

# **Is Pan-Asian Economic Integration Moving Forward?: Evidence from Pan-Asian Trade Statistics**

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# Is Pan-Asian Economic Integration Moving Forward?: Evidence from Pan-Asian Trade Statistics<sup>1</sup>

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## Abstract

Asia is growing economically faster than any other region in the world; this led to the shift of the center of gravity of the global economy from the West to the East. However, it is not clear whether the Asian economy is integrating regionally or globally. In the context of the growing efforts of regional or sub-regional pan-Asian integration, it is worthwhile to explore the pan-Asian trade flows regionally as well as globally. Thus, this paper examines the trend and determinants of economic integration in pan-Asia, and its sub-regions in terms of the trade intensity index (TII) and the intra-regional trade share. The Asian Regional Integration Center (ARIC) of the Asian Development Bank (ADB) database revealed that, despite a rapid increase in the intra-Asian trade volume of all countries from 1990 to 2012, the trends of the intra-regional trade share of different countries are different, which indicates that countries in the region function independently, and stronger economic ties have not yet developed within pan-Asia and its sub-regions. Furthermore, the dynamic panel data analysis shows that free trade agreements or regional trade agreements (FTAs/RTAs) are the main determinants of the growing intra-Asian trade proportion. Other determinants are countries' level of economic development, foreign direct investment (FDI) stock, urban population growth and access to information and communication technology (ICT). Thus, we argue that active participation in FTAs/RTAs, an open FDI policy, urbanization and the technological development of Asian countries create an enabling environment for pan-Asian economic integration.

Key Words: Economic integration, Intra-Regional trade, Trade statistics, Panel data econometrics,  
Pan-Asia

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## I . Introduction

Because Asia is growing economically faster than any other region in the world, recent regional integration efforts are increasing towards Pan-Asian economic integration (Wignaraja 2014). Despite continued efforts for deeper integration at each sub-regional level, countries from East Asia, Southeast Asia, South Asia, Oceania, and the Pacific are involved in the negotiations of large integration initiatives, such as the Regional Comprehensive Economic Partnership (RCEP) (Chia 2013). However, there is no such bold effort that can lead to the realization of an Asia-wide regional integration in the near future. Thus, this paper examines the trend and determinants of economic integration in Asia in terms of the trade intensity index (TII) and intra-regional trade share and argues that the relative importance of the global market outside the region is increasing, whereas the relative importance of intraregional market is declining.

Asian trade within Asia and with the world has increased rapidly over the last two decades. Unilateral and plurilateral liberalization by many Asian countries and sub-regions at various times contributes to this trend (Rai 2010). However, in contrast to Europe and North America where regional integration is driven by policy and institution, economic integration in Asia remains largely market driven. As Kumar (2009) argued, Asian economic integration followed the “flying geese pattern,” which means capital, technology, and know-how moved from more developed to less developed nations. For instance, the development first moved from Japan to the Asian economic tigers and then to Southeast Asian countries, mainly to Thailand, Malaysia, Indonesia, and the Philippines. The economic integration process was further fueled by trade and investments liberalization in addition to the production fragmentation across countries. Policy-driven regional integration is also becoming visible after the Asian financial crisis (1997/98). Different forms of bilateral free trade agreements (FTAs) and regional trade agreements (RTAs) proliferate within and outside Asia, and, currently, every country is engaging in FTAs or RTAs. However, most RTAs are at a sub-regional level, and the broader pan-Asian level cooperation is not progressing well. Furthermore, these agreements are very different from each other, in terms of the scope, coverage, and commitments; therefore, Kawai and Wignaraja (2009) argued that multiple trade agreements can be detrimental to increasing trade due to the “spaghetti bowl effect.”<sup>2</sup> Similarly, various studies revealed that broader and deeper economic cooperation at the pan-Asian level would generate tremendous gains; hence, integration is opposed among a small group of countries at different sub-regional levels (Urata 2013). Thus, it is worthwhile to observe the progress toward broader pan-Asian regional integration although it remains largely market driven.

The paper is organized as follows. Section 2 examines the trend of inter sub-regional and intra-regional trade in Asia. The Economic Integration database of Asian Development Bank’s Asian Regional Integration Center (ARIC) revealed that the trade volume of each country in Asia toward Asia and toward

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2 A well-known economist Jagdish Bhagwati first used the term “spaghetti bowl effect” in 1995, which refers to the problems likely due to the many rules of origin of a product and other complexities caused by involving many FTAs.

the world increased dramatically over the last two decades. However, the trends of intra-regional trade are not similar across countries. Section 3 assesses the determinants of intra-regional trade in the region and finds the positive and significant impacts from FTAs/RTAs with Asian countries are Gross National Income (GNI) per capita, foreign direct investment (FDI) and urbanization. However, the economic size of the countries or economies has a negative and significant impact on the intra-regional trade share. Section 4 concludes this paper.

## II. Pan-Asian intra-regional and inter sub-regional trade

In terms of population and geographical sizes, Asia is the largest continent. Asia covers 30% of the global terrestrial surface and provides shelter for approximately 60% of the global population. Hence, Asia possesses a high degree of sociocultural and developmental diversity as well as political diversity. Thus, there are many sub-regions within Asia that are involved in sub-regional integration initiatives, such as the Association of South East Asian Nations (ASEAN), which is comprised of 10 countries from Southeast Asia, and the South Asian Association for Regional Cooperation (SAARC), which is comprised of 7 countries of South Asia.<sup>3</sup> However, broader regional integration initiatives across the sub-regions are underway with minimal progress. For instance, Regional Comprehensive Economic Partnership (RCEP), which is widely known as ASEAN plus six, and ASEAN plus three (APT) groupings of integration are under discussion.<sup>4</sup> Interestingly, Asian regional integration initiatives broaden the scope; this leads its neighboring regions, particularly from Oceania and Pacific Islands, into the integration process.

Therefore, Asia is defined in a broader perspective that is composed of East to West Asia, North to South Asia, two Oceanian countries, Australia and New Zealand, and the Pacific Island countries.<sup>5</sup> All the countries are included as long as data are sufficiently available for analysis. Based on the ADB's country grouping, Appendix 1 shows the list of countries for each group, which emphasizes the 39 countries covered in this study.

Regional economic integration includes both trade and investment integration fueled by regional as well as global value chains within the region. However, this paper solely analyzes regional trade statistics because it is more sensitive towards the market, and other aspects move together with trade in general.

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3 Member countries of ASEAN include Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. Similarly, current member states of the SAARC are Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

4 RCEP or ASEAN plus six consists of 10 ASEAN countries plus China, Japan, Republic of Korea, India, Australia and New Zealand. Similarly, ASEAN plus three (APT) includes 10 ASEAN member states plus China, Japan and Republic of Korea.

5 ARIC regional integration database of ADB covers 48 countries from Asia, Oceania and the Pacific as a group of Asia. This study follows the same groupings as used in the ARIC database. Indeed, it is rational to include Australia, New Zealand, and the Pacific countries because certain countries are already in the broader Asian integration process.

## 1. Intra-regional trade by country/economy

Figure 1 shows the trend of total trade volume of top five (in terms of their total trade volume) and an aggregate of other 34 Asian countries to Asia from 1990 to 2012. The figure clearly indicates the increasing trend of trade volume towards Asia from its member economies; People's Republic of China (PRC), Japan, and Hong Kong remained at the top 1st, 2nd and 3rd rank in 2012, respectively. We can observe a similar trend of total trade from the top five and the aggregate of the other 34 Asian countries to the world in Figure 2. Although the Republic of Korea (ROK) moved into 3rd place, the overall trend is primarily similar.

In general, the trade volume of Asian countries to Asia as well as to the world increased over the period; however, rapid growth was observed from 2002. Despite a sharp drop in 2009 due to the huge global economic crisis, the trade volume rose sharply after that for most of the major economies of Asia in general. Because the total trade of Asian economies to Asia and the world follow the similar trend, it remains unclear whether the regional economic integration is advancing within the region vis-à-vis with the world.

To examine the depth of regional economic integration in Asia, Figure 3 shows the trade proportion of Asian economies to Asia.<sup>6</sup> In contrast to the trend of trade volume, the proportion of trade to Asia of its countries and economies are not similar. For example, the trade proportion to Asia grew slowly for Japan, Hong Kong, Taiwan, ROK, and Singapore from 1990 to 2012, although there were sharp declines observed during the Asian financial crisis in 1997-98 and during the global financial crisis in 2007-08. However, the proportion of trade to Asia has declined for the PRC and certain Central Asian and Pacific countries. Interestingly, the proportion of trade of Hong Kong to Asia remained more than 75%, Taiwan and Singapore remained more than 60%, and Japan and ROK remained more than 50% in 2012. In the same year, the trade proportion to Asia remained at 44.5% and 31.13% for PRC and India, respectively.

These trends indicate that trade integration in Asia has not progressed significantly over the last two decades. Huge diversity, prolonged territorial disputes among major economic powers, and relatively cold bilateral relations among neighboring countries hinder the regional integration process in Asia.<sup>7</sup>

## 2. Intra-regional trade by sub-region

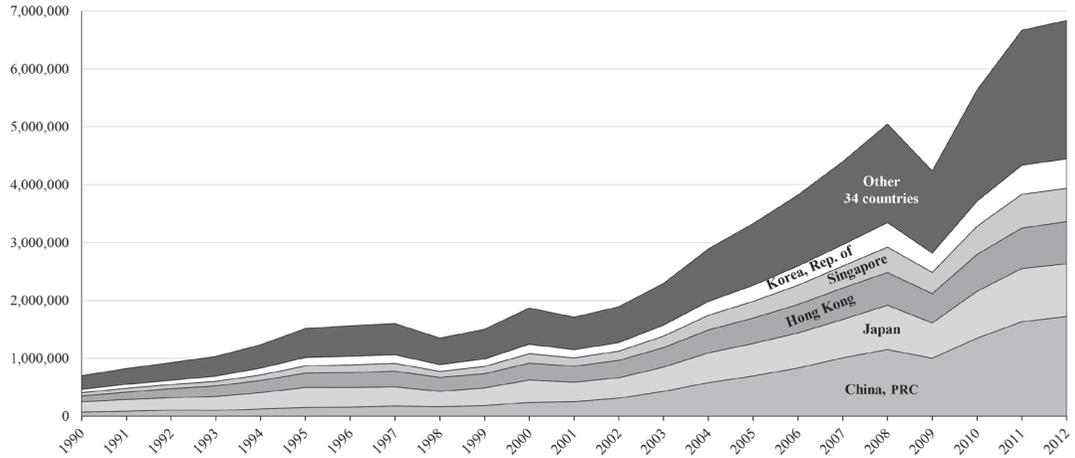
Figure 4 presents the trend of intra-regional and intra sub-regional trade share in Asia. The sub-regions of Asia and the list of countries for each sub-region are presented in Appendix 1. The figure shows a gradual but slowly increasing intra-East Asian and intra-Southeast Asian trade share. Intra-regional trade in

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6 As defined by ADB, "trade share is the percentage of trade with a partner to the total trade of a country/region. The trade share is computed as the dollar value of total trade of country/region *i* with country/region *j* expressed as a percentage share of the dollar value of total trade of country/region *i* with the world. A higher share indicates a higher degree of integration between partner countries/regions" (Available at: <https://aric.adb.org/integrationindicators/technotes>, Accessed: March 18, 2015).

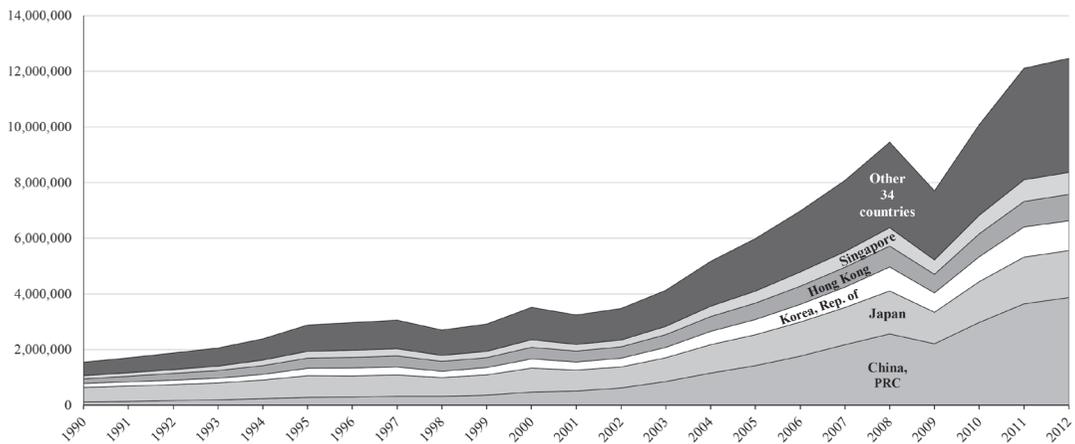
7 In Asia, PRC, Japan, ROK, and India are among the major economic powers that have problems in their bilateral relations.

Fig. 1 Total trade volume from Asian (top five and the total of other 34) countries to Asia, 1990-2012 (million US\$)



Notes: PRC=People’s Republic of China, Rep.=Republic. The list of pan-Asian countries (the data of emphasized countries are included in this analysis) is presented in Appendix 1.

Fig. 2 Total trade volume from Asian (top five and the total of other 34) countries to the world, 1990-2012 (million US\$)

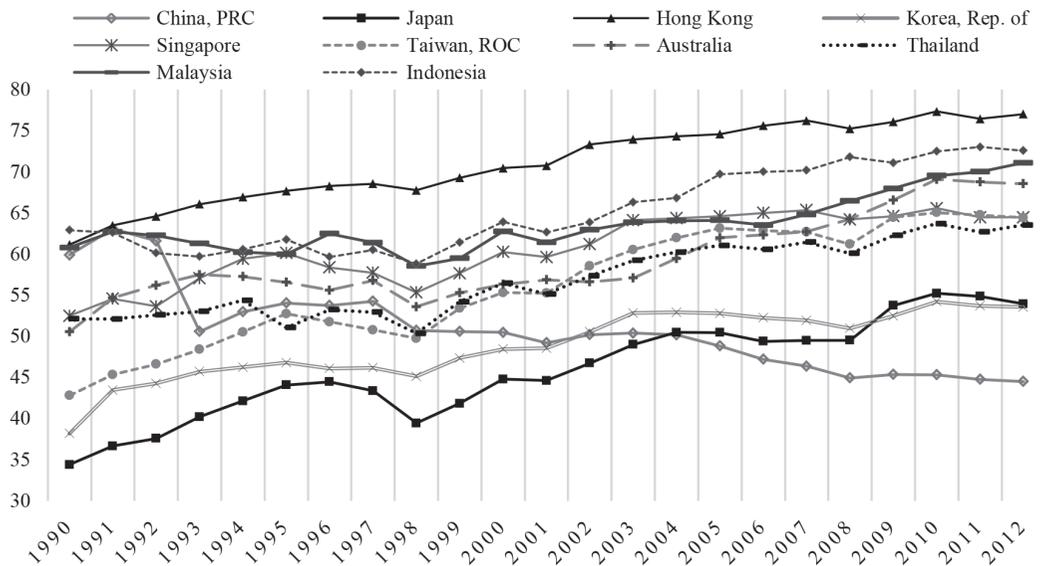


Notes: PRC=People’s Republic of China, Rep.=Republic. The list of pan-Asian countries (the data of emphasized countries are included in this analysis) is presented in Appendix 1.

East Asia rose from 28.58% in 1990 to 40.6% in 2004, which declined to 35.87% in 2012. Intra-regional trade in Southeast Asia rose from nearly 17% to 24.56% from 1990 to 2012, respectively.

However, there is a stable trend for South Asia, whose intra-regional proportion of trade remained approximately 2% to 3% over the 1990 to 2012 period. Other sub-regions, namely the Pacific, Oceania, and Central & West Asia, experienced decreasing trend (particularly from approximately 1995).

Fig. 3 Trade share of top ten (in terms of trade volume) Asian countries to Asia, 1990-2012 (percentage of total trade volume of the country)



Notes: PRC=People’s Republic of China, Rep.=Republic, ROC=Republic of China. The list of pan-Asian countries (the data of emphasized countries are included in this analysis) is presented in Appendix 1.

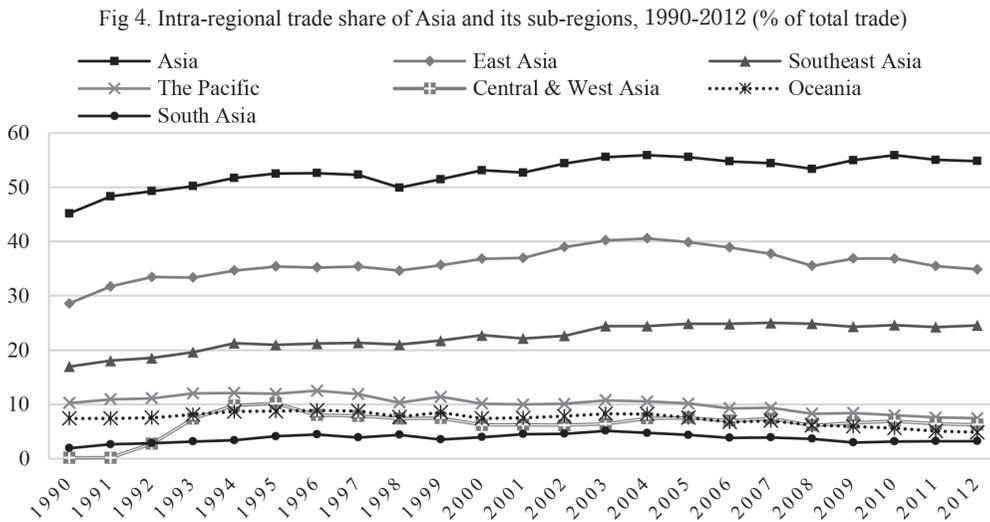
However, intra-regional trade in Asia increased (although slowly) from 45.2% in 1990 to 55.94% in 2010. Then, the region experienced a slowdown, marginally achieving 54.85% in 2012. The trend also clearly indicates the adverse effect of the regional and global financial crisis on the regional economic integration process because the trend generally declined in 1997-98 and 2008-09 when the region suffered severely from the Asian financial crisis and the global financial crisis, respectively.

In the context of growing efforts on pan-Asian integration, there is increasing interest in inter sub-regional trade flows in Asia. To detect such flows in relation to global trade, the trade intensity index (TII) is used. The TII shows the relative importance of trade of a region with other regions vis-à-vis global trade.<sup>8</sup> Specifically, as defined in the Integration Indicators technical notes of the ARIC home page, the TII of region A to region B is the ratio of the proportion of trade from region A to region B with region A’s total trade with the world and the global proportion of trade to region B. Specifically, the TII from region A to region B ( $TII_{AB}$ ) is calculated as follows:

$$TII_{AB} = \frac{t_{AB}/T_{AW}}{t_{WB}/T_{WW}}$$

where, is  $t_{AB}$  the amount of total trade of region A with region B,  $T_{AW}$  is the amount of the total trade of

8 The original definition of TII is available at: <https://aric.adb.org/integrationindicators/technotes>, accessed: March 20, 2015.



region A with the world,  $t_{WB}$  is the amount of world trade with region B, and  $T_{ww}$  is the total dollar value of world trade. If the  $TII_{AB}$  value exceeds one, this means the trade flow between the region A and region B is more than expected given their importance in the world trade. TII for Asia and certain sub-regions over the 1990 to 2012 period are presented as follows.

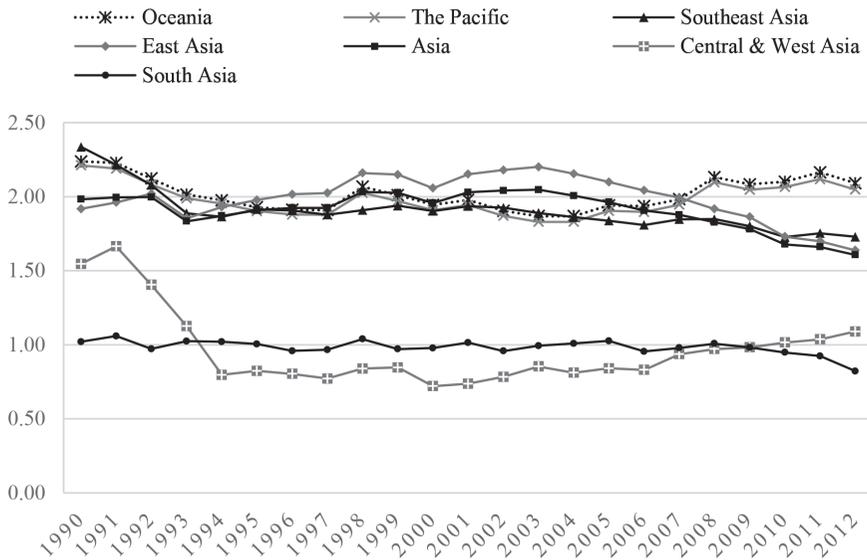
Figure 5 presents the TII of East Asia with Asia and its other sub-regions from 1990 to 2012. The TII with Oceania, the Pacific, Southeast Asia and East Asia remained approximately 2 with small fluctuation during the period. Surprisingly, the TII for East Asia and with Southeast Asia has been declining since 2003, which indicates a reduction in relative trading importance with the region. In fact, efforts and discussion of pan-Asian integration are concentrated in the Association for South East Asian Nations (ASEAN) plus frameworks that primarily includes China, Japan, ROK and all the economies of Southeast Asia. It is also troublesome that East Asian TII with overall Asia has declined sharply from 2.05 to 1.61 from 2003 to 2012, respectively.

Interestingly, the relative importance of East Asian trade with the Pacific and Oceania has not only remained high with a TII of more than two since 2007, but has also increased since 2004. Thus, it is worthwhile to include these regions in the overall Asian integration.

Conversely, the TII value of East Asia remained approximately one for South Asia until 2008 but declined to 0.82 in 2012. This finding suggests that East Asia, as the leading sub-region in Asia, should develop strategies to increase trade with South Asia to increase the gain from pan-Asian integration. Conversely, indicating the growing importance of Central and West Asia in pan-Asian integration, the TII with Central and West Asia climbed over one in 2010 and has been sharply increasing since then.

Figure 6 presents the TII of Southeast Asia with Asia and its other sub-regions from 1990 to 2012. The TII with its own region, Southeast Asia, remained highest around four; however, it fluctuated sharply

Fig 5. TII of East Asia with other Asian sub-regions, 1990-2012



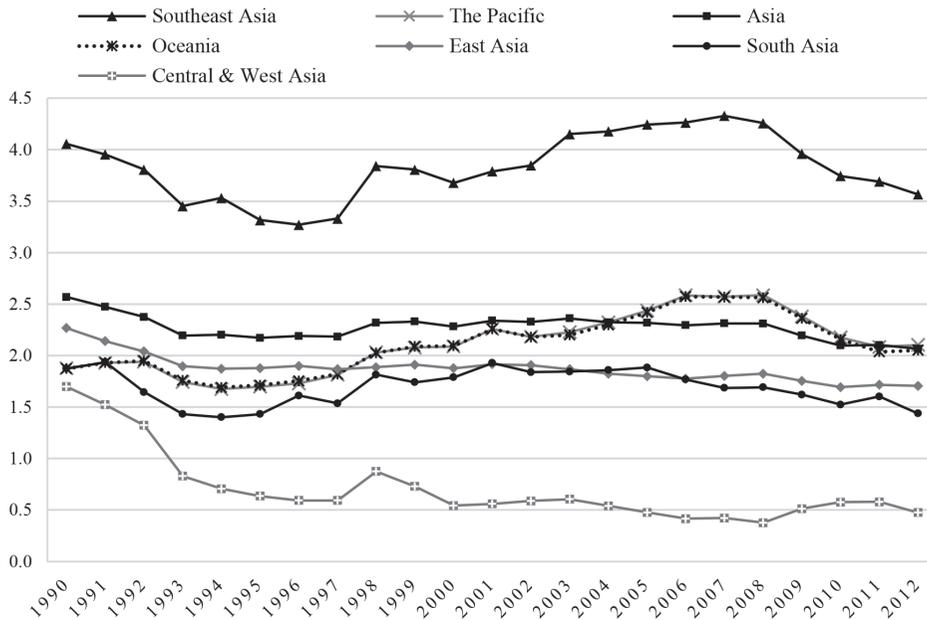
and achieved the lowest of 3.27 in 1996 and the highest of 4.33 in 2007. However, the TII has declined sharply since then and achieved 3.57 in 2012. The TII with East Asia declined from 2.27 to 1.71 during the period. Similarly, the TII with South Asia also declined, particularly from 2002. Although the TII with Oceania increased through 2006 achieving 2.57, it has declined sharply since then. The TII with Central and West Asia showed the worst record; it declined from 1.7 to 0.47 during the period. These results indicate that Southeast Asia needs to revise its trade policy towards its neighboring regions in Asia if they aspire to be the key player in Asian integration.

Similarly, although the TII with Asia overall remained over two during the period; the trend has declined from 2.57 to 2.07 over the period. This finding indicates that Southeast Asia will encounter more challenges to play the key role in pan-Asian integration. However, as the most integrated sub-region in Asia with stronger institutional establishments compared with to other sub-regions, ASEAN is expected to play a key role in the pan-Asian integration process (Kurlantzick 2012).

Figure 7 presents the TII of South Asia with Asia and its other sub-regions from 1990 to 2012. The TII with its own region, South Asia, remained highest until 2008, achieving its apex of nearly five; however, it decreased sharply immediately thereafter and achieved the lowest point at 1.42 in 2012. The relative importance of trade to East Asia remained at the lowest level, which primarily remained below one, and the trend declines over the period.

The TII value for other regions remained more than one; however, the trends are declining in general. Similarly, the TII with overall Asia declined and remained marginally over one; it has declined gradually from 1.21 to 1.0 during the period. These results indicate that South Asia needs to improve its trade policy

Fig 6. TII of Southeast Asia with other Asian sub-regions, 1990-2012



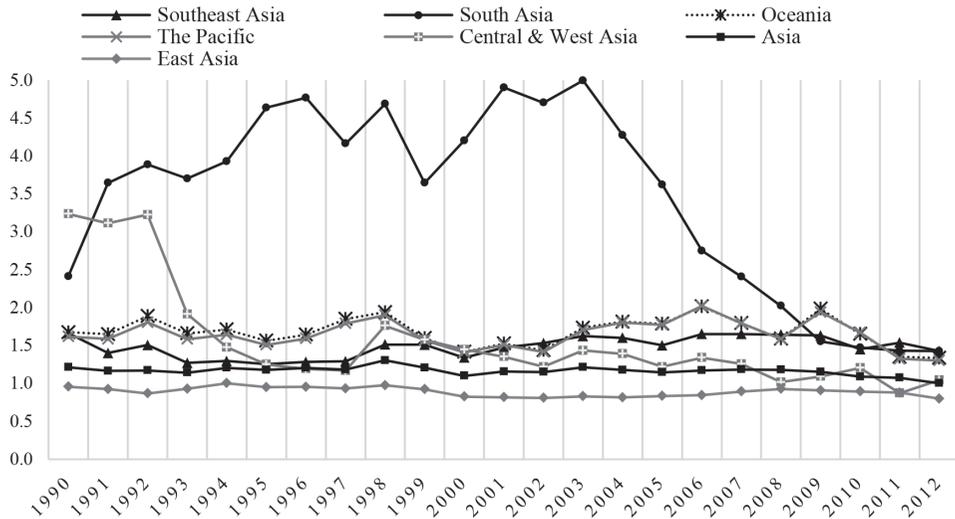
with its neighboring regions to play a significant role in pan-Asian integration.

In the case of Central and West Asia, the TII for South Asia has been more than one since 1990; however, it is declining. The TII with its own region, Central and West Asia, remained very high at 24.31 in 1995. However, it continuously declined and achieved 7.58 in 2012. The TII of Oceania with the Pacific remained highest among with other sub-regions over the period, which achieved its peak at 7.66 in 1995. However, the trend has declined sharply since 2003, achieving 3.88 in 2012. Except for Central and West Asia, the TII for the other sub-regions is approximately two over the period, which indicates the key importance of Asia for the region. A similar trend can be observed for the TII of the Pacific with the other sub-regions. These results are available upon request.

Overall, despite having a high importance of trade among sub-regions and Asia as a whole, the importance is decreasing, which arguably reduces the motives for pan-Asian economic integration. The declining importance can also be observed through the decline in the TII of the Asian sub-regions with Asia as a whole, as shown in Figure 8.

To examine the importance of the entire Asian trade with its sub-regions, Figure 9 presents the TII of Asia as a whole with Asia and its sub-regions from 1990 to 2012. Interestingly, the TII for all the sub-regions is more than one, which indicates the greater importance of trade flows with its sub-regions vis-à-vis with the world. Among the sub-regions, the TII with Southeast Asia remained highest at approximately 5, but fluctuates between 4.4 and 5.8 during the period. The Pacific and Oceania follows a similar trend,

Fig 7. TII of South Asia with other Asian sub-regions, 1990-2012



ranging from 2.4 in 1990 to 2.1 in 2012. The similar trends of the TII are in accordance with Asia as a whole and East Asia, which also declined from approximately two to approximately 1.6, respectively during the same period. South Asia and Central & West Asia remained at the bottom with a TII of approximately one.

The TII of Asia as a whole to its sub-regions indicates that the relative importance of trade within the region is greater than with the world. A similar conclusion can be derived from the TII of Asian sub-regions discussed above. These results signify a strong desirability of pan-Asian economic integration, which supports the results of many empirical assessments that showed enormous benefits of pan-Asian integration (Wignaraja et. al. 2015; Francois, Rana and Wignaraja 2009).

However, we found daunting challenges because the TII trends are decreasing for most of the sub-regions as well as Asia as a whole. It is more worrisome that the declining trend is sharper in recent years for most of the sub-regions. This finding may be due to the faster pace of growth in global trade integration compared with the regional trade integration.

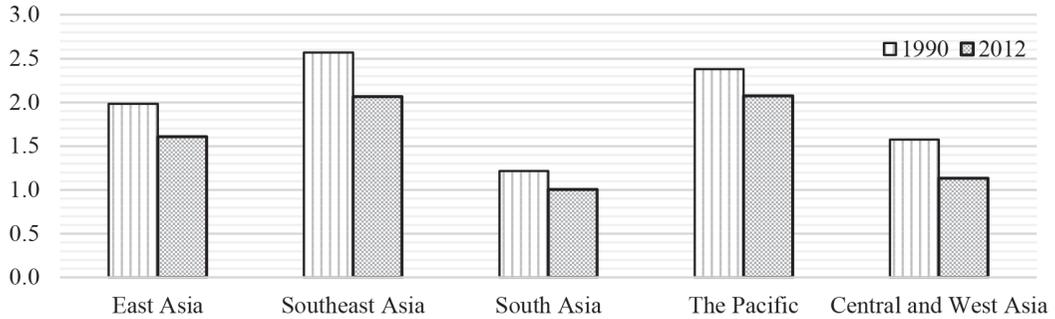
Thus, what determines the pace of regional economic integration in general and intra-regional trade, in particular, is one of the main concerns for regional integration efforts. The next section explores the major determinants of intra-regional trade in Asia.

### III. Determinants of intra-regional trade share

#### 1. Model specification

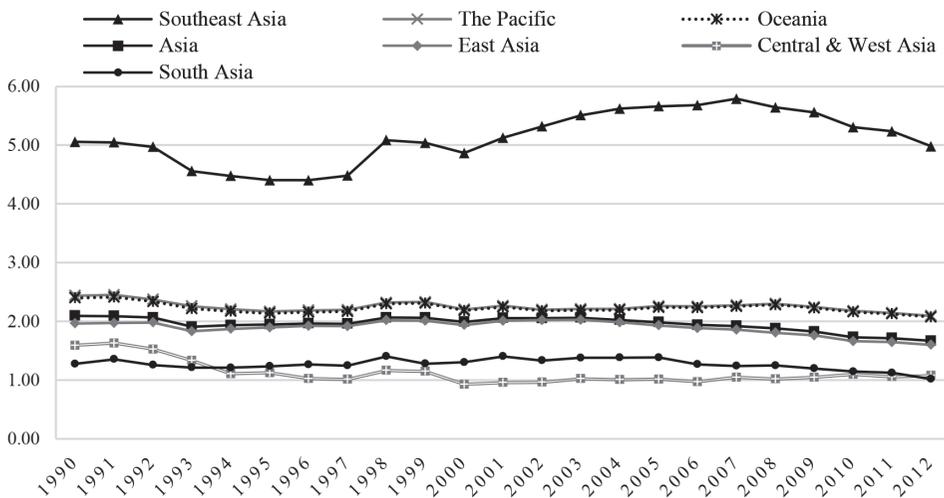
To determine the determinants of the intra-regional proportion of trade of Asian countries and

Fig. 8 TII of sub-regions with Asia, 1990 and 2012



Notes: There is no data for Oceania

Fig. 9 TII of Asia with its sub-regions, 1990-2012



economies, we employ the dynamic panel data model implemented by Roodman (2005), which is explained in detail by Roodman (2009) in Stata. The intra-Asian proportion of trade of each of the 39 selected countries is the dependent variable.<sup>9</sup> The annual data from 1990 to 2012 is used, which is mainly taken from two online databases, namely ADB-ARIC Integration Indicators and the World Development Indicators (WDI).<sup>10</sup> The proportion of trade of each country in Asia changes slowly over time, and the current level of intra-regional proportion of trade also depends on their past level of intra-regional trade share. Thus, the lagged dependent variable is also included in the explanatory variables as one of the major determinants. However, this inclusion creates a dynamic structure of the model; hence fixed country effects and the OLS estimator becomes biased and inconsistent in short panels (Nickell, 1981). To overcome

9 Selected countries are listed with underlined in Appendix 1.

10 The ADB-ARIC Integration Indicators is available at: <https://aric.adb.org/integrationindicators> and the World Development Indicators (WDI) is available at: <http://data.worldbank.org/data-catalog/world-development-indicators>.

such problems, Arellano and Bover (1995) and Blundell and Bond (1998) suggested a system generalized method of moments (GMM) estimator (Sapkota 2014). Therefore, the model is specified as follows:

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

where  $Y_{it}$  represents the dependent variables of country  $i$  at year  $t$ .  $Y_{it-1}$  is one period lag of the dependent variable,  $X_{it}$  represents the set of determinants of intra-regional trade share,  $\eta_i$  is the country fixed effect,  $\eta_t$  is the time-varying effect, and  $\varepsilon_{it}$  is an error term.  $\beta_1$  and  $\beta_2$  are the coefficients of each explanatory variable, which are the parameters of interest.  $\alpha$  is the constant term. The correlation matrix and the summary statistics of the dependent and independent variables are given in Appendix 2a and 2b.

GMM is appropriate for our data for several reasons. First, if the independent variables and the error term " $\varepsilon_{it}$ " in the model are not independent, unobserved variables can affect both the outcome variable and independent variable; therefore, the estimated coefficients can be biased. Such a 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 the countries, this problem will remain in the error term. GMM addresses this problem (Blundell and Bond 1998). Second, GMM is also appropriate for the fixed individual effect (in our case, the country-specific effect) and heteroskedasticity and autocorrelation within individuals but not across them (Roodman 2009).

Several trade-related variables are considered as the major determinants of intra-regional trade share. In addition to the lag dependent variable, we consider each country's number of FTAs/RTAs, which are in effect with the Asian countries or sub-regions. Although the quality of FTAs and RTAs is different, the gravity model revealed that FTAs/RTAs leads to a trade creation effect, and trade diversion effect is far limited in general (Urata and Okabe 2010). Similarly, countries' trade as a percentage of GDP is considered to examine whether the countries with more trade dependence trade more within the region.

Gross Domestic Product (GDP) in purchasing power parity (PPP) term is considered as one of the determinants of intra-regional trade because the traditional gravity model of trade considers the size of economy and distance between trade partners as the major determinants of trade between them (Helpman, Melitz and Rubinstein 2008). It is expected that the larger economies in Asia trade proportionately more within the region; Thornton and Goglio (2002) found this for Southeast Asia. The distance is ignored because this study uses intra-regional trade as the dependent variable instead of bilateral or inter-regional trade.

Gross National Income (GNP) per capita is considered another determinant of intra-regional trade share. GNP per capita is one of the widely used measures of the level of economic development, and it is expected to make positive impacts on intra-regional trade (Sharma and Chua 2000).

Similarly, foreign direct investment (FDI) stock as a percent of GDP is considered as another determinant. The literature, including Bilas and Franc (2010), suggest that the foreign capital creates dynamic, positive effects on regional economic integration. In addition, mobile cellular subscriptions (per 100 people) are included because mobile technology boosts the environment for international interaction

and networking, which helps to increase intra-regional trade (Bankole, Osei-Bryson and Brown 2013).

We also include urban population growth as a prospective determinant of intra-regional trade. Brakman and Marrewijk (2013) suggest that trade patterns may also depend on the level of urbanization between countries. Finally, the value added from the service sector to GDP is considered as another determinant. As the service sector contribution to GDP increases in addition to human resources and other forms of development (Wagner 2012), the service sector growth is expected to generate a positive effect on the intra-regional trade.

System GMM uses a large matrix of available instruments and weights them properly to overcome the endogeneity problem. We assumed trade-related variables exclusively, such as a lag dependent variable, total trade as a percentage of GDP, and the number of FTAs as an endogenous variable, and used as *gmmstyle* instruments in *xtabond2* command in Stata as suggested by Roodman (2009). The remaining variables are used as *ivstyle* instruments. The Sargan/Hansen test supports the joint validity of the instruments.

## 2. Results and discussion

Table 1 presents the results. The asterisk (\*) indicates the level of significance, where one asterisk (\*) means a 10% level of significance, two asterisks (\*\*) means a 5% level of significance, and three asterisks (\*\*\*) means a 1% level of significance. No asterisk means no significant effect. The sign of the coefficients

Table 1. Determinants of intra-regional trade in Asia, 1990-2012  
Dependent variable: intra-regional trade with all of Asia (%)

Explanatory variables	
Trade Share (%) with the partner to all of Asia in prev. year	0.402*** (0.035)
Trade (% of GDP)	0.003 (0.009)
Number of FTAs/RTAs with Asian countries or sub-regions	0.476*** (0.133)
Log of GDP, PPP (current in Billions \$)	-2.240*** (0.217)
Log of GNI per capita, Atlas method (current US\$)	2.161*** (0.444)
FDI stock (% of GDP)	0.022*** (0.005)
Mobile cellular subscriptions (per 100 people)	0.014* (0.007)
Urban population growth rate (annual %)	3.213*** (0.254)
Services (% of GDP)	0.009 (0.033)
Constant	16.38*** (4.709)
Observations	858
Number of countries	39

Notes: Dynamic panel-data estimation, two-step system GMM; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; Standard errors in parentheses; all data are annual. GDP and GNI per capita are in natural logarithm because these two variables are in natural numbers, not in percent form.

indicates the direction of the effect.

Among the trade-related variables, the lag dependent variable and the number of FTAs/RTAs are highly significant at the one percent level to increase the intra-regional trade share of countries in Asia. Although it is intuitive that the past level affects the current level of intra-regional trade, the positive and significant effect of FTAs is consistent with the existing literature such as Baier and Bergstrand (2007) who empirically argued that bilateral FTA approximately doubles the trade between the members. Ghosh and Yamarik (2004) also found the trade-creating effect of RTAs. However, the total trade and the service sector value added both as a percent of GDP are found to be insignificant, which indicate that the trade dependence and service sector growth do not affect the intra-regional trade. The reason behind these results needs further investigation.

The level of development measured by the log of GNI per capita is highly significant to increase intra-regional trade. This finding indicates that a country's level of development boosts their trade capacity. However, the size of the economy measured by the log of GDP has a significant negative impact on intra-regional trade in Asia. The size captured the fact that larger economies, such as China, trade more outside Asia than inside the region (Gaulier, Lemoine and Deniz 2007).

FDI, measured as the percent of GDP, is also highly significant to increase intra-regional trade in Asia. This finding is consistent with the existing literature that FDI has been instrumental for production fragmentation particularly in East and Southeast Asia, which contributes increasing trade of parts and components within the region (Fukao, Ishido and Ito 2003). Therefore, trade and investment policies should complement each other because both contribute to the overall economic integration process. Furthermore, those countries that economically lag behind, such as Myanmar, Cambodia, and Nepal, should pursue the trade and investment policies that led them to be a part of the regional value chains. The other countries, which are already a major part of regional and global value chains such as Japan, Australia, Korea (Rep. of) and China, can accelerate economic integration, which will boost the regional and global value chain by increasing opportunities for regional trade and investment and developing the trade and investment capacity of countries that lag behind within the region.

Similarly, technological advancement also has a significant positive impact on intra-regional trade. The result shows that mobile cellular subscription per 100 people is significant at the 10% level to increase intra-regional trade in Asia. The result is consistent with the recent findings of Bankole, Osei-Bryson and Brown (2015) because they found a significant positive impact of ICT on intra-African trade. Moreover, we found a significant positive impacts of urbanization measured by urban population growth on intra-regional trade in Asia. Urbanization can contribute to intra-regional trade through increasing the cross-border movement of people (Skeldon 2006) and promoting international networks (Smart and Smart 2003). Overall, the results of this study are firmly consistent with the existing literature.

## IV. Conclusion

In this paper, we investigated whether the regional integration at the pan-Asian level as well as its sub-regional level is moving forward. Although intra-regional trade increased from 45.2% in 1990 to 54.85% in 2012 at the pan-Asian level, we found that the relative importance of Asian trade with pan-Asia as well as with its sub-regions vis-à-vis global trade, measured by the trade intensity index (TII), declined over the same period. The finding indicates that as countries' trading capacities grows, they tend to trade globally rather than regionally. Such a declining economic importance of the region is not encouraging evidence for broader regional integration in pan-Asia as well as its sub-regional level. Thus, trade and investment policies that boost regional trade and investment are essentially important for countries in the region for rapid progress on pan-Asian integration.

Employing the dynamic panel data approach, we found that FTAs/RTAs are one of the main determinants of the growing intra-Asian proportion of trade. Clearly, countries should increase the quality as well as the quantity of bilateral and multilateral trade and investment agreements within the region. However, care should be taken to avoid the trade diversion effects of global trade while engaging in FTAs/RTAs.

Other determinants of intra-regional trade are countries' level of economic development, FDI stock, urban population growth and access to ICT. Thus, it is argued that a more open FDI policy, urbanization and technological development of Asian countries would create an enabling environment for pan-Asian economic integration. Both liberalizing the trade and investment regime as well as boosting domestic demand are essential for any country in the region to be ready to meaningfully participate in the pan-Asian regional integration process.

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## Sources

- Figs. 1-9: The data are taken from the ARIC Regional Integration Indicator database, available at <https://aric.adb.org/integrationindicators> (last accessed on March 7, 2015).
- Table 1: Data for dependent variable, FDI stock and number of FTAs/RTAs of all countries are taken from ARIC Regional Integration Indicator database of the Asian Development Bank, available at <http://aric.adb.org/>. Data for the remaining variables (except for Taiwan) are taken from the World Bank's WDI online database, available at <http://databank.worldbank.org/data/databases.aspx>. Data for Taiwan are taken from the ADB's Statistical Database System available online at <https://sdb.sdb.org/sdb/index.jsp>.

## Appendices

Appendix 1 List of pan-Asian countries (underlined included in the analysis) with sub-regional grouping as per the ADB

Central Asia sub-region	<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	<u>People' s Republic of China</u> , <u>Japan</u> , <u>Hong Kong</u> , <u>the Republic of Korea</u> , <u>Mongolia</u> , and <u>Taiwan (Republic of China)</u>
Southeast Asia sub-region	<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	<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	<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	<u>Australia</u> and <u>New Zealand</u>

Source: Integration Indicators groupings of ADB's ARIC database, available at <https://aric.adb.org/integrationindicators/groupings>, accessed: March 17, 2015.

Appendix 2a Correlation Matrix

	tras	trade	ftas	gdp	gnipc	fdi	mob	pop	ser
Intra-regional trade in Asia (tras)	1								
Trade (% of GDP)	0.17	1							
No. of FTAs/RTAs within Asia (ftas)	-0.04	0.07	1						
GDP, PPP (current in Billions \$) (gdp)	-0.12	-0.17	0.26	1					
GNI per capita, (current US\$) (gnipc)	0.15	0.28	0.19	0.20	1				
FDI stock (% of GDP) (fdi)	0.20	0.73	0.14	-0.09	0.47	1			
Mobile subscriptions (per 100 people) (mob)	0.14	0.32	0.47	0.15	0.54	0.49	1		
Urban population growth (annual %) (pop)	0.38	0.03	-0.13	0.03	-0.19	-0.10	-0.13	1	
Services value added (% of GDP) (ser)	0.14	0.13	0.02	0.10	0.45	0.32	0.40	-0.20	1

Source: Data for Intra-regional trade in Asia, FDI stock and number of FTAs/RTAs of all countries are taken from ARIC Regional Integration Indicator database of the Asian Development Bank available at: <http://aric.adb.org/>. Data for the remaining variables (except for Taiwan) are taken from the World Bank's WDI online database, available at: <http://databank.worldbank.org/Data/Databases.aspx>. Data for Taiwan are taken from the ADB's Statistical Database System available online at: <https://sdfs.adb.org/sdfs/index.jsp>.

## Appendix 2b Summary Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Intra-regional trade in Asia	897	54.636	21.161	2	95.171
Trade (% of GDP)	897	93.759	72.416	0.1	449.99
No. of FTAs/RTAs within Asia	897	2.295	2.210	0	13
GDP, PPP (current in Billions \$)	897	467.488	1305.829	0.22	14790.12
GNI per capita, (current US\$)	897	5981.52	10276.17	110	59770
FDI stock (% of GDP)	897	32.932	57.939	0	579.78
Mobile subscriptions (per 100 people)	897	29.753	42.065	0	229.24
Urban population growth (annual %)	897	2.291	1.861	-3.103	10.92797
Services value added (% of GDP)	897	47.980	15.349	6.7	93.115

*Source:* Data for Intra-regional trade in Asia, FDI stock and number of FTAs/RTAs of all countries are taken from ARIC Regional Integration Indicator database of the Asian Development Bank available at: <http://aric.adb.org/>. Data for the remaining variables (except for Taiwan) are taken from the World Bank's WDI online database, available at: <http://databank.worldbank.org/Data/Databases.aspx>. Data for Taiwan are taken from the ADB's Statistical Database System available online at: <https://sdfs.adb.org/sdfs/index.jsp>.