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Regional Borders and Trade in Asia

Woong Lee and Chankwon Bae



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EXECUTIVE SUMMARY

This paper investigates the effect of regional borders on trade in Asia. The regional borders define the three regions of Asia: South, Southeast, and East Asia. Regional trade indicates the flows of trade within a region, whereas regional border trade means trade across regions. A gravity model is augmented with the region dummies to estimate the regional border effects that capture any and all time-invariant factors promoting or impeding regional trade. The main finding is that regional border effects are asymmetric on the three regions in Asia. There is a large and significant regional border effect on South Asia, small on Southeast Asia, and negligibly negative on East Asia. The significant and positive regional border effect in South Asia suggests that countries share intrinsic factors facilitating trade between the countries in this region. Although the regional border effect of Southeast Asia is positive, its magnitude shows little difference between its regional trade and regional border trade. Finally, the estimate on East Asia presents a completely different picture from the actual data. It implies that there exist some factors leading to active regional border trade between East Asia and other Asian regions.

Keywords: Border Effect, Regional Borders, Natural Trading Partners, Gravity Model JEL Classification: F13, F14, F15

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Regional Borders and Trade in Asia

Woong Lee* and Chankwon Bae**

I. Introduction

Over the last two decades, there has been a substantial increase in world trade.¹ The world has been further integrated with rapid growth in trade, and this process has been facilitated by many factors that lower or remove obstacles to trade. In the same period, increase in trade in Asia has been particularly noticeable, leading to a larger gap in the growth of trade between Asia and the rest of the world.²

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¹ Since 1991, world trade has increased at an average rate of 9.1 percent. During the 21st century, it is 9.7 percent and in the last 10 years, 2002 through 2011, it soared at 12 percent (the annual average growth rates in world trade are calculated by the authors, using the data drawn from the World Trade Organization Statistical Database: http://stat.wto.org/Home/WSDBHome.aspx?Language=E, extracted on 9/21/2012).

² In the 1990s and the 2000s, the average annual growth rates of trade in Asia are approximately 10.8 percent and 11.9 percent, respectively. In the last 10 years, it increased to 14.8 percent.

A sharp increase in Asian trade has accelerated integration among countries within Asia. These countries continued implementing trade policies with a greater orientation toward opening markets. They have put considerable efforts into economic integration not only with their neighbors but also with countries in different regions of Asia. Especially since 1990, many Asian countries have become involved in regional trade agreements (RTAs). As a result, there are more than 30 RTAs in Asia, both multilateral and bilateral, currently in force.³

Scholars have studied economic integration in Asia, especially ASEAN, AFTA, SAARC, and SAFTA.⁴ They focus on the effects of these RTAs on trade volume and economic growth. Frankel (1994), Ramasamy (1995), Endoh (1999), Thorn and Goglio (2002), Elliott and Ikemoto (2004), and Siah (2009) investigate the effects of ASEAN and AFTA. Hassan (2001), Hirrantha (2004), Batra (2004), Rahman, Shadat and Das (2006), and Gul and Yasin (2011) deal with SAARC and SAFTA. Magee (2008), for example, shows that the formation of ASEAN results in net welfare benefit, suggesting that the trade creation effect dominates the trade diversion effect. These works focus on the effects of RTAs while paying little attention to examining region-specific effects on trade.

This paper explores how "regional borders" influence trade flows in Asia. In this paper, "regional trade" indicates trade flows between countries within a region such as East, South, or Southeast Asia. "Regional border trade" defines trade between countries across regions. Most importantly, the regional border effect may capture any and all time-invariant factors that facilitate trade among countries in a region. For example, in a gravity model framework, if the regional

³ See Table 1.

⁴ ASEAN (the Association of Southeast Asian Nations); AFTA (ASEAN Free Trade Area); SAARC (South Asian Association for Regional Cooperation); and SAFTA (South Asian Free Trade Area).

border effect on South Asia is positive (negative), then it implies that some intrinsic factors captured by the regional border facilitate (impede) regional trade in South Asia, after controlling for economic size, distance, and other determinants. That is, after controlling for the gravity variables, regional trade in South Asia is larger than regional border trade between South Asia and other Asian regions.

The regional border effect is different from the border effect in the previous literature (McCallum 1995; Anderson and van Wincoop 2003). It is associated with trade flows between countries within a regional border such as Southeast Asia while the border effect is related to trade across the physical border between two countries (e.g., the political border between Canada and the U.S.). It may be linked to the hypothesis of natural trading partners because both explain constant factors that promote or impede trade between countries. The difference between them is that the hypothesis of natural trading partners does not consider either legal or regional borders.

The challenge is that there is no decisive classification to define regional borders unlike political borders. In this paper, the U.N. Statistical Division's geographical regions in Asia are adopted with a little modification. All ASEAN members are within the regional border of Southeast Asia and all SAARC nations are inside the regional border of South Asia. Both ASEAN and SAARC were created for economic, social, and cultural developments among their members. The establishment of these regional associations was possible because of their common social and cultural elements as well as geographic proximity. Thus, the U.N. regional classification can categorize the countries into South and Southeast Asia, respectively. In East Asia's case, not only historical but also cultural interdependence could allow China, Japan, and Korea to fall into a single region in Asia (Geographical Association 1937). Various versions of the gravity model are employed to test for how regional borders affect trade flows in Asia. The sample is limited to three regions in Asia: East, South, and Southeast Asia. Middle East and Central Asia are excluded to avoid a petroleum-related trade distortion.

The results show that the regional border effects are asymmetric on the three regions in Asia. There is a large and significant regional border effect in South Asia. The coefficient on South Asia's border effect is approximately 1.6 to 1.8, which means five to six times larger trade volume between countries within South Asia than trade between South Asian and non-South Asian countries. The estimate for Southeast Asia ranges from 0.2 to 0.5, indicating its regional border effect is just 1.1 to 1.6. More interestingly, East Asia's border effect is revealed to be small and negative, which implies that there is little difference between regional trade and cross-regional border trade in East Asia.

These findings contradict the stylized facts that East Asian countries' main trade partners are themselves and Southeast and South Asian countries' trade volumes with East Asia exceed their regional trade in these two Asian regions.⁵ South Asia's regional trade is only 10 percent followed by trade with Southeast Asia, which is 30 percent, and trade with East Asia, which is 60 percent. In the case of Southeast Asia, regional trade between Southeast Asian countries is 40 percent and regional border trade with East Asia and South Asia are approximately 55 percent and less than 5 percent, respectively. East Asia's regional trade is more than 70 percent, followed by 25 percent with Southeast Asia and 5 percent with South Asia.

The difference between the stylized facts and the empirical results suggests

⁵ See pages 9 and 10 in Section 2.

that there may be intrinsic factors facilitating trade between countries within South Asia, but the small sizes of the economies and other intrinsic factors are likely to impede trade between them. The regional border effect of Southeast Asia is minimal because its magnitude does not show much difference between regional trade and regional border trade. The small and negative regional border effect of East Asia implies that the large economic sizes of its member countries and other factors may be main drivers in promoting trade between countries in East Asia.

This paper is organized as follows. Section 2 describes the notion of regional borders and regional border effects, and then displays the stylized facts of trade flows in Asia, focusing on regional trade and cross-regional border trade over time. Section 3 empirically analyzes the relationship between regional borders and trade in Asia. Finally, Section 4 summarizes the findings and makes concluding remarks.

II. Regional Borders and Trade

1. Definition of Regional Borders

Regional trade is defined as trade flows between countries in a region. In this study, three Asian regions are considered: East, Southeast, and South Asia.⁶ Regional trade is different from intra-regional trade. In literature, intra-regional trade sometimes represents trade between countries in an economic zone or preferential trade area such as EU or NAFTA as in Magee (2008) whereas regional trade defines trade between countries within a geographical region.⁷ A larger regional trade indicates that more trade between countries within a region, such as Southeast Asia, than trade across regions, for example, between Southeast Asia and South Asia. More specifically, it is a situation where trade between India and Bangladesh, which lies in the same region, South Asia, is larger than trade between India and South Korea, located in the different regions. In corresponding to regional trade, regional border trade is defined as trade between countries across regions. One such example is trade between Japan in East Asia and India in South Asia.

⁶ This paper's regional categorization for Asia is as follows: East (China, Hong Kong, Macao, Japan, South Korea, Mongolia); South (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka); Southeast (Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam).

⁷ In cases of South and Southeast Asia, there is no difference from SAARC or ASEAN, respectively because the nations in the region of South coincide with the members of SAARC and the countries in Southeast are identical to the members of ASEAN.



Figure 1. Regional Trade and Regional Border Trade

The regional border effect captures any and all constant factors that promote trade between countries within a region. On the other side, it suggests any obstacles to trade across regional borders. In a gravity equation, if the regional border effect is positive (negative), then it means that after controlling for economic size and other gravity variables as well as country-specific components, trade between countries within a region is larger (small) than trade across regions. In other words, there exist some intrinsic factors that facilitate (impede) trade within a region, and at the same time, impede (facilitate) cross-regional border trade.

In this sense, the regional border effect is different from the border effect in McCallum (1995) and Anderson and van Wincoop (2003). The former is involved in trade between countries within a regional border (East, South, or Southeast) while the latter is related to trade across the legal border between two countries. The regional border effect is more or less associated with the hypothesis of natural trading partners because both explain similarities among trading partners that are constant over time (Eicher, Henn and Papageorgiou 2012).⁸

⁸ A theory of natural trading partners states that a RTA is more likely to be beneficial if members'

However, the distinction between the two hypotheses is that natural trading partners do not explicitly consider any kind of 'border'.

In a gravity model framework, controlling for regional border effects is identical to adding region dummies. Scholars often add region dummies in estimating the gravity equation, while they do not interpret or put little importance on these variables (e.g., Frankel 1997). Recently, Amos Jr. et al. (2012) interpreted a positive coefficient for a region dummy as a situation where two countries in the same international region have enhanced trade volume between each other. However, this article differs from previous studies in interpreting region dummies. First, the new definition, the regional border effect, is introduced to emphasize the role of regional borders, which corresponds to the border effects (McCallum 1995; Anderson and van Wincoop 2003). Next, it provides flexibility in interpreting the signs of the regional border effects. Positive or negative sign of the regional border effect has meaningful explanations. The positive or negative sign of the regional border effect shows meaningful information. A positive sign of the regional border effect means some constant factors that are not appropriately controlled in the gravity equation but may facilitate trade between countries within a region, which also suggests a possibility of natural trading partners.

Unlike political or physical borders, there is no decisive classification for identifying regional borders. Hence, our task starts by establishing a standard for defining regional borders for Asia. First, the definition of a region is examined for selection of an appropriate classification. There are many definitions of a region and some examples are as follows:

- "An area, especially part of a country or the world having definable characteristics

trade volumes are higher prior to agreement and are more proximate to each other (e.g., Panarariya 1997 and Krishna 2003).

but not always fixed boundaries"9

- "A large area of land whose politics, geography, or culture is different from other areas" ¹⁰
- "A broad geographic area distinguished by similar features" ¹¹

These definitions indicate that a region is an area in the world marked by certain common properties. This implies that the members of a region share common characteristics, different from nonmembers in another region.

Considering the definitions and implications of a region delineated above, this paper follows the U.N. Statistical Division's geographical regions in Asia with some modifications: East (Eastern) Asia, Southeast (South-Eastern) Asia, and South (Southern) Asia.¹² The nations in Southeast Asia coincide with the members of ASEAN. All countries in South Asia are also members of SAARC except the Islamic Republic of Iran.¹³ Both ASEAN and SAARC were created for economic, social, cultural development among its members, and their establishment was possible because of common social and cultural factors as well as geographical proximity. In the case of East Asia, there are great differences among China, Korea, and Japan, especially between China and Japan. However *"their civilizations have common cultural roots, and we think of them as constituent members of the same cultural province and as the most typical representatives of it"* (Geographical Association 1937, p.

⁹ Oxford Dictionaries: http://oxforddictionaries.com/definition/english/region, extracted on 3/12/13.

¹⁰ MacMillan Dictionary: http://www.macmillandictionary.com/dictionary/british/region. extracted on 3/12/13.

¹¹ http://www.merriam-webster.com/dictionary/region?show=0&t=1363068136. extracted on 3/12/13.

¹² http://unstats.un.org/unsd/methods/m49/m49regin.htm: Accessed on 3/13/2013.

¹³ Iran is excluded from the sample of this paper because of its heterogeneity among South Asian countries and a statistical distortion from the petroleum trade.

280). Moreover, the countries in East Asia have much more economic interdependence, particularly trade, than countries in other Asian regions.

The U.N. classification also meets the criteria that conceptualize regions in regional economics: homogenous regions (Amos Jr. *et al.* 2012, p. 211). In the homogenous criterion, the definition of a region is based upon common features, such as production, natural resources, culture or language (Russett 1967, as cited in Amos Jr. *et al.* 2012, p. 211). Frankel (1997, pp. 11-12) implicitly supports a testable justification on the impact of regional borders:

"Considers regionalism at two levels: both the formal regional trading arrangements that are already in effect and these broader continent-sized groupings that are under discussion. There should be an a priori presumption that the existing formal arrangements are more likely to have already had substantive economic effects than are the broader, informal groups, but the latter have also generated a lot of interest."

Therefore, this paper's regional classification is rooted in cultural, economic, geographic and social factors shared among the members in a region in Asia and this fits into the definitions of a region. Since the common components in a region are distinguished from those in other regions, regional borders can be formed, at least in Asia. The formation of ASEAN in Southeast Asia and SAARC in South Asia reiterates the applicability of the regional border categorization.

2. Trends of Regional Trade and Regional Border Trade

In this section, the general trends of the trade volume in Asia and its regions in the 1990s and the 2000s are provided, which focuses on regional trade and regional border trade.¹⁴ Figure 2 shows the trends of imports and exports by continents during the last two decades. The proportions of Europe and North America decline over time, especially at the turn of the 21st century. The imports of North America increased by 5 percent in the late 1990s but the share substantially decreased in the 2000s. The imports of Europe decreased continuously over time, but the decline being especially sharp in the early 1990s, and the recent drop looks more severe due to a series of fiscal crises in the Euro zone. The exports in North America were stable in the 1990s but reduced substantially since the beginning of the 21st century. The exports of Europe decreased overall in the 1990s, and showed a downward trend during the 2000s except in the early years of the period.

In Figure 2, the most distinctive fact is the rise of Asia. Its share in the world imports was approximately 23 percent in 1991 and increased to 27 percent in 2006.





Source: WTO Statistical Database.

¹⁴ The data used in this section are drawn from the WTO Statistical Database: http://wits.worldbank.org/wits.

The proportion surpassed 30 percent in 2010 and reached 32 percent in 2011. The share of Asia in world exports grew steadily over time. It went beyond 30 percent from 2009, and recently showed 33 percent. Thus, the role of Asia has become more important in world trade.

Figure 3 compares the shares of regional trade in each region and crossregional border trade in Asia over time. In Figure 3, "SE" stands for Southeast Asia, "E" for East Asia, "O" for Oceania and "S" for South Asia. Oceania is included here because WTO data regards Oceania as a part of Asia, which will be corrected in the later sections. "SE to SE" represents regional trade within Southeast Asia, which indicates import flows between Southeast Asian countries.¹⁵

In the total trade of Asia, the portion of Southeast Asian regional trade gradually decreased between 1991 and 2011, from 11 to 10 percent in exports and from



Note: RBT stands for regional border trade. Source: WTO Statistical Database.

¹⁵ Regional trade is trade between countries in an Asian region. It does not represent intra-regional trade of FTAs or trading blocs.

13 to 9 percent in imports. The shares of East Asia's regional imports and exports were 24 and 27 percent, respectively in 1991, while these numbers suddenly jumped up to 44 and 43 percent respectively in 1993. The shares of East Asia have not changed much over time: 42 percent in 1993 and 43 percent in 2011. The shares of regional trade for Oceania and South Asia are trivial in terms of total trade in Asia.

Regional border trade, which means trade across regions, occupies the remaining shares. The share of regional border trade reached over 60 percent at the turn of the 20th century while it plummeted to almost 40 percent in the 2000s. In the case of imports, the share was the lowest of 42 percent in 2003, and then recovered to 48 percent in 2011. Regional border exports were 58 percent in 1991, steadily decreased to 40 percent in 2004, and recently increased to 46 percent in 2011. In short, in the last two decades, regional trade in Southeast Asia is constant, its importance of East Asia increased from the early 1990s, and its share in South Asia appears trivial.

Figures 4, 5 and 6 present the trends of regional trade and regional border trade in the three regions of Asia: South, Southeast and East Asia. Since imports and exports show the same pattern, only imports are provided for simplicity. Figure 4 shows that South Asia's major trade partner is East Asia. The shares of its trade are 60 percent with East Asia and 30 percent with Southeast Asia, respectively, indicating that South Asia's regional trade is just 10 percent. Figure 5 gives Southeast Asia's proportion in total Asian trade across the regions over time. Southeast Asia's major trade partner is East Asia with the figure of 50 percent. In 1991, Southeast Asia's regional trade was about 30 percent and increased to 40 percent in 1998. Although there were fluctuations over time, the proportions of Southeast Asia's regional border trade stayed constant. Figure 6 illustrates the



Figure 4. Trends of Regional Trade and Regional Border Trade in South Asia

Note: Regional indicates regional trade between countries in South Asia. Source: WTO Statistical Database.



Figure 5. Trends of Regional Trade and Regional Border Trade in Southeast Asia

Note: Regional indicates regional trade between Southeast Asian countries. Source: WTO Statistical Database.



Figure 6. Trends of Regional Trade and Regional Border Trade in East Asia

trends of the regional trade and regional border trade for East Asia. The proportion of East Asia is constant over time except the period between 1991 and 1993. The proportion of South Asia was 40 percent in 1991 but suddenly dropped to 25 percent in two years. After 1993, the proportions are almost the same in the remaining period: the share of Southeast Asia is 25 percent and that of South Asia less than 5 percent, respectively. Hence, East Asian countries' main trade partners with Asia are themselves.

Overall, it is clear that the importance of Asian trade has risen in the world. In the Asian context, the regional border trade is the largest (50 percent), followed by regional trade of East Asia (40 percent) and that of Southeast Asia (10 percent). The proportion of regional trade in South Asia is negligible with less than 1 percent in the total Asian trade. The trends of regional trade and regional border trade in each Asian region imply that East Asian countries heavily rely on them-

Note: Regional indicates regional trade between East Asian countries. Source: WTO Statistical Database.

selves, while the countries in South Asia mainly depend on trade with other regions in Asia.

However, other factors such as economic, social, and cultural components can possibly disguise the pattern of regional trade in Asia. For example, the size of an economy is directly related to trade volume and this factor may distort actual trends of regional trade and regional border trade. Therefore, in the following sections a gravity model is adopted to incorporate the above factors to analyze trade patterns regarding regional borders in Asia.

III. Empirical Works

1. The Gravity Model of Asian Trade

A standard gravity model is augmented with indicator variables for the three Asian regions to capture the effects of regional borders on Asian trade. Since the sample for this study covers Asian countries excluding Central and Middle-East areas to prevent a statistical distortion from the petroleum trade, three dummy variables (East, South, and Southeast) are considered, following the U.N. geo-graphical classification.¹⁶ Here, the dummy for a region (e.g., East Asia) equals unity when trade is between two countries in the same region (two East Asian countries) and zero otherwise.

The gravity equation to be estimated is given by

$$\ln M_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln d_{ij} + \beta_4 l_{ij} + \beta_5 c_{ij} + \sum \theta^k r_{ij}^k + \varepsilon_{ijt} , \qquad (1)$$

where ln M_{ijt} is the log of imports from country *j* to country *i* for year *t* as a dependent variable.¹⁷ Imports depend on the GDPs of importing and exporting countries, Y_{it} and Y_{jt} . d_{ij} is the distance between the capitals of countries *i* and *j*, which proxies transportation costs for trade between the two countries. l_{ij} is a

¹⁶ See http://unstats.un.org/unsd/methods/m49/m49regin.htm (accessed on 3/13/2013).

¹⁷ The dependent variable is the logarithm of imports, instead of trade volume (sum of imports and exports) or exports. This paper estimates all three cases and the results are not different. Thus the case of imports are reported because of the accuracy of data and simplicity.

dummy variable defined as unity when any two countries speak a common language and zero otherwise. c_{ij} indicates whether any two countries share a common border. r_{ij}^k are the key variables of this paper's interest, which tests for the regional border effects on trade. They indicate whether country *i* and its trading partner *j* belong to the same region *k*: East, South, and Southeast Asia. For example, the variable for East Asia equals unity when trade occurs between any two East Asian countries and zero otherwise. Hence, "region dummies" for the three Asian regions can capture the impact on trade flows of regional borders.

Although r_{ij}^{k} looks similar to intra-regional trade effect in current literature, it is named the regional border effect because the intra-regional trade effect sometimes refers to the effect caused by a multilateral FTA or an economic union among several countries as in Elliott and Ikemoto (2004) while the regional border effect captures the difference between intra-trade within a geographical region (i.e., regional trade) and inter-regional trade across the regions (i.e., regional border trade). Here, r_{ij}^{k} , where superscript k is East Asia, shows whether trade between East Asian countries is larger or smaller than trade between East Asian countries and countries in other two regions. In other words, it captures any factors promoting or impeding trade between East Asian countries.

Next, equation (1) is modified by adding a variable that indicates whether a regional trade agreement (RTA) between the two countries is in force as follows:

$$\ln M_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln d_{ij} + \beta_4 l_{ij} + \beta_5 c_{ij} + \beta_6 a_{ijt} + \sum_{ijt} \theta^k r_{ij}^k + \varepsilon_{ijt}$$
(2)

where a_{ijt} takes the value of unity if there is an RTA between countries *i* and *j* in year *t* and zero otherwise. Equation (2) is augmented with the interaction terms

of regional (r_{ij}^{k}) and RTA dummies (a_{ijt}) as well as a cross-region RTA dummy, which equals unity if RTAs are made between countries in different regions. Finally, a_{ijt} is replaced with individual RTA dummies to test for whether there exist any changes in the estimates on regional border effects. This may test how the estimates from equation (1) are sensitive to additional variables.

In order to estimate equations (1) and (2), the data are collected on bilateral imports from the U.N. COMTRADE and GDP data from World Bank.¹⁸ The geographic data, which are *d*, *l* and *c*, are taken from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII).¹⁹ The RTA variable is constructed by using "the Regional Trade Agreement Information System" on the website of the World Trade Organization (WTO), and Table 1 lists all RTAs in force among Asia countries as of 2012.

As previously mentioned, both home and partner countries in the sample are limited to the three regions in Asia: East, South, and Southeast Asia. The dataset covers 12 years from 1990 through 2011. Table 2 presents the definitions and descriptive statistics of the variables employed in this study.

In order to deal with unobserved country heterogeneities, the following alternatives are considered. First, a set of country-pair fixed effects is included into the standard gravity model to control for country-pair characteristics that are specific to each country pair but constant over time. Another way to address the problem is to incorporate a set of country-specific fixed effects for both home and destination countries. These controls absorb any time invariant countryspecific factors that influence bilateral trade flows between two countries. In this

¹⁸ Trade flow data are extracted from The World Integrated Trade Solution (WITS, wits.worldbank.org/ wits) and GDP data are collected from the World Bank (http://data.worldbank.org)

¹⁹ They are available at http://www.cepii.fr/anglaisgraph/bdd/gravity.asp.

Abbreviation	In force	Member countries (year joined)	Туре
AFTA [*]	1992	Brunei, Indonesia, Malaysia, Philippines,	FTA
		Singapore, Thailand (1992); Vietnam (1995);	
		Lao PDR and Myanmar (1997); Cambodia (1999)	
APTA	2002	China (2002)	PSA
(2002 Accession of	China) [»]		
SAFTA [™]	2006	Bangladesh, Bhutan, India, Maldives,	FTA
		Nepal, Pakistan, Sri Lanka	
SAPTA [#]	1995	Bangladesh, Bhutan, India, Maldives,	PSA
		Nepal, Pakistan, Sri Lanka	
chasean	2005	ASEAN - China	EIA, PSA
indasean	2010	ASEAN - India	FTA
japasean	2008	ASEAN - Japan	FTA
krasean	2010	ASEAN - Korea	FTA, EIA
chhk	2003	China - Hong Kong	FTA, EIA
chmaca	2003	China - Macao	FTA, EIA
chpaki	2007	China - Pakistan	FTA, EIA
chsing	2009	China - Singapore	FTA, EIA
indjap	2011	India - Japan	FTA, EIA
indkr	2010	India - Korea	FTA, EIA
indmal	2011	India - Malaysia	FTA, EIA
indsing	2005	India - Singapore	FTA, EIA
indsri	2001	India - Sri Lanka	FTA
japbrun	2008	Japan - Brunei	FTA, EIA
japidne	2008	Japan - Indonesia	FTA, EIA
japmal	2006	Japan - Malaysia	FTA, EIA
japphi	2008	Japan - Philippines	FTA, EIA
japsing	2002	Japan - Singapore	FTA, EIA
japthai	2007	Japan - Thailand	FTA, EIA
japvnm	2009	Japan - Vietnam	FTA, EIA
krsing	2006	Korea - Singapore	FTA, EIA
malpaki	2008	Malaysia - Pakistan	FTA, EIA
sripaki	2005	Sri Lanka - Pakistan	FTA

Table 1. RTAs in Force in Asia (as of Sep. 1, 2012)

Notes: - Partial scope agreement (PSA) is trade agreement covering only certain products. Economic Integration Agreement (EIA) is any type of RTA (free trade area, common market, bilateral, or multilateral trade agreement) covering services (Marchetti 2011).

- "The Association of Southeast Asian Nations (ASEAN) Free Trade Area; "The Asian Pacific Trade Agreement (Bangkok Agreement); "Bangladesh, India, Korea, Lao PDR, Sri Lanka, Nepal, Philippines (1975); "South Asian Free Trade Agreement; "SAARC Preferential Trade Arrangement."

- The above table does not include the following RTAs: India - Afghanistan (PSA), India - Bhutan (FTA), India - Nepal (FTA), and Thailand - Lao PDR (PSA).

Source: http://rtais.wto.org/UserGuide/RTAIS_USER_GUIDE_EN.html (accessed on October 13, 2012).

	Definition	Obs.	mean	Std.Err	Min	Max
$\ln M_{ijt}$	Log of imports to <i>i</i> from <i>j</i>	5084	18.682	3.731	3.784	26.119
$\ln Y_{it}$	Log of GDP in home <i>i</i>	5084	12.689	4.258	7.837	26.354
$\ln Y_{jt}$	Log of GDP in partner <i>j</i>	5084	12.275	3.981	6.763	29.621
$\ln d_{ij}$	Log of distance between <i>i</i> and <i>j</i>	5084	7.831	.646	4.107	8.833
l_{ij}	Takes one if <i>i</i> and <i>j</i> speak common language, zero otherwise	5084	.131	.348	0	1
C _{ij}	Takes one if <i>i</i> and <i>j</i> share a common border, zero otherwise	5084	.101	.302	0	1
r_{ij}^k	Takes one if both <i>i</i> and <i>j</i> belong to the same region <i>k</i> , zero otherwise	-	-	-	-	-
	k =East Asia	5084	.067	.251	0	1
	k =South Asia	5084	.041	.197	0	1
	k =Southeast Asia	5084	.221	.415	0	1
a _{ijt}	Takes one if any RTA between <i>i</i> and <i>j</i> is in force for year <i>t</i> , zero otherwise	5084	.217	.412	0	1

Table 2. Descriptive Statistics

study, the model with origin and destination country-specific fixed effects is adopted because country-pair fixed effects unavoidably result in drops of the three region dummies and other time-invariant variables.

2. Estimation Results

Table 3 presents the results of the estimation of equation (1). In both columns, the terms for home and partner countries and year fixed effects are included to control for unobserved country and year-specific heterogeneity. In column (1), the gravity variables are added, while the regional border dummies (r_{ij}^{k}) are dropped. The results from this traditional gravity model show the coefficients on GDPs to be significantly positive, suggesting the size of economies matters in trade, and the negative relationship between distance and trade. As expected, the estimates on common borders (c_{ij}) and language (l_{ij}) are positive and significant at the 1 percent level.

Table 3. Regional Bor	der Effects in the Gravity	Model
Variable	(1)	(2)
$\ln \gamma$.942***	.944***
III I it	(.089)	(.088)
$\ln Y_{ii}$.781	.787
Jt	(.084)	(.083)
$\ln d_{ii}$	767	531
.,	(.034)	(.045)
l_{ii}	.451	.461
,	(.US8) 054 ^{***}	(.U59) 272****
C _{ij}	.554 (072)	.//3 (07/l)
	(.072)	- 167 [*]
East		(.092)
Constl		1.843****
South		(.107)
Southoast		.465****
Southeast		(.083)
Regional border effect-East		-1.182
Regional border effect-South		6.315
Regional border effect-Southeast		1.592
Regional border effect-Average		2.282
Adjusted R ²	.875	.882
Observations	5084	5084

Notes: - Robust standard errors are in parentheses.

- ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

- Columns (1) and (2) include fixed effects for home and partner countries and year.

- Regional border effects are computed as the exponent of the (absolute value of the) coefficients on the region dummies in column (2).

 Average regional border effect is computed as the geometric mean of the regional border effects in column (2). In column (2), the traditional gravity model is augmented with the three regional dummies, which are East, South, and Southeast, to find the regional border effects in Asia. Column (2) shows that there is little difference from the coefficients of the gravity variables in column (1) in terms of their sign and magnitude. The coefficient of East is estimated to be negative although it is only marginally significant, implying that its regional trade, which is trade between East Asian countries, is smaller than its regional border trade. The estimate on South is 1.84, which is the highest among the regional border effects. By taking the exponent of the estimates on regional border dummies, the regional border effects are calculated as in Table 3. The estimate for South Asia's regional border trade during the period. Likewise, the coefficient of Southeast Asia is estimated to be significantly positive at the 1% level, suggesting that regional trade in Southeast Asia is 1.6 times larger than its regional border trade.

As a result, it is estimated that the effects of regional borders are asymmetric on the three regions in Asia after controlling for gravity variables between countries and unobserved home and partner country's heterogeneities. In short, the regional border effect is the largest on South Asia, followed by Southeast and East. This contradicts the trends shown in Section 3. Figures 6 shows that East Asian countries' main trade partners are themselves and Figures 4 and 5 display that South and Southeast Asian countries also trade mainly with East Asian countries. Figure 4 shows that the regional border trade of South Asia with East Asia reaches approximately 60 percent in its total trade while trade within its region stays only at 10 percent. Figure 5 indicates that Southeast Asia trades 55 percent and 45 percent with East Asian and South Asian countries, respectively. On the other hand, Figure 6 points out that regional trade between countries within East Asia represents more than 70 percent of its total trade.

It can be inferred why the empirical results in column (2) of Table 3 give totally different pictures from the stylized facts in Figures 4 through 6. In South Asian countries, there may exist some similarities in promoting trade flows within this region, but at the same time, the small sizes of the economies and other heterogeneities impede trade between countries within the region. The large magnitude of the estimate on South Asia implies some intrinsic factors facilitating regional trade between countries in South Asia, which can provide incentives to form a regional cooperation bloc such as SAARC. In Southeast Asia, the effect of its regional border is not as strong as in South Asia. The small and negative impact of regional borders in East Asia suggests that some factors like the large economic sizes of its member countries lead to active trade within the region.

Table 4 shows the results of estimating equation (2), which includes RTA variables. In the first three columns the RTA variable is defined as FTAs only while in the last column it includes both FTAs and PSAs (Partial Scope Agreements: trade agreements covering only certain products). PSAs are included to check the robustness of the regional border effects. East RTA is a dummy indicating regional trade agreements between East Asian countries. South and South-East RTAs are defined in the same way. Cross-region RTA means RTAs between countries in different regions with each other. In column (1) the coefficient of RTA is estimated to be significantly positive, implying FTAs increase trade among their member countries by 50 percent. When PSAs are added into the RTA variable in column (4), the effect of RTAs is still positive, but becomes smaller as a natural result.

In columns (2) and (3) of Table 4, the RTA variable (limited to FTAs) is divided by region. Although it is estimated that the effect of the RTA within East

Variable		FTA only		PSA included
variable	(1)	(2)	(3)	(4)
$\ln Y$.992***	.942***	1.009***	.961***
III I it	(.087)	(.089)	(.087)	(.088)
$\ln \gamma_{\rm e}$.789***	.771***	.813***	.764***
jt	(.083)	(.085)	(.083)	(.085)
ln <i>d</i>	541***	535	546	533***
ij	(.044)	(.046)	(.044)	(.045)
1	.462	.457	.461	.452
- 1)	(.058)	(.059)	(.059)	(.059)
C	.752	.765	.747	.759
IJ	(.074)	(.076)	(.076)	(.075)
Fast	156	183	155	140
Edot	(.091)	(.092)	(.093)	(.093)
South	1.682	1.729	1.682	1.755
Coun	(.110)	(.127)	(.126)	(.111)
Southeast	.159	.342	.384	.336
	(.108)	(.181)	(.181)	(.102)
RTA	.403			.168
	(.087)	F04***	F0.4***	(.066)
East RTA		.561	.564	
		(.128)	(.123)	
South RTA		.328	.3/9	
		(.194)	(.192)	
Southeast RTA		.138	.169	
		(.177)	(.1/8) E01***	
Cross-region RTA			.531	
	000	000	(.112)	000
Adjusted K ²	.883	.882	.883	.882
Observations	5084	5084	5084	5084

Table 4. Regional Border and RTA Effects

Notes: - Robust standard errors are in parentheses.

- ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

- All specifications include fixed effects for home and partner countries and year.

Asia is larger, this result is not very informative because the RTA in the region indicates the China-Hong Kong FTA, which is a special case. Setting East Asia apart from our consideration, as seen in column (3), FTAs between countries within the same regions have a smaller effect on bilateral trade than cross-regional FTAs. More exactly, the effects of inter-regional FTAs are 24 to 70 percent larger

than the effects of intra-regional FTAs.

In all the columns of Table 4, the evidence on the regional border effects is consistent with column (2) of Table 3. The regional border effect is the largest on South Asia, followed by Southeast and East Asia, which shows that the regional borders apparently have an asymmetric impact on regional trade in Asia and this finding remains robust to the inclusion of individual RTAs.²⁰

²⁰ See the appendix.

IV. Conclusion

This paper investigates the relationship between regional borders and trade flows in Asia. The regional border effect captures any factors facilitating trade between countries within a region. The key finding is that there is a large and significant regional border effect in South Asia but small in Southeast Asia and negligibly negative in East Asia.

The significant regional border effect in South Asia suggests that countries in this region shares common properties that naturally promote regional trade. Nevertheless, in reality, the data show that their trade is restricted by some artificial factors. One example is a remarkably low level of trade openness between countries in this region, for instance, shown by many exceptions of tariff concession in SAFTA. Accordingly, it is recommended that South Asian nations make more efforts to eliminate trade and non-trade barriers within the region. By doing so, they can intensify regional integration in South Asia and concomitantly join the path of economic integration with other Asian regions and the rest of the world.

The regional border effect of East Asia has implications for the Korea-China-Japan FTA that is currently being discussed. The empirical evidence shows that larger regional trade in East Asia mainly depends on economic size and other determinants, implying that few inherent factors support East Asian countries' regional trade. Hence, it is likely that the flows of their regional trade after the FTA are largely affected by economic factors such as comparative advantages between them or coverage of tariff concessions, rather than by other noneconomic influences. Lastly, a drawback should be mentioned. The regional border effects of South and Southeast Asia overlap the effects of ASEAN and SAARC because ASEAN and SAARC were established in 1967 and 1985, respectively wherein the data in this research starts from 1990. However, these effects are subject to evaluation with the data before and after their implementations, which were already studied (e.g., Magee 2008). Viewing this matter from a different angle, the reason to create ASEAN or SAARC could lie with some factors in related to regional borders.

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Appendix

Wi with i	thout Korea ndividual A	a/Japan FT/ ASEAN cour	As ntries		All FTAs i	n Asia	
$\ln Y_{it}$.976 ^{***} (.088)	chpaki	.284 [*] (.166)	$\ln Y_{it}$.976 ^{***} (.087)	chpaki	.240 (.165)
$\ln Y_{jt}$.788 ^{****} (.084)	indjap	.191 (.347)	$\ln Y_{jt}$.754 ^{****} (.085)	indjap	.169 (.320)
$\ln d_{ij}$	544 ^{***} (.045)	indkr	1.098 ^{***} (.232)	$\ln d_{ij}$	545 ^{***} (.045)	indkr	1.108 ^{***} (.223)
l_{ij}	.458 ^{***} (.059)	malpaki	1.273 ^{***} (.310)	l_{ij}	.452 ^{***} (.060)	indsri	1.480 ^{***} (.167)
C_{ij}	.761 ^{***} (.076)	indsing	.434 ^{**} (.181)	${\cal C}_{ij}$.815 ^{****} (.077)	japbrun	3.744 ^{***} (.269)
East	201 ^{**} (.094)			East	213 ^{**} (.094)	japidne	017 (.188)
South	1.824 (.119)			South	1.694 (.123)	japphi	.065 (.197)
Southeast	.391 (.181)			Southeast	.359 (.181)	japthai	.125 (.153)
afta	.164 (.177)			afta	.172 (.177)	japvnm	.180 (.349)
safta	.116 (.207)			safta	366 (.212)	malpaki	1.226 (.309)
indasean	1.302 (.242)			indasean	1.319 (.242)	sripaki	1.235 (.198)
japasean	.508 (.183)			japasean	.395 (.192)	indsing	.405 (.181)
krasean	.374 (.253)			krasean	.419 (.282)	japsing	969 (.143)
chhk	.565 (.125)			chhk	.553 (.124)	krsing	431 (.259)
Adjusted R ²		.883		Adjusted R2		.884	
Ubservations		5084		Ubservations		5084	

Table A1. Regional Border and Individual FTA Effects

Notes: - Robust standard errors are in parentheses.

- ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.
- All specifications include fixed effects for home and partner countries and year.

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국문요약

본 논문은 아시아의 각 지역간 교역에 관한 연구로, 이를 위해 '지역간 국경무역 (regional border trade)'이라는 개념을 도입한다. 지역간 국경무역이란 한 지역에 속한 국가와 다른 지역에 속한 국가 간의 교역을 의미한다. 예를 들면 동아시아에 속해 있 는 한국과 남아시아에 속해 있는 인도와의 교역이 이에 해당된다. 본 연구에서는 아시 아 주요 3개 지역인 동아시아, 동남아시아, 남아시아의 지역국경효과(regional border effect)를 분석한다. 지역국경효과가 양(+)의 부호를 보이면 지역 내 국가간 교역을 촉 진시키는 고유한 요소들이 존재함을 보여준다. 본 연구는 중력모형을 기반으로 각 지 역의 국경효과를 추정한다. 본 연구의 주요 결과는 아시아에서 지역국경효과가 비대 칭적으로 나타난다는 것이다. 남아시아의 값이 가장 크고 양(+)의 값을 가지는 반면, 동남아시아는 지역국경효과는 거의 없으며, 동아시아는 지역국경효과가 음(-)의 추정 계수를 취한다. 가장 큰 규모의 양(+)의 부호를 가지는 남아시아의 지역국경효과는 남 아시아 국가간 교역을 촉진시키는 고유의 요소들의 영향이 크다는 것을 의미한다. 동 남아시아의 경우, 지역 내와 지역 간 교역이 별반 차이가 없음을 나타내며, 동아시아 가 가지는 음(-)의 추정계수는 동아시아와 동남아시아 또는 남아시아 국가 사이에 지 역국경교역이 동아시아 내 교역보다 활발히 이루어짐을 의미한다.

핵심용어: 국경효과, 지역국경, 자연적 교역상대국, 중력모형

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AIMS and SCOPE

The Journal of East Asian Economic Integration is an economic journal, for the promotion of interdisciplinary research on international economics. Published as a quarterly by the Korea Institute for International Economic Policy (KIEP), a Korean governmentfunded economic think-tank, the journal is global in perspective and covers both theory and empirical research.

TOPICS COVERED

The Journal of East Asian Economic Integration brings together articles from many different realms of economics at both regional and global levels. Trade, investment, finance, and regional studies, in which relevant to East Asian Economic Integration, are a major focus. Specific areas of interest include, but are not limited to:

- Trade and Investment Issues Economic Integration
- APEC ASEAN ASEM International Finance
- Liberalization of Financial Services and Capital
- International Cooperation for Korean Unification

NOTES FOR CONTRIBUTORS

SUBMISSION GUIDELINE :

Refer to our website http://www.jeai.org.

SUBMISSION DEADLINE :

The journal is published every March, June, September and December of each year and submissions are accepted for review on an ongoing basis (no specific deadline).

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The Journal of East Asian Economic Integration Award is given annually to articles that have made exemplary contributions to advance the public as well as academic understanding of international economics. Every article published in the journal is given a contribution award of KRW 2,500,000; and annual nominations for the outstanding and noteworthy articles include KRW 5,000,000 prize and a detailed one-to two-page nomination statement describing how the selected papers have contributed to the knowledge of international economics.



Regional Borders and Trade in Asia

Woong Lee and Chankwon Bae

This paper investigates the effect of regional borders on trade in Asia. The regional borders define the three regions of Asia: South, Southeast, and East Asia. Regional trade indicates the flows of trade within a region, whereas regional border trade means trade across regions. A gravity model is augmented with the region dummies to estimate the regional border effects that capture any and all time-invariant factors promoting or impeding regional trade. The main finding is that regional border effects are asymmetric on the three regions in Asia. There is a large and significant regional border effect on South Asia, small on Southeast Asia, and negligibly negative on East Asia. The significant and positive regional border effect in South Asia suggests that countries share intrinsic factors facilitating trade between the countries in this region. Although the regional border effect of Southeast Asia is positive, its magnitude shows little difference between its regional trade and regional border trade. Finally, the estimate on East Asia presents a completely different picture from the actual data. It implies that there exist some factors leading to active regional border trade between East Asia and other Asian regions.

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