alpha_b > 0$ and $\alpha_m < 0$: This means even though there is more intra-bloc trade among ACFTA members, there is also a lower propensity to import from the ROW. Hence, there is evidence of trade diversion. If the increase in intra-regional trade is entirely offset by a decrease in imports from the ROW, there is pure trade diversion. On the other hand, if intra-regional trade increases more than decrease in imports from the ROW, there are both trade creation and trade diversion.

If $\alpha_b > 0$ and $\alpha_m > 0$: there is evidence of pure trade creation.

Equation (1) to (4) will then be modified by including trade flows between all pairs of countries, and by replacing FTA_{it} with FTA_{bt}, FTA_{mt}, *and* FTA_{xt}:

$$ln(EXPORTS/IMPORTS_{ijt}) = \beta_0 + \alpha_b FTA_{bt} + \alpha_m FTA_{mt} + \alpha_x FTA_{xt} + \beta_2(lnDISTW_{ij}) + \beta_3(ADJ_{ij}) + \beta_4(COMLANG_{ij}) + \beta_5(CONFLICT_{ijt}) + \beta_6(lnGDP_{ijt}) + \beta_7(lnPOPULATION_{ijt}) + \varepsilon_{ijt} \quad (5)$$

Estimating this equation, using both cross-sectional regression and panel regression with time and country fixed effects, will hopefully reveal the true impacts of ACFTA.

VIII. Conclusion

I apply the gravity model with different specifications to measure the impact of ACFTA on trade flows between China and ASEAN countries. Traditional OLS regression reveals a positive and statistically significant effect of ACFTA on trade flows. However, when accounting for both time and country fixed effects, the effect of ACFTA on exports from China to ASEAN becomes negative and statistically significant. The effect of ACFTA on imports to China from ASEAN also becomes negative but statistically insignificant. These results contradict the expectation of improved trade flows between China and ASEAN countries.

Despite the negative coefficients of *FTA* on China's exports, it is perhaps premature to conclude that ACFTA has a negative impact on trade between China and ASEAN countries. Using the same regression specifications on the 10 ASEAN countries revealed that although ACFTA did not have a significant effect on ASEAN countries as a group, it had a significant effect on certain individual ASEAN countries. ACFTA affected each country differently, benefiting some while harming others. This could be because members had different tariff reduction schedule, causing countries to divert trades towards those with early schedule and away from those with late schedule. Hence, it is hard to determine if the overall impact of ACFTA on the bloc as a whole is positive or negative. However, if the negative coefficients were indeed caused by trade diversion away from countries with late tariff reduction schedule, then an effective policy aiming to maximize trade will be to join every trade agreement possible and to reduce tariffs quickly, so that trade is not diverted away.

To extend this paper, I suggest an extended model that includes trade flows data of all 38416 country-pairs, which include pairs in which neither country is a member of ACFTA. The extended data can be used to measure specific trade creation and trade diversion effects of ACFTA on members as well as non-members.

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