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Trade integration in Asia: Trends and determinants

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Abstract. While economic nationalism is mounting over the globalization around the western world in recent years, Asia's external trade and the economies overall is growing faster than in other regions shifting the center of gravity of the world economy from the West to the East. However, it is unclear how Asian economies are integrating within the region. Using the dynamic panel data approach, particularly the generalized method of moments (GMM) estimator, on the cross-country panel data of 34 Asian countries for the period of 1990-2015 this study examines the trend and the determinants of regional trade integration in Asia. The results show fast-growing intra-regional and overall trade for most of the countries in the region. It also finds a significant positive effect of economy's size and access to mobile phone on the total trade and intra-regional trade volume. Similarly, mobile phone concentration and urbanization rates have a significant positive effect on both intra-Asian trade volume and its share in the total trade. However, the size of an economy has no significant effect on intra-regional trade share. The finding suggests that further liberalization of trade together with policies boosting domestic/regional demand are helpful for broader regional integration in Asia.

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1. INTRODUCTION

As Asia is the biggest continent possessing high degree of social, economic and political diversity, regional integration here seems to be very challenging. However, Asian economy is growing faster than other regions and Asia wide comprehensive economic integration efforts are increasing in the recent years (Wignaraja, 2014). Although backlash against globalization, especially in Europe and the United States of America, is increasing recently (Kobrin, 2017), openness in Asia is only moving forward rapidly (Pengestu & Armstrong, 2018; Sapkota, 2011), demonstrating some progress in regional integration at the sub-regional level and more debate, discussion, and dialogue at broader regional level. We also witness Trans Pacific Partnership agreement with Asia being in its heart, even though it is unlikely to come into effect soon due to the policy shift by the new administration of the United States (Narine, 2018). However, efforts to make Asian integration more comprehensive would continue, if not increase, because Asian trade and investment volumes are increasing rapidly, while all involved countries are reducing trade and other barriers (Kimura & Obashi, 2016). Using panel data on all Asian countries (including the Pacific and Oceania, even though the data is limited on them) from 1990 to 2015, this article examines trends and determinants of total and intra-regional trade, and argues that the relative importance of the global market outside the region is increasing, hence, it is important to boost regional demand and improve economic cooperation among the nations within the region.

Liberalization of trade and investment regimes, unilateral as well as plurilateral, in many Asian countries at various times and levels (Rai, 2010) has contributed to rapid growth of trade in Asia, especially since the 1990s. The integration process is also driven by the production fragmentation across countries (Obashi & Kimura, 2017). Unfortunately, Asian regional integration remains largely market-driven (Krapohl & Fink, 2013) unlike the western world where regional integration is strongly institutionalized, such as in the European Union. However, an effective regional institution is essentially important for better regional cooperation and governance in solving regional problems and managing different unforeseen crises (Pengestu & Armstrong, 2018; Intal, 2018), thus making stronger impact on global rulemaking and other processes related to globalization. So far, Asian economic integration followed the “flying geese pattern,” which means capital, technologies and know-hows moved from more developed to less developed nations (Kumar, 2017). Nevertheless, policy-driven regional integration is becoming more visible after the Asian financial crisis (1997/98) in different forms of bilateral free trade agreements (FTAs) and regional trade agreements (RTAs) at the sub-regional level that proliferate within and outside Asia. Currently, every country is engaging in FTAs or sub-regional RTAs, however, these agreements are very different from each other, in terms of the scope, coverage, and commitments. Kawai and Wignaraja argued that multiple trade agreements can be detrimental to increasing trade due to the “spaghetti bowl effect” which refers to the problems likely due to the many rules of origin of a product and other complexities caused by involving many FTAs (Kawai & Wignaraja, 2009). As the fundamental trade theory suggests and also various studies revealed, broader and deeper economic cooperation covering whole or most of Asia would generate tremendous gains (Urata, 2013). Thus, the main question is what are the major determinants of total and intra-regional trade in Asia?

Therefore, we aim to uncover the critical determinants of trade integration in broader Asia which is useful for policymakers focusing their efforts on rapid progress in regional economic integration in Asia. To do so, we use the dynamic panel data method, mainly the generalized method of moments (GMM)

estimator, on the cross-country panel data of 34 Asian countries (including five Pacific and two Oceanian countries) for the period of 1990-2015. The data has been taken from the Asian Regional Integration Center (ARIC) of the Asian Development Bank (ADB) and the World Development Indicators of the World Bank. It is expected to find a significant positive effect of the economy's size, the level of economic development, urbanization rate, participation in intra-regional FTAs/RTAs, and penetration of information and communication technology (ICT) on the fast-growing total trade and intra-regional trade volumes in Asian countries.

2. TRENDS OF INTERNATIONAL TRADE IN ASIA

In this article, Asia is defined broadly, following the definition and coverage of the Asian Development Bank, to include East to West Asia, North to South Asia, and the countries of Oceania, including Australia, New Zealand, and the Pacific island countries. We have included in our analysis all the countries in the ADB database for which data is sufficiently available. Appendix 1 lists the countries in Asia by sub-regional grouping, with the 34 countries covered in this study underlined. Due to the great diversity across Asia, which accounts for more than 30 percent of global terrestrial surface and more than 60 percent of global population (Population, 2015), the broader Asia-wide regional integration process has not yet been institutionalized. Some regional integration institutions exist at the sub-regional level, such as the Association of South East Asian Nations (ASEAN) and the South Asian Association for Regional Cooperation (SAARC), but they are progressing too slowly to create a promising environment for all stakeholders, including the regional economic powers, to markedly institutionalize the broader Asian integration process.

However, market-led regional integration, as reflected in trade and investment, has been moving forward rapidly since the end of the cold war in 1990 (Das, 2005). Figure 1 shows that Asia's trade rose from US\$1.5 trillion in 1990 to a peak of nearly US\$13 trillion in 2014, before dropping to US\$11.7 trillion in 2015. Similarly, the share of intra-Asian trade also rose, from 45.7 percent to 57.1 percent during the same period. This growing intra-Asian trade is fueled by many Asian countries' rapid progress towards a highly diversified industrial base (Clark, Lima & Sawyer, 2017), fast-growing production networks within the region (Das, Sen, & Srivastava, 2016; Athukorala & Yamashita, 2006), and increasing trading capacity (ESCAP, 2013).

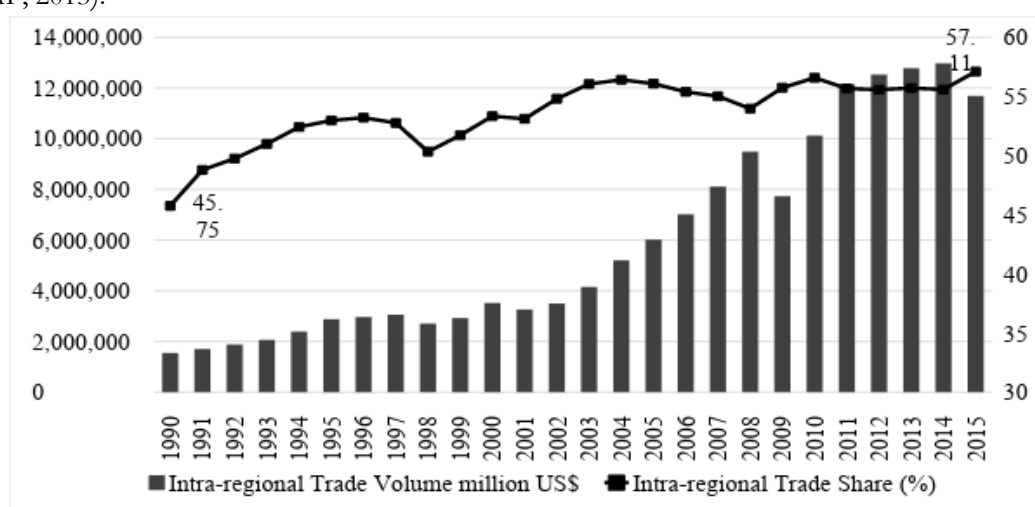


Figure 1. Trends in intra-Asian trade volume and intra-Asian trade share, 1990–2015

Source: authors' calculations using ADB Regional Integration Indicator database.

The database was retrieved from: <http://aric.adb.org/integrationindicators> (21.05.2017)

Figure 2 shows trends in total trade for the top five Asian economies and the other 29 selected Asian economies (summed). China has grown most rapidly, surpassing Japan in 2004 and progressing even faster since then. Other economies have grown continuously, except in 2009 and 2015. While the global financial crisis in 2007–08 caused 2009's sharp drop in trade, Lewis and Monarch have pointed out structural factors, such as a reversal in the speed of trade openness and the slowing of supply chain fragmentation, as causes of the recent decline in both global and Asian trade (Lewis & Monarch, 2016). However, the causes of the recent trade slowdown are not as clear as those of 2008/09 (*ibid*).

On the other hand, Hong, Lee, Liao and Senerviratne (2017) argue that the major cause of the recent global and Asian trade slowdown has been weakness in China's imports. They have also estimated the spillover effects from a rebalancing of demand in China and pointed out the negative impacts on neighbouring and other countries (*ibid*).

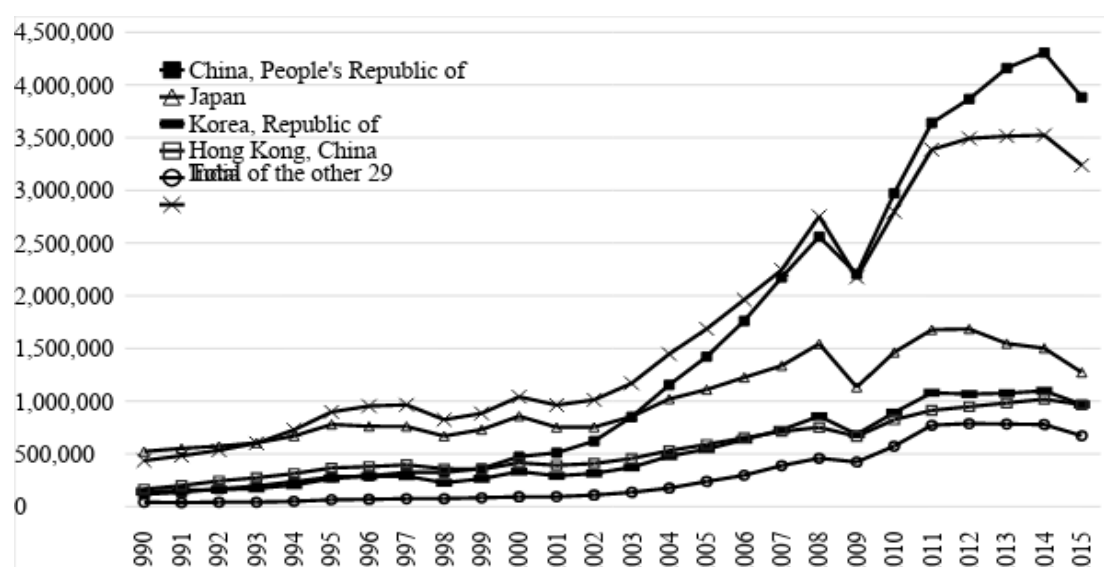


Figure 2. Trends in total trade volume for the top five and 29 other selected Asian economies, US\$ million, 1990–2015.

Source: authors' calculations using ADB Regional Integration Indicator database.

The database was retrieved from: <http://aric.adb.org/integrationindicators> (21.05.2017)

Although both global and intra-regional trade are increasing in Asia, it is interesting to observe the relative importance of intra-regional vis-à-vis global trade in the region. The intra-regional trade intensity index (TII) is useful for this purpose. As defined on the Asian Regional Integration Center (ARIC) website, the intra-regional trade intensity index is the ratio of intra-regional trade share to the share of world trade with the region (ARIC, nd).

Figure 3 shows declining intra-regional TII, from 2.03 in 1990 to 1.63 in 2015, indicating that the outside world is becoming more important to Asian countries in terms of trade than the Asian region. Although the decline was sharp in 1992–93 and then gradually rose until 2003, it resumed declining sharply after 2003. This might be due to global trade growing faster than regional trade integration. Although a TII value of greater than 1.0 means that intra-regional trade is more important than global trade in Asia, such a declining trend clearly indicates huge challenges for the Asian integration process in the future.

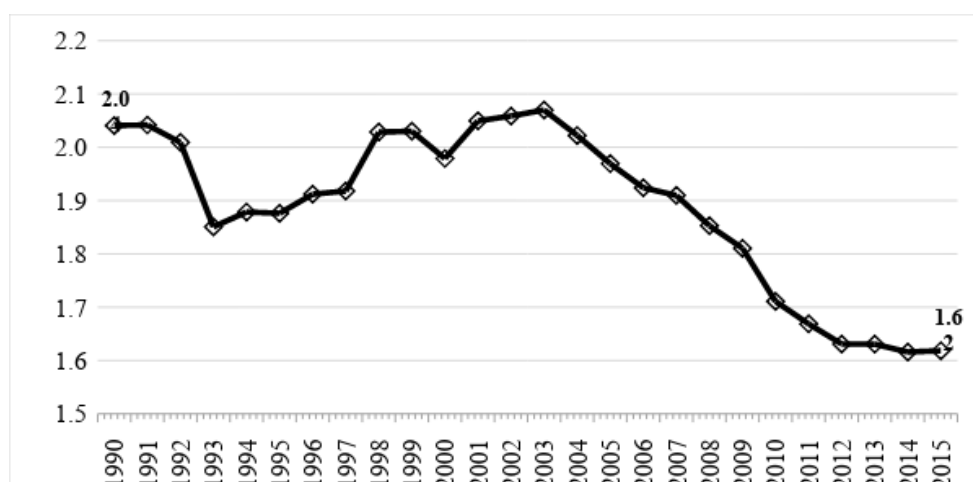


Figure 3. Trends in the intra-regional trade intensity index (TII) of Asia, 1990–2015

Source: authors' calculations using ADB Regional Integration Indicator database.

The database was retrieved from: <http://aric.adb.org/integrationindicators> (21.05.2017)

Existing studies of the TII of Asian sub-regions reveal that the relative importance of trade within each of the sub-regions is greater than that of trade with the world (Sapkota & Shuto, 2016), even though the TII trends are declining for each of the regions. The authors also found TII to be greater than 1.0 for each sub-region versus trade with all of Asia. Therefore, we argue that overall Asian economic integration is desirable, as many empirical assessments also show significant benefits from such integration (Wignaraja, Morgan, Plummer & Zhai, 2015). For these reasons, the main determinants of 21st-century Asian economic integration are an important subject of exploration.

3. METHODOLOGY

3.1 The data

We used the annual data of 34 Asian countries for the period 1990–2015 taken from two online databases: the ADB-ARIC Integration Indicators (ARIC, nd) and the World Development Indicators (WDI) (World Bank, nd). We consider intra-Asian trade volume and the ratio of intra-Asian trade to total trade of sample countries to be measures of regional trade integration, and therefore included these as dependent variables in the model. We also included total trade volume as a dependent variable, in order to draw comparative perspectives on international trade.

The potential determinants of intra-regional trade were chosen based on the existing literature on trade. Basically, we considered similar determinants for both total trade and intra-regional trade. First, we included a trade-related variable: each country's number of bilateral Free Trade Agreements or Regional Free Trade Agreements (FTAs/RTAs). Although FTAs and RTAs differ somewhat in nature, the gravity model has revealed that FTAs/RTAs lead to a trade creation effect, and a far more limited trade diversion effect, in general (Urata & Okabe, 2010). Thus, we expect a positive effect of FTAs/RTAs on regional trade as well.

The traditional gravity model of trade has shown that size of economy and distance between trade partners are the major determinants of inter-country trade (Helpman, Melitz & Rubinstein, 2008). It is expected that the larger economies in Asia may have proportionately more within-region trade, as is the case in the Southeast Asia sub-region (Thornton & Alessandro, 2002). Therefore, we included gross

domestic product (GDP) as a determinant of trade. We did not include distance in the study because our focus is on regional trade, not bilateral or inter-regional trade.

Most cross-country studies have used the level of economic development as a major factor influencing bilateral international trade. Similar to Sharma and Chua (2000), we also consider gross national income (GNI) per capita to be a determinant of trade. We included mobile cellular subscriptions (per 100 people) in the set of determinants because mobile technology may enhance the environment for international interaction and networking and thus may help to increase intra-regional trade (Bankole, Osei-Bryson & Brown, 2013). Finally, we included urbanization as another prospective determinant of trade. Brakman and Marrewijk (2013) and Smart and Smart (2003) have suggested that trade patterns may be influenced by level of urbanization, as urbanization may increase mobility and promote networks (Brakman & Marrewijk, 2013).

Trade volumes, GDP, and GNI per capita are expressed in millions of 2011 international dollars (\$). While trade volume of the 34 Asian countries ranges from \$233 million to nearly \$8 trillion, with an average of \$391.2 billion, intra-Asian trade volume ranges from \$188 million to more than \$3.6 trillion. Similarly, while the size of the economy as measured by GDP in PPP terms ranges from \$340 million to \$18.6 trillion, with an average of \$679.3 billion, the level of economic development as defined by GNI per capita in PPP terms ranges from \$1,000 to \$87,550, with an average of \$12,885. The average number of FTAs/RTAs in the region is 3.62; mobile cellular subscriptions per 100 people are nearly 39; and annual urban population growth is 2.17%. Further details are provided in the summary statistics and correlation matrix of the variables in Appendix 2 and Appendix 3, respectively.

3.2 Model specification

We have followed the dynamic panel data approach to estimate the determinants of the international trade and intra-regional trade in Asia. The trade volumes and the proportion of intra-regional trade of each country change slowly over time, which means that current levels of trade depend on past outcomes. Thus, lagged dependent variables are included as determinants in the model. However, inclusion of lagged dependent variables as a predictor creates a model with a dynamic structure. Therefore, fixed country effects and the OLS estimator cannot be used as they cause the model to become biased and inconsistent (Nickell, 1981). To solve this problem, many experts suggest a system generalized method of moments (GMM) estimator, as specified in the following model (Arellano & Bover, 1995; Blundell & Bond, 1998):

$$Y_{it} = a + \beta_1 Y_{it-1} + \beta_2 X_{it} + \eta_i + \varepsilon_{it}$$

where, Y_{it} are the dependent variables measured by the natural logarithm of (i) total trade volume (\$ million PPP), (ii) intra-Asian trade volume (\$ million PPP), and (iii) the ratio of intra-Asian trade to total trade of country i at year t . Y_{it-1} are one-period lagged dependent variables. X_{it} is a set of dependent variables and includes the natural logarithm of GDP, GNI per capita, number of FTAs/RTAs, and number of mobile phone subscriptions (per 100). We also include urban population growth, and sub-region dummies (with East Asia as base category) to control for regional effects.

Among the parameters, a is the constant term; β_1 is the coefficient of dependent variables and β_2 is a vector of the coefficients of determinants; η_i is the country fixed effect; and ε_{it} is the error term, which follows a normal distribution.

System GMM is appropriate for our data for several reasons. First, if the explanatory variables (Y_{it}) are correlated with the error term ε_{it} , possibly due to simultaneity, omitted bias or measurement errors, the estimated coefficients may be inconsistent and biased. In particular, lagged dependent variables of

GDP, GNI per capita, and FTAs/RTAs may be endogenous, as the volume and pattern of trade may determine the size of the economy, development level, and direction of trade. System GMM uses a large matrix of available instruments and weights them properly to overcome the endogeneity problem. Arellano and Bover (1995) claim that the problem of endogeneity can be partially solved by controlling fixed effects and time; however, if there are certain unobserved variable changes over time and across countries, the problem may remain. Blundell and Bond (1998) claim that GMM addresses the problem of endogeneity.

Second, as Roodman (2009) has suggested, GMM is also appropriate for controlling individual fixed effects, and addressing heteroscedasticity and serial autocorrelation. While estimating the system GMM in Stata, we use the *xtabond2* command as explained by Roodman, using the endogenous variables (discussed earlier) as *gmmstyle* instruments and the remaining variables as *ivstyle* instruments. Thus, lag values of all endogenous variables are used as instruments for all endogenous variables. The Hansen test of overidentifying restrictions and autocorrelation tests are carried out to assess the validity of the instruments used. The Hansen test and the second order correlation tests indicate that we cannot reject the validity of the moment conditions assumed for the estimation.

4. EMPIRICAL RESULTS AND DISCUSSION

The system GMM estimates of the determinants of trade volume and intra-Asian trade share are presented in Table 1. Column 1 reports the estimates of total trade volume, while columns 2 and 3 report the estimates of intra-Asian trade volume and their share of total trade, respectively. The signs and values of the coefficients indicate the direction and magnitude of effects.

The lagged dependent variable is significantly positive in all the specifications considered. The estimates show that a one percent increase in trade volume in the current year contributes to a 0.54 percent increase in the following year's trade volume, while a one percent increase in intra-regional trade volume or its share of total trade in the current year results in an increase of about 0.4 percent in intra-regional trade or its share for the following next year. This indicates that if a country or economy can increase its overall as well as its intra-regional trade in a certain year, it provides a foundation for future growth.

Size of economy (measured by GDP) also has a positive and significant effect on total trade and intra-Asian trade volume: a one percent increase in GDP would increase total trade volume by 0.42 percent and intra-regional trade volume by 0.51 percent. However, we do not find a significant effect of GDP on the share of intra-Asian trade. This result is consistent with the finding of Gaulier, Lemoine and Deniz that the trade growth of larger economies, such as China, is more greatly contributed to from outside Asia than from inside the region (Gaulier, Lemoine & Unal-Kesenci, 2007). We also do not find a significant effect of GNI per capita (i.e., level of economic development) on either trade volume or intra-regional trade share.

Surprisingly, FTAs/RTAs have no effect on either total or intra-regional trade. This finding contradicts existing literature such as Baier and Bergstrand (2007), who argued that bilateral FTAs approximately double trade between members, and Ghosh and Yamarik (2004), who found trade-creating effects of RTAs. Arguably, Asian FTAs/RTAs mostly follow "open regionalism," which does not discourage trade with non-members (Camroux, 2012). Declining intra-regional TII shown in Figure 3 also indicates that trade beyond Asia has been becoming more important than that within the region and that recent trade growth is mainly driven by outside trade.

Table 1

Determinants of intra-regional trade in Asia, 1990–2015

Variables	Log of total trade volume (PPP, million \$ 2011)	Log of intra-Asian trade volume (PPP, million \$ 2011)		Log of intra-Asian trade share (%)	
	(1)	(2)	(3)	(4)	(5)
Lagged dependent variable	0.535*** (0.073)	0.403*** (0.043)	0.392*** (0.047)	0.376*** (0.014)	0.376*** (0.015)
Log of GDP, PPP (million constant 2011 int'l \$)	0.421*** (0.094)	0.516*** (0.088)	0.537*** (0.073)	-0.042 (0.028)	-0.028 (0.027)
Log of GNI per capita, PPP (constant 2011 int'l \$)	0.006 (0.068)	0.053 (0.056)	0.018 (0.047)	0.036 (0.033)	0.020 (0.031)
Log of all FTAs/RTAs (signed an in effect)	-0.020 (0.042)	-0.045 (0.040)		-0.010 (0.018)	
Log of intra-regional FTAs/RTAs (signed an in effect)			-0.091** (0.037)		-0.028** (0.014)
Log of mobile cellular subscriptions (per 100 people)	0.042*** (0.016)	0.089*** (0.015)	0.103*** (0.015)	0.038*** (0.007)	0.041*** (0.008)
Urban population growth (annual %)	0.000 (0.018)	0.042*** (0.014)	0.043*** (0.016)	0.040*** (0.010)	0.038*** (0.009)
Central Asia region	-0.188** (0.095)	-0.516*** (0.086)	-0.536*** (0.080)	-0.417*** (0.041)	-0.414*** (0.040)
East Asia region	-0.109 (0.191)	-0.100 (0.271)	-0.190 (0.248)	-0.039 (0.084)	-0.067 (0.083)
Oceania region	-0.483*** (0.138)	-0.609*** (0.097)	-0.563*** (0.101)	-0.108 (0.212)	-0.049 (0.195)
South Asia region	-0.450*** (0.147)	-0.674*** (0.158)	-0.736*** (0.124)	-0.191** (0.079)	-0.220*** (0.071)
The Pacific region	-0.264 (0.236)	-0.256 (0.260)	-0.235 (0.183)	-0.028 (0.104)	0.023 (0.102)
Constant	0.517 (0.619)	0.007 (0.633)	0.206 (0.505)	2.587*** (0.217)	2.582*** (0.227)
Observations	785	785	785	785	785
Number of countries	34	34	34	34	34
AR (1) test	0.012	0.005	0.005	0.003	0.003
AR (2) test	0.871	0.661	0.638	0.333	0.333
Sargan test (p-value)	366.4 (1.0)	387.5 (1.0)	380.5 (1.0)	639.7 (0.99)	628.6 (0.99)

Source and Notes: Authors' estimation using two-step system GMM; Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. Data for intra-regional trade in Asia, and number of FTAs/RTAs are from ADB-ARIC Integration Indicators retrieved from: <http://aric.adb.org/>. Integration indicators and remaining variables are from World Development Indicators (WDI): <http://data.worldbank.org/data-catalog/world-development-indicators> (21.05.2017).

Technological advancement as measured by mobile cellular subscriptions is found to significantly increase intra-regional trade. The magnitude of this effect is more than twice as large for intra-regional trade as for global trade: the elasticity of total trade with mobile phone subscriptions is 4.2 percent while

that for intra-Asian trade is 8.9 percent. It is also interesting that the intensity of mobile phones not only increases trade volume but also increases the share of intra-regional trade. This result is consistent with recent research by Bankole, Osei-Bryson and Brownas (2013), who found a significant positive effect of ICT on intra-African trade. While our study showed no effect of urbanization on total trade volume, we found a significant positive effect of urbanization on intra-Asian trade and its share of total trade. Indeed, urbanization contributes to intra-regional trade by increasing the cross-border movement of people (Skeldon, 2006) and promoting international networks (Smart & Smart, 2003).

Finally, we found heterogeneity in total trade volume and intra-Asian trade among the six sub-regions in Asia, which offers some policy implications. In comparison to the Southeast Asia sub-region, the volume of total trade is significantly lower in the Oceania, Central Asia and South Asia sub-regions, while other sub-regions do not differ significantly from Southeast Asia in level of trade. Interestingly, the sub-regions follow a similar pattern with regard to intra-Asian trade volume. Thus, sub-regions of smaller economic size have greater difficulty achieving sub-regional integration. This gives a clear rationale for the broader Asian integration. Similarly, the ratio of intra-regional trade to total trade is significantly lower in the Central Asia and South Asia sub-regions. As these two regions lag in economic development, regional demand for goods and services is still very low; therefore, their trade dependency on richer nations outside the sub-region is naturally high.

The results suggest that Southeast Asian countries not only have well-diversified trade, they also have a better position in intra-regional trade integration in terms of volume and its share of total trade than Central Asia and South Asia countries have. Thus, it can be said that while the laggards should learn from the leaders, such as East Asia and Oceania in economic development and Southeast Asia in regional integration, the leaders should also bear some responsibility for integrating the laggards into the mainstream regional economy. This includes reducing the potential costs of liberalization, particularly in the lagging countries and regions; minimizing the political and policy uncertainty of trade policy; and striving for better regional as well as global integration to ensure fair distribution of the benefits of regional integration and globalization.

5. CONCLUSION

This article has explored the trends and determinants of regional as well as global trade integration in Asia from 1990 to 2015 using annual panel data from 34 Asian countries. Although global and intra-regional trade increased for Asian countries (including the Pacific and Oceania), the relative importance of regional trade versus global trade, measured by intra-regional TII, was found to have decreased over the period. The findings indicate that as countries' trading capacities grew, they tended to trade globally rather than regionally. Such a declining importance of within-region trade is not encouraging evidence for broader regional integration in Asia. Thus, trade and investment policies that boost regional trade and investment are essential for countries in the region if we are to see rapid progress on broader Asian integration.

Dynamic panel-data estimation in two-step system GMM showed that previous level of trade, size of economy, and access to mobile phone technology have significant and positive effects on both total and intra-regional trade. However, size of economy has no effect on the share of intra-regional trade. Urbanization has a significant positive effect on intra-regional trade and its share of total trade, but not on total trade. Unexpectedly, FTAs and RTAs were not found to significantly affect either global or intra-regional trade. This finding suggests that the nature of FTAs and RTAs matters more than their numbers for boosting intra-regional trade in Asia, and that in-depth investigation is needed to better understand the design and utilization of FTAs and RTAs. Further liberalization of trade regimes together with policies for boosting domestic/regional demand is also essential for comprehensive Asia-wide regional integration. To

achieve this objective, in-depth analysis of trade, investment, and other economic and foreign policies of the major economies and geopolitical actors of the region is required. While such research is beyond the scope of this study, we suggest that further exploration of related policies and institutions related to broader Asian integration would be valuable.

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REFERENCES

- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, 68(1), 29-51.
- ARIC (nd). Integration Indicators technical notes. Asian Regional Integration Center. Retrieved from: <http://aric.adb.org/integrationindicators/technotes> (21.05.2017)
- ARIC. Regional Integration Indicator database. Manila: Asian Development Bank, Asian Regional Integration Center. Retrieved from: <http://aric.adb.org/integrationindicators> (21.05.2017).
- Baier, S. L., & Bergstrand J. H. (2007). Do free trade agreements actually increase members' international trade?. *Journal of International Economics*, 71(1), 72-95.
- Bankole, F. O., Osei-Bryson, K. M., & Brown, I. (2015). The impact of information and communications technology infrastructure and complementary factors on intra-African Trade. *Information Technology for Development*, 21(1), 12-28.
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, 87(1), 115-143.
- Brakman, S., & Van Marrewijk, C. (2013). Lumpy countries, urbanization, and trade. *Journal of International Economics*, 89(1), 252-261.
- Camroux, D. (2012). Regionalism in Asia as Disguised Multilateralism: A Critical Analysis of the East Asia Summit and the Trans-Pacific Partnership. *The International Spectator*, 47(1), 97-115.
- Das, D. K. (2005). Market-driven regionalization in Asia. *Global Economy Journal*, 5(3), 77-99.
- Francois, J., Rana, P. & Wignaraja, G. (2009). *Pan-Asian Integration: Linking East and South Asia*. Asian Development Bank. Retrieved from: <http://hdl.handle.net/11540/181> (11.09.2017).
- Gaulier, G., Lemoine, F., & Deniz, Ü. K. (2007). China's emergence and the reorganisation of trade flows in Asia. *China Economic Review*, 18(3), 209-243.
- Ghosh, S., & Yamarik, S. (2004). Are regional trading arrangements trade creating?: An application of extreme bounds analysis. *Journal of International Economics*, 63(2), 369-395.
- Helpman, E., Melitz, M., & Rubinstein, Y. (2008). Estimating trade flows: Trading partners and trading volumes. *The Quarterly Journal of Economics*, 123(2), 441-487.
- Intal, P. (2018). East Asia's transformation and regional architecture. In Armstrong, S., & Westland, T. (Eds.). *Asian Economic Integration in an Era of Global Uncertainty*. Acton: ANU Press.
- Kawai, M., & Wignaraja, G. (2009). *The Asian'noodle bowl': Is it serious for business?* (No. 136). ADBI working paper series.
- Kimura, F., & Obashi, A. (2016). Production networks in East Asia: What we know so far. In *Production Networks and Enterprises in East Asia* (pp. 33-64). Springer, Tokyo.
- Kobrin, S. J. (2017). Bricks and mortar in a borderless world: Globalization, the backlash, and the multinational enterprise. *Global Strategy Journal*, 7(2), 159-171.
- Krapohl, S., & Fink, S. (2013). Different Paths of Regional Integration: Trade Networks and Regional Institution -

- Building in Europe, Southeast Asia and Southern Africa. *JCMS: Journal of Common Market Studies*, 51(3), 472-488.
- Kumar, R. (2009). SAARC: Changing Realities. *Opportunities and Challenges, Bonn: German Development Institute Discussion Paper*, 11.
- Lewis, L. T., & Monarch, R. (2016). *Causes of the global trade slowdown* (No. 2016-11-10). Board of Governors of the Federal Reserve System (US).
- Narine, S. (2018). US Domestic Politics and America's Withdrawal from the Trans-Pacific Partnership: Implications for Southeast Asia. *Contemporary Southeast Asia: A Journal of International and Strategic Affairs*, 40(1), 50-76.
- Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica: Journal of the Econometric Society*, 1417-1426.
- Obashi, A., & Kimura, F. (2017). Deepening and widening of production networks in ASEAN. *Asian Economic Papers*, 16(1), 1-27.
- Pangestu, M & Armstrong, S. (2018). Asian economic integration: The state of play. In Armstrong, S., & Westland, T. (Eds.). *Asian Economic Integration in an Era of Global Uncertainty*. Acton: ANU Press.
- Population Division, United Nations Department of Economic and Social Affairs. (2015). *World Population Prospects: The 2015 Revision, Key Findings and Advance Tables*. UNDESA ESA/P/WP.241.
- Rai, D.K. (2010). Asian Economic Integration and Cooperation: Challenges and Ways Forward for Pan-Asian Regionalism. *GIGA Working Paper Series*, 152. Retrieved from: <http://ssrn.com/abstract=1713187> (29.08.2017).
- Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal*, 9(1), 86-136.
- Sapkota, J. B. (2011). Globalization and Human Aspect of Development in Developing Countries: Evidence from Panel Data. *Journal of Globalization Studies*, 2(1), 78-96.
- Sapkota, J. B., & Shuto, M. (2016). Is Pan-Asian Economic Integration Moving Forward?: Evidence from Pan-Asian Trade Statistics. *Area Studies Tsukuba*, 37, 39-57.
- Sharma, S. C., & Chua, S. Y. (2000). "ASEAN: economic integration and intra-regional trade", *Applied Economics Letters* 7(3), 165-169.
- Skeldon, R. (2006). Interlinkages between internal and international migration and development in the Asian region. *Population, space and place*, 12(1), 15-30.
- Smart, A., & Smart, J. (2003). Urbanization and the global perspective. *Annual Review of anthropology*, 32(1), 263-285.
- Thornton, J., & Goglio, A. (2002). Regional bias and intra-regional trade in Southeast Asia. *Applied Economics Letters*, 9(4), 205-208.
- Tinbergen, J. (1962). *Shaping the World Economy: Suggestions for an International Economic Policy*. New York: Twentieth Century Fund.
- Urata, S. (2013). *Constructing and multilateralizing the regional comprehensive economic partnership: An Asian perspective* (No. 449). ADBI Working Paper Series.
- Urata, S., & Okabe, M. (2010). The impacts of free trade agreements on trade flows: An application of the gravity model approach. In *Free Trade Agreements in the Asia Pacific* (pp. 195-239).
- Wignaraja, G. (2014). The determinants of FTA use in Southeast Asia: A firm-level analysis. *Journal of Asian Economics*, 35, 32-45.
- Wignaraja, G., Morgan, P., Plummer, M. G., & Zhai, F. (2015). Economic Implications of Deeper South Asian–Southeast Asian Integration: A CGE Approach. *Asian Economic Papers*, 14(3), 63-81.
- World Bank (nd). World development indicators. Washington, D.C. The World Bank. Retrieved from: <https://data.worldbank.org/products/wdi> (21.05.2017).

APPENDICES

Appendix 1. List of all Asian countries (underlined included in the analysis)

Central Asia sub-region (all 8 selected)	<u>Armenia</u> ; <u>Azerbaijan</u> ; <u>Georgia</u> ; <u>Kazakhstan</u> ; <u>the Kyrgyz Republic</u> ; <u>Tajikistan</u> ; <u>Turkmenistan</u> ; and <u>Uzbekistan</u>
East Asia sub-region (5 selected)	<u>People's Republic of China</u> ; <u>Japan</u> ; <u>Hong Kong, China</u> ; <u>the Republic of Korea</u> ; <u>Mongolia</u> ; and <u>Taiwan, China</u>
Southeast Asia sub-region (9 selected)	<u>Brunei Darussalam</u> ; <u>Cambodia</u> ; <u>Indonesia</u> ; <u>the Lao People's Democratic Republic (Lao PDR)</u> ; <u>Malaysia</u> ; <u>Myanmar</u> ; <u>the Philippines</u> ; <u>Singapore</u> ; <u>Thailand</u> ; and <u>Viet Nam</u>
South Asia sub-region (5 selected)	<u>Afghanistan</u> ; <u>Bangladesh</u> ; <u>Bhutan</u> ; <u>India</u> ; <u>the Maldives</u> ; <u>Nepal</u> ; <u>Pakistan</u> ; and <u>Sri Lanka</u>
The Pacific sub-region (5 selected)	<u>Cook Islands</u> ; <u>Fiji</u> ; <u>Kiribati</u> ; <u>the Marshall Islands</u> ; <u>the Federated States of Micronesia</u> ; <u>Nauru</u> ; <u>Palau</u> ; <u>Papua New Guinea</u> ; <u>Samoa</u> ; <u>Solomon Islands</u> ; <u>Timor-Leste</u> ; <u>Tonga</u> ; <u>Tuvalu</u> ; and <u>Vanuatu</u>
Oceania sub-region (all 2 selected)	<u>Australia</u> and <u>New Zealand</u>

Source: Asian Development Bank (ADB), retrieved from: <https://www.adb.org/about/members> (21.05.2017).

Appendix 2. Summary statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
<i>Dependent variables</i>					
Total trade volume, PPP (million constant 2011 int'l \$)	884	391184	864615	223	7945950
Intra-Asian trade volume, PPP (million constant 2011 int'l \$)	884	207422	426313	188	3625578
Intra-Asian trade share (%)	884	53.48	21.26	2	95.2
<i>Independent variables</i>					
GDP, PPP (million constant 2011 int'l \$)	884	679318	1808829	340	18600000
GNI per capita, PPP (constant 2011 int'l \$)	884	12885	18193	1000	87550
Number of FTAs/RTAs (signed and in effect) among Asian countries	884	3.62	3.65	0	20
Mobile cellular subscriptions (per 100 people)	884	38.96	48.21	0	235.61
Urban population growth (annual %)	884	2.17	1.72	-3.1	7.03

Source: Data for intra-regional trade in Asia, and number of FTAs/RTAs are retrieved from ADB's Regional Integration Indicator database, available at: <http://aric.adb.org/integrationindicators>, and remaining are retrieved from the World Bank's World Development Indicators database, available at: <https://data.worldbank.org/data-catalog/world-development-indicators> (21.05.2017).

Appendix 3. Correlation matrix

	Intradev	Intrvasia	Intrasia	lngdp	lngnipc	Intftas	lnmobile	popgu
Intradev	1							
Intrvasia	0.97	1.00						
Intrasia	-0.05	0.19	1.00					
lngdp	0.97	0.93	-0.09	1.00				
lngnipc	0.52	0.54	0.13	0.44	1.00			
Intftas	0.25	0.26	0.05	0.22	0.29	1.00		
lnmobile	0.38	0.43	0.23	0.31	0.57	0.66	1.00	
popgu	0.01	0.11	0.47	0.03	-0.25	-0.15	-0.13	1

Sources: authors' calculation using the data of intra-regional trade in Asia, and number of FTAs/RTAs retrieved from ADB's Regional Integration Indicator database, available at: <http://aric.adb.org/integrationindicators>, and remaining retrieved from the World Bank's World Development Indicators database, available at: <https://data.worldbank.org/data-catalog/world-development-indicators> (21.05.2017).

Notes: All variables (except popgu) are in log form: Intradev=Log of total trade volume PPP (million constant 2011 international \$); Intrvasia=Log of intra-Asian trade volume PPP (million constant 2011 international \$); Intrasia=Log of intra-Asian trade share (%); lngdp=Log of GDP in PPP (million constant 2011 international \$); lngnipc=Log of GNI per capita, PPP (constant 2011 international \$); Intftas=Log of number of total FTAs/RTAs (signed and in effect); lnmobile=Log of mobile cellular subscriptions (per 100 people); popgu=Urban population growth rate (annual %).