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Trade and Global Value Chain

Trade and Global Value Chain

Recent Trends in Asia's Trade

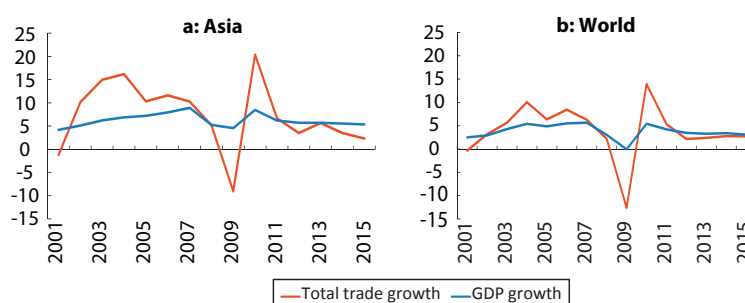
Asia's trade growth in 2015 continued to slow below world trade growth; it also fell further below GDP growth.

Trade growth by volume fell from 3.5% in 2014 to 2.3% in 2015 in Asia and the Pacific, much sharper than the decline in global trade from 2.8% to 2.7% in the same period. In comparison, North America's trade growth fell 0.8 percentage points to 3.7%, and Africa's by 0.4 percentage points to 0.7%. Latin America's total trade continued to contract (from a rate of -2.0% in 2014 to -2.3% in 2015). By contrast, trade growth accelerated to 4.3% from 2.7% in the European Union (EU) and to 3.3% from 1.5% in the Middle East.

Asia's trade growth has consistently fallen below output growth since 2012, consistent with the global trend (Figures 2.1a, 2.1b).

By volume, both export and import growth has slowed in Asia and the Pacific since 2011, after a rebound in 2010 following the global financial crisis. Worldwide growth deceleration was more pronounced in developing economies than developed economies. Developing Asia's export growth slowed sharply to 3.0% in 2015 from 6.4% in 2013 and 4.6% in 2014, compared with the gradual recovery in developed economies' export growth to 3.0% in 2015 from 1.7% in 2013 and 2.5% in 2014 (Figures 2.2a, 2.2b). Import growth has been below that in developed economies since 2014—a meager 1.7% in 2015 against 4.5% growth in developed economies. While sluggish import growth may have helped economies with current account deficits shore up current account balances, it also reflected the domestic demand weakness across

Figure 2.1: Merchandise Trade and GDP Growth—Asia and World (% , y-o-y)

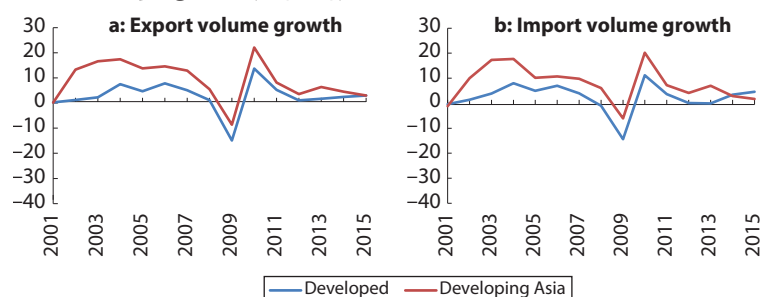


GDP = gross domestic product, y-o-y = year-on-year.

Note: Real GDP growth is weighted using GDP at purchasing power parity. Total trade growth is the average of export volume growth and import volume growth.

Sources: ADB calculations using data from International Monetary Fund, World Economic Outlook April 2016 Database. <https://www.imf.org/external/pubs/ft/weo/2016/01/weodata/index.aspx>; World Trade Organization Statistics database. <http://stat.wto.org> (accessed September 2016).

Figure 2.2: Export and Import Volume Growth—Developed Economies and Developing Asia (% , y-o-y)

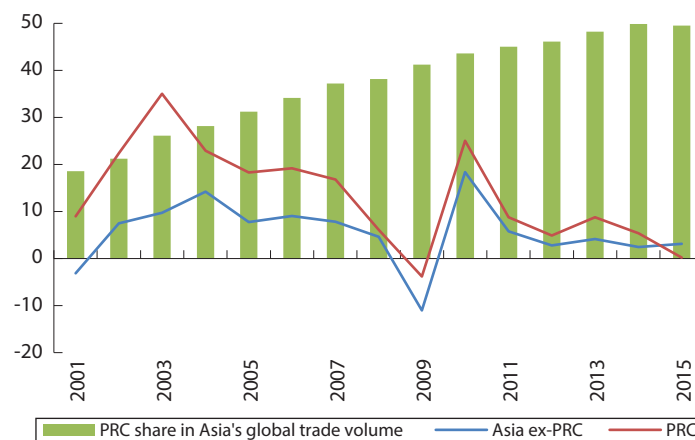


y-o-y = year-on-year.

Notes: Economies were grouped into “developed” and “developing” based on country classification of the United Nations. The computations included 37 developed economies (European Union [EU], non-EU, Asia, and North America) and 146 developing economies (from non-EU, Africa, Asia, Middle East, and Latin America and the Caribbean). Developing Asia includes ADB’s 45 developing member economies.

Source: Source: ADB calculations using data from World Trade Organization Statistics database. <http://stat.wto.org> (accessed October 2016).

Figure 2.3: PRC and Asia ex-PRC Trade Volume Growth (% , y-o-y)



PRC = People's Republic of China, y-o-y = year-on-year.

Source: ADB calculations using data from World Trade Organization Statistics database. <http://stat.wto.org> (accessed October 2016).

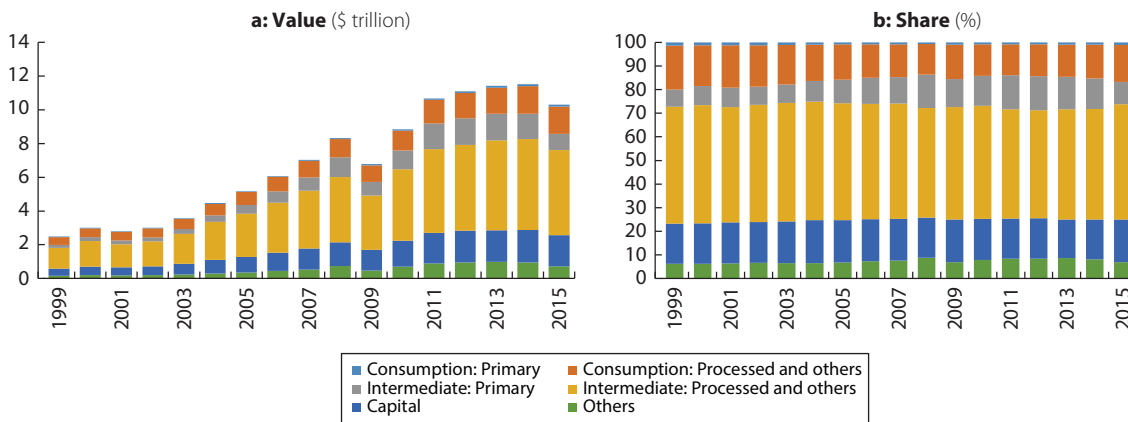
developing Asia, further complicating the challenge of sustaining economic growth momentum beyond tepid export growth.

Asia's trade slowdown was driven by weaker trade in the People's Republic of China (PRC) and slower intermediate goods trade growth in the region.

The PRC's trade slowdown worsened in 2015, with trade volume growth plunging to just 0.2% from 5.4% in 2014 (Figure 2.3). PRC's exports continued to grow, but much slowly, down to 4.8% in 2015 from 6.8% in 2014, as reforms continue to steer the economy

away from export-oriented growth to more domestic demand-driven growth—slower yet more sustainable and balanced. Imports contracted 4.2%, reversing the 4% growth in 2014. With the PRC accounting for the bulk of the region's total trade, the PRC trade slowdown pulled down Asia's total global trade. Excluding the PRC, Asia's aggregate trade volume growth rose to 3.1% from 2.5% in 2014.

By value, intermediate goods trade contracted 13.2% in 2015, affecting Asia's overall trade performance as well. Intermediate goods—particularly processed goods—remain a major component of Asian exports and imports—accounting for about 58% of its total

Figure 2.4: Total Trade by Commodity Groups—Asia

Note: Based on Broad Economic Categories.

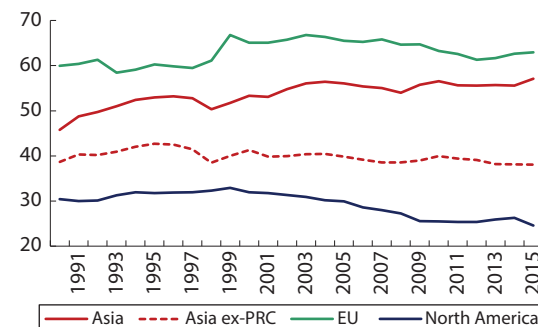
Source: ADB calculations using data from United Nations. Commodity Trade Database. <https://comtrade.un.org> (accessed October 2016).

trade (Figures 2.4a, 2.4b). Beginning in 2010, growth of processed intermediate goods fell rapidly from 31% to 1.3% in 2014 and contracted 6.8% in 2015. Consumption goods growth also declined, but not as much—by 1.9% in 2015; while capital goods fell 3.6%. Detailed commodity level data show that the fall in intermediate goods trade value had nearly equal drops in both price and volume.⁴ Falling intermediate goods trade growth could indicate stagnating or loosening global and regional value chains (see “Analyzing Global and Regional Value Chains” for more details).

Asia's Intra-regional Trade

Despite the slowdown in overall trade, Asia's intra-regional trade share increased in 2015 given its declining trade with non-Asian economies.

Intra-regional trade in Asia and the Pacific increased to 57.1% in 2015, up from an average 55.8% during 2010–2014 (Figure 2.5). By comparison, intra-regional trade in the European Union (EU) and North America is 63% and 25%, respectively.

Figure 2.5: Intra-regional Trade Shares—Asia, European Union, North America (%)

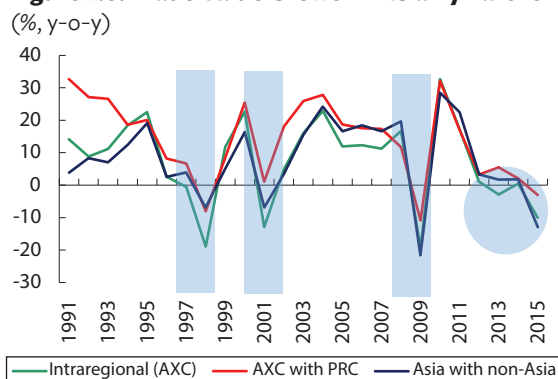
EU= European Union, PRC= People's Republic of China.

Notes: EU refers to the aggregate of 28 EU members. North America covers Canada, Mexico, and the United States.

Sources: ADB calculations using data from CEIC; and International Monetary Fund. Direction of Trade Database. <https://www.imf.org/en/Data> (accessed August 2016).

However, intra-regional trade by value declined by 7.4% in 2015 after growing only 1.3% in 2014. Indeed, intra-Asia trade share increased in 2015 because of an even sharper drop in Asia's trade with non-Asian economies (down by 13%). Excluding the PRC, intra-regional trade growth fell even more sharply at 10% in 2015, while Asia's trade with the PRC contracted 3% (Figure 2.6).

⁴ The United Nations Commodity Trade Database lists exports up to a six-digit product level.

Figure 2.6: Trade Value Growth—Asia By Partner

AXC = Asia excluding the PRC, PRC = People's Republic of China, y-o-y = year-on-year.

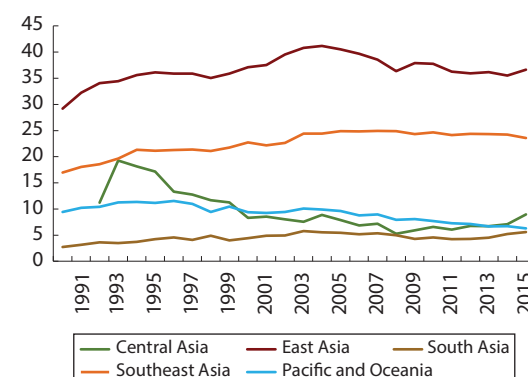
Source: ADB calculations using data from International Monetary Fund, Direction of Trade Database. <https://www.imf.org/en/Data> (accessed August 2016).

Trade share mostly strengthened within subregions, but declined across subregions—also confirmed by gravity model estimation results based on bilateral trade data.

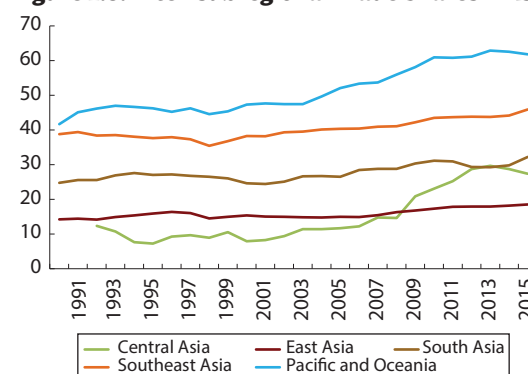
While the intra-subregional trade shares of Central Asia, East Asia, and South Asia rose in 2015 from 2014, those of Southeast Asia and the Pacific and Oceania fell (Figure 2.7).⁵ Intra-subregional trade shares remain the highest in East Asia and Southeast Asia. Central Asia outpaced the Pacific and Oceania in 2015 and now occupies the third position. South Asia still has the lowest share, but not too far behind the Pacific and Oceania.

Inter-subregional trade shares—trade across subregions within Asia—declined in Central Asia and the Pacific and Oceania, and slightly rebounded in East Asia. Inter-subregional trade shares increased in South Asia and Southeast Asia. The Pacific and Oceania continues to engage in significantly more trade with other subregions in Asia than within itself, with the highest inter-subregional trade share among Asian subregions (Figure 2.8).

After controlling for economic size and geographic, cultural, and economic proximity, Asia's intraregional exports are significantly higher than exports to non-Asian economies (Box 2.1). From gravity model estimation results based on data for 2011–2015, the most recent

Figure 2.7: Intra-subregional Trade Shares—Asia (%)

Source: ADB calculations using data from International Monetary Fund, Direction of Trade Database. <https://www.imf.org/en/Data> (accessed August 2016).

Figure 2.8: Inter-subregional Trade Shares—Asia (%)

Source: ADB calculations using data from International Monetary Fund, Direction of Trade Database. <https://www.imf.org/en/Data> (accessed August 2016).

period, intraregional trade bias declined to 0.96 from 1.16 in 2010–2014.⁶

Gravity model is also a useful tool to assess the impact of foreign exchange rate on trade. The volatility of exchange rate has grown significantly recently. However, weaker local currency does not seem to contribute to export growth as much as before (Box 2.2).

⁵ The Pacific and Oceania includes ADB's Pacific developing member economies plus Australia and New Zealand.

⁶ Intraregional trade bias refers to the coefficient of the intra-Asia dummy in the gravity model of bilateral export flows. A positive and significant coefficient means that Asia's trade with itself is higher than its trade with non-Asian economies.

Box 2.1: Gravity Model Estimation of Bilateral Exports

In traditional gravity models, trade flows (either exports or imports) are determined by the size of the respective source and destination economies and distance, which appears to be an overall proxy for trade costs. However, this simple specification fails to capture the unobserved multilateral trade resistance. Multilateral trade resistance measures the cost of country i to export to country j relative to the cost of exporting to other economies (outward multilateral resistance) or the cost of country i to import from country j relative to the cost of importing from all possible import sources (inward multilateral resistance).

Because of the structural weakness of the intuitive gravity model in assessing trade flows, international trade literature uses the Anderson and van Wincoop (2003) gravity model specifications that account for multilateral trade resistance. To account for time-varying characteristics of each trading partner, the gravity model is augmented with country fixed effects interacted with year dummies.

Results of gravity model estimation using annual data covering 2011–2015 and 2010–2014 are shown in box table 1. This 5-year rolling regression, updated annually, provides a snapshot of progress

1: Gravity Model Estimation Results

Dependent Variable: Log(bilateral exports)	All Goods	Capital Goods	Consumption Goods	Intermediate Goods
Log(distance)	-1.79*** (0.02)	-1.72*** (0.02)	-1.90*** (0.02)	-1.83*** (0.02)
Colonial relationship dummy	0.82*** (0.11)	0.73*** (0.10)	0.93*** (0.12)	0.84*** (0.11)
Common language dummy	0.98*** (0.04)	0.92*** (0.05)	1.04*** (0.05)	0.82*** (0.05)
Contiguity dummy	0.91*** (0.12)	0.94*** (0.11)	0.99*** (0.12)	0.95*** (0.12)
Regional dummies (base: Asia to ROW)				
Both in Asia dummy	0.96***[1.16***] (0.32)	0.11 [0.51] (0.36)	0.48 [0.90**] (0.40)	0.15 [0.47] (0.37)
Importer in Asia dummy	0.92 (0.61)	-0.22 (0.82)	0.09 (0.65)	0.81 (0.76)
Both in ROW dummy	-0.61 (0.46)	-0.93 (0.70)	-1.27*** (0.45)	0.03 (0.61)
Sample size	148,780	148,780	148,780	148,780
Censored observations	40,292	76,499	58,922	54,211
Uncensored observations	108,488	72,281	89,858	94,569

*** = significant at 1%, ** = significant at 5%, * = significant at 10%, robust standard errors in parentheses.

ROW = rest of the world.

Notes: Based on annual data covering 2011–2015. Numbers in brackets are the coefficients of the regional dummies for gravity model estimation results using annual data covering 2010–2014. Time-varying economy dummies are included but not shown for brevity. Heckman sample selection estimation was used to account for missing economy-pair data. Data cover 173 economies, of which 43 are from Asia. Trade data based on Broad Economic Categories.

Sources: ADB calculations using data from Institute for Research on the International Economy. <http://www.cepii.fr/CEPII/en/cepil/cepil.asp>; and United Nations. Commodity Trade Database. <https://comtrade.un.org> (both accessed October 2016).

in regional trade integration. The coefficient of “both in Asia” dummy can be viewed as a trade integration index.

In terms of intra-subregional trade bias, East Asia still stands out, followed by Southeast Asia and Central Asia. South Asia continues to engage in significantly more trade with other subregions within Asia, although its inter-subregional bias weakened slightly (box table 2). While Asia’s intra-subregional bias remained high for both estimation periods (2011–2015 and 2010–2014) in all goods across most subregions, inter-subregional bias weakened. Subregional trade integration seems to be progressing steadily,

centered on subregional specific integration initiatives such as the Greater Mekong Subregion, Central Asia Regional Economic Cooperation, South Asia Subregional Economic Cooperation, and the Pacific Islands Forum. While this is encouraging for advancing regional integration, weak inter-subregional trade links suggest more work is needed to improve inter-subregional connectivity and trade facilitation across subregions (beyond subregional level efforts).

2: Gravity Model Estimation Results: Intra- and Inter-subregional Trade

Dependent Variable: Log(bilateral exports)	Central Asia	East Asia	South Asia	Southeast Asia	Pacific and Oceania
Intra-subregional Trade Dummy					
All goods	4.53***[4.44***]	6.63***[6.74***]	1.33**[1.48***]	4.65***[4.81***]	1.07**[0.75]
Capital goods	3.16***[3.98***]	3.35***[3.84*]	0.57[0.85*]	3.06***[2.77***]	0.13 [0.47]
Consumption goods	5.48***[5.02***]	5.64***[5.03***]	0.72[1.29***]	4.79***[4.04***]	0.44 [-0.09]
Intermediate goods	3.59***[3.62***]	6.94***[7.27***]	0.85*[1.04***]	4.91***[5.46***]	0.13 [0.07]
Inter-subregional Trade Dummy					
All goods	0.62 [0.90**]	0.65*[0.77**]	3.89***[4.13**]	0.83**[1.02***]	-2.05***[-1.16*]
Capital goods	-0.60 [-0.06]	-0.28 [0.11]	1.94***[1.61***]	0.07 [0.39]	-1.04 [-0.56]
Consumption goods	0.21 [1.10*]	0.24 [0.58]	4.32***[3.59***]	0.12 [0.54]	-0.57 [-0.13]
Intermediate goods	-0.52 [-0.03]	-0.15 [0.10]	3.48***[4.14***]	0.28 [0.58]	-3.43***[-2.09***]

*** = significant at 1%, ** = significant at 5%, * = significant at 10%. Estimates for 2010–2014 are in brackets.

Note: Base category (benchmark) is the subregion’s trade with economies outside Asia. A separate regression was estimated for “all goods” and for each commodity group. The usual gravity model variables and time-varying economy dummies are included but, for brevity, not shown. Heckman sample selection estimation was used to account for missing bilateral economy-pair data. Data cover 173 economies, of which 43 are from Asia. Trade data are based on Broad Economic Categories.

Sources: ADB calculations using data from Institute for Research on the International Economy. <http://www.cepii.fr/CEPII/en/cepil/cepil.asp>; and United Nations. Commodity Trade Database. <https://comtrade.un.org> (both accessed October 2016).

Box 2.2: Impact of Foreign Exchange Rate on Trade

Analyzing recent trade growth patterns reveals some interesting changes—a slump in trade growth or convergence toward moderate, longer-term growth rates. Given conventional wisdom—that exchange rate appreciation contributes to an increase in imports and decreased exports, with depreciation acting vice versa—the box examines how the change in exchange rate affected trade flows in the 2000s. Examining exchange rate movements over time, the analysis shows that variations in real effective exchange rate (REER) movements across economies decreased before the global financial crisis (box figure 1a). However, exchange rate variations across economies rapidly increased after the crisis (box figure 1b).

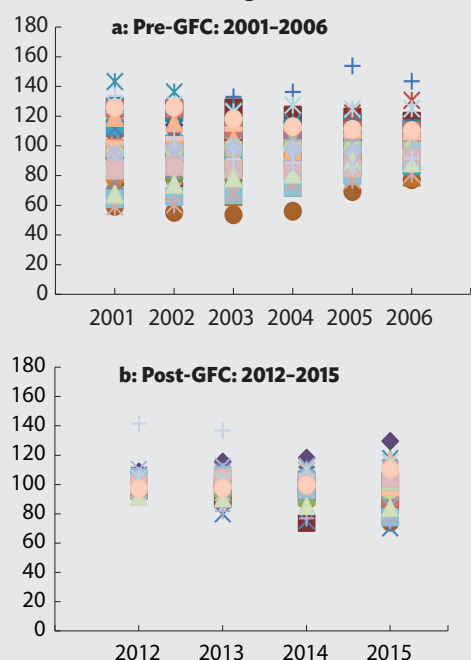
On the other hand, the trade response to exchange rate changes has been smaller since the global financial crisis. Many more economies had lower elasticity of both exports and imports

relative to changes in REER after the global financial crisis than before (box figures 2a, 2b).

Given the main focus on trade volume growth—excluding the volatile price factor—the empirical analysis investigates how real exchange rate movements lead to changes in trade volumes. While much of the literature tests the impact of exchange rate volatility on trade flows, not much examines the impact of the exchange rate level itself on trade, particularly trade volume. In investigating the relationship between changes in trade and exchange rates, a panel gravity model is employed with various fixed effects included to control for omitted variable bias and its associated endogeneity.

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln xrate_{ijt} + \beta_2 \ln GDP_{jt} + \beta_3 R_{ij} + \gamma_{it} + \delta_j + \phi_{ijt}$$

1: Real Effective Exchange Rate Index

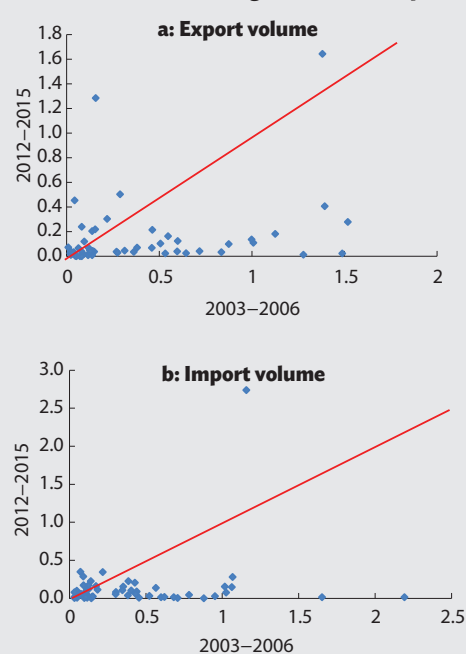


GFC = global financial crisis.

Note: Includes 61 economies with available data on real effective exchange rate.

Source: Bank for International Settlements. <https://www.bis.org/statistics> (accessed July 2016).

2: Real Effective Exchange Rate Elasticity



REER = real effective exchange rate.

Notes: Points above the 45-degree line indicate that REER elasticity of export (import) volume is higher during 2012–2015 compared to 2003–2006. Includes 61 economies with available data on REER.

Source: Kang (2016).

where the subscript i and j denote the importer and exporter, respectively, and t denotes time. X is the annual bilateral export volume, calculated by deflating the export value by producer price index of the exporting economy. $xrate$ is the bilateral real exchange rate, calculated by $nxrate \times \frac{CPI_i}{CPI_j}$, where $nxrate$ is the nominal exchange rate, and CPI_i and CPI_j are consumer price indexes of importing and exporting economies, respectively. GDP_{jt} denotes the real GDP of exporting economies, and R_{ijt} controls the usual gravity variables, including distance, colonial relationship, common language, and geographical contiguity. γ_{it} is time-varying importer fixed effects to control for remaining importer specific factors on trade, such as tariffs and other nontariff barriers, and δ_j are exporter fixed effects. Finally, ϕ_{ijt} is an error term. The model tests the impact of exchange rate on exports for 2001–2015 and separately for 2003–2006 (before the global financial crisis), 2007–2010 (global financial crisis), and 2012–2015 (after the crisis). In addition to the level of real exchange rate, we test the impact of its one and two-lagged values (box Table 1). This can help estimate the longer-term impact of exchange rate and also addressing potential simultaneity problem.

1: Gravity Model Estimation Results: Impact of Real Exchange Rates on Bilateral Exports

Period	Log (RER)	Log (RER _{t-1})	Log (RER _{t-2})
Full Period	0.13***	0.06***	0.04***
Pre-GFC	0.66***	0.22***	0.05
GFC	0.09***	0.03	0.01
Post-GFC	0.27***	0.20	0.07

*** = significant at 1%, ** = significant at 5%, * = significant at 10%. Dependent Variable: Log(bilateral exports volume).

GFC = global financial crisis, RER = real exchange rate.

Notes: Full-period covers 2001–2015, 2003–2006 is the period before the global financial crisis, 2007–2010 is the global financial crisis period, and 2012–2015 after the crisis. The usual gravity model variables were included but for brevity are not shown. For the complete gravity model estimation results, please see Annex 2a. Data cover 166 economies, of which 40 are from Asia. Sources: ADB calculations using data from Institute for Research on the International Economy. <http://www.cepii.fr/CEPII/en/cepil/cepil.asp>; United Nations. Commodity Trade Database. <https://comtrade.un.org/>; and World Bank. World Development Indicators. data.worldbank.org/data-catalog/world-development-indicators (accessed September 2016).

First, trade resistance factors point to the significance and expected direction of influence on trade volume. For 2001–2015, the real exchange rate (RER) effect of the year is positive and significant at the 1% level, suggesting the weaker an exporter's currency, the larger the export volume relative to trading partners. A 1% depreciation of an exporter's RER

on average leads to a 0.13% increase in export volume of the same year. When the lagged variable of the RER is considered, the magnitude of the impact decreases over time. The term structure of the RER impact on trade reveals interesting, consistent patterns. First, the size of the RER coefficient shrinks from level RER to lag(1) and lag(2) RERs. Even the significance of the RER is not retained for lag(2) RER across all three periods. This indicates the effect of the real exchange rate over export volume is greatest during the contemporaneous year and dissipates over time. There is no indication of a J-curve effect.

Second, the magnitude of the RER coefficient is consistently larger for the periods before and after the global financial crisis and much smaller during the global financial crisis. The exchange rate effect was significantly dampened during the crisis period.

Third, compared with the pre-global financial crisis period, the exchange rate effect on export volume in the period after the crisis was less than halved during the same year and its lagged impact has become even insignificant. The results show the exchange rate effect significantly weakened.

One potential cause of the subdued impact of exchange rate on trade is a deepening global value chain (GVC) worldwide. For example, while depreciation of the local currency may induce greater exports by increasing the price competitiveness of exported goods, the impact could be dampened if the exported goods embed a large portion of intermediates, as these demands could be undermined by the depreciation, obscuring the net impact of currency depreciation. Additionally, some adjustments were made to test this GVC factor hypothesis, by averaging export, GDP, and exchange rate variables for 2001–2003, 2006–2008, 2009–2011, and 2012–2014, and including the data of domestic value added (DVA) share out of gross bilateral exports for the years 2000, 2005, 2008, and 2011, given the available value added decomposition data for these years. This can also measure the persistent effect of GVC participation spreading over multiple years. box table 2 presents both summary results under a base-line model without time-varying importer fixed effects and an extended model with time-varying importer fixed-effects.

Overall, a larger DVA share leads to less bilateral exports. This indicates that deepening GVCs can induce greater trade, confirming the hypothesis that rapid expansion of GVCs has contributed to international trade growth. The impact of average real exchange rate on exports becomes negative

Box 2.2. continued.

after considering the GVC impact, although the sizes of the coefficients are very small. Further, the interaction between DVA share and exchange rates reveals a positive coefficient. These suggest deepening GVCs could have dampened the traditional mechanism of exchange rate levels influencing trade. Nevertheless, the coefficient of the interaction term indicates the impact of exchange rate could still be positive for the exports of an economy with higher than 77% of DVA share based on the basic model and 70% based on the extended model. These results suggest not that the GVC is the only factor that might have induced the weakening impact of exchange rate on trade, but that it could be one of the structural factors.

2: Regression Results

	Base Model	Extended Model
DVA share	-0.355*** (0.144)	-0.279** (0.155)
Average RER	-3.74e-05*** (1.85e-05)	-2.98e-05** (1.73e-05)
DVA*(average RER)	4.85e-05*** (2.14e-05)	4.26e-05*** (1.85e-05)

*** = significant at 1%, ** = significant at 5%. Dependent variable:

Log(bilateral exports volume).

DVA = domestic value added, RER = real exchange rate.

Notes: Results for other gravity model variables, for brevity, are not presented. DVA share is the share of domestic value added in total exports for 47 economies with available data from the ADB Multi-Regional Input-Output Tables, with 14 economies from Asia (Australia; Bangladesh; People's Republic of China; India; Indonesia; Japan; the Republic of Korea; Malaysia; Mongolia; the Philippines; Sri Lanka; Taipei, China; Thailand; and Viet Nam). Bilateral RER is deflated by the ratio of consumer price indexes of importer over that of exporter.

Sources: ADB calculations using data from ADB Multi-Regional Input-Output Tables based on methodology by Wang, Wei, and Zhu (2014); Institute for Research on the International Economy. <http://www.cepii.fr/CEPII/en/cepii/cepii.asp> (accessed July 2016); United Nations. Commodity Trade Database. <https://comtrade.un.org> (accessed September 2016); and World Bank. World Development Indicators. data.worldbank.org/data-catalog/world-development-indicators (accessed September 2016).

Analysis of Global and Regional Value Chains

The expansion of global and regional value chains has slowed.

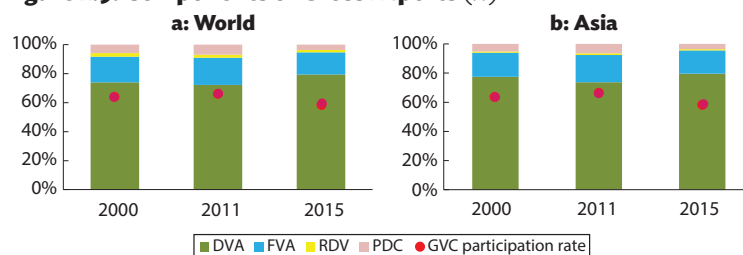
The *Asian Economic Integration Report 2015* referred to maturing global and regional value chains as one of the potential causes of trade growth slowdown since 2012. The recent International World Input-Output data supports this argument.⁷ Among the components of gross world exports, the value of DVA increased 2.6 times between 2000 and 2011 and 1.1 times between 2011 and 2015. For the same periods, foreign value added (FVA) increased 2.8 and 0.8 times, respectively; returned domestic value added (RDV), 2.1 and 0.9 times; and purely double-counted terms (PDC), 3.2 and 0.5 times. While DVA still increased between 2011 and 2015, all other components that capture an expanding production network through multiple border-crossing have decreased in absolute value. As shown in Figure 2.9a, the DVA portion out of gross exports declined between 2000 and 2011, while other components' shares grew, except for RDV during this period, indicating a deepening GVC. This trend reversed between 2011 and 2015, with the DVA portion accounting for a much larger portion.

As a major contributor to international trade and the deepening of the GVC, Asia is no exception. Value-added decomposition of Asia's gross exports also points to deepening integration into the GVC between 2000 and 2011, which reversed the direction between 2011 and 2015 (Figure 2.9b).

Asia's GVC participation as measured by the share of value added contents of gross exports used for further processing through cross-border production networks also attests to this. The GVC participation ratio rose from 63.2% to 65.5% between 2000 and 2011 but declined to 58.7% in 2015 (see Figure 2.9).⁸

⁷ The ADB Multi-Regional Input-Output Table covers 47 economies, with 14 from Asia and Pacific (Australia; Bangladesh; the PRC; India; Indonesia; Japan; the Republic of Korea; Malaysia; Mongolia; the Philippines; Sri Lanka; Taipei, China; Thailand; and Viet Nam).

⁸ The GVC participation ratio is measured as: $[(\text{gross exports} - (\text{T1} + \text{T9} + \text{T10} + \text{T15} + \text{T16})) / \text{gross exports}]$. Please refer to Annex 2b for the components of decomposed gross exports.

Figure 2.9: Components of Gross Exports (%)

DVA = domestic value added, FVA = foreign value added, PDC = purely double-counted terms, RDV = returned domestic value added.

Note: The GVC participation ratio is measured as: $[\text{gross exports} - (T_1 + T_9 + T_{10} + T_{15} + T_{16})] / \text{gross exports}$. Please refer to Annex 2b for the components of decomposed gross exports.

Sources: ADB calculations using ADB Multi-Regional Input-Output Tables and methodology by Wang, Wei, and Zhu (2014).

Regional value chains have strengthened over time, while progress varies across subregions.

For the geographical linkage of value chains in Asian subregions from a forward-linkage perspective, we find that East Asia is becoming more integrated outside the region than inside, reflecting its strong outward orientation. Out of gross exports, DVA export share to the region has fallen slightly, from 34.4% in 2000 to 33.5% in 2015, while the share outside the region increased from 65.5% to 66.5% (Table 2.1). This phenomenon is more pronounced when the progress of vertical specialization is examined. In East Asia, 37% of FVA exports went outside the region in 2000 and jumped to 56% by 2015. The RDV and PDC also indicate a similar trend, albeit to a lesser extent.

In contrast, South Asia's value chain linkage strengthened inside the region. South Asia's DVA export share for the region grew from 20.1% to 25.5% between 2000 and 2015. The regional share for other components went even further in South Asia, reflecting its relatively closer value chain linkage inside the region. For example, the regional share for FVA increased from 22.3% to 38.4%. South Asia's overall intra-subregional linkage weakened overtime. Instead its value chain linkage with other subregions strengthened, particularly with Southeast Asia. The share of Southeast Asia in South Asia's FVA exports, for example, rose from just 9.7% in 2000 to 19.1% in 2015.

Southeast Asia does not show much change over time between regional and extra-regional value chain linkages. At the subregional level, however, its linkage has strengthened with South Asia in particular. Oceania, represented only by Australia in our data, reveals fast-

growing value chain linkage with the region. East Asia's share is the largest for Oceania, while the share of other subregions has also grown in general.

Among select Asian economies, Viet Nam shows the highest FVA export portion of gross exports, at 31.0% in 2015, followed by Taipei, China at 25.4%; Malaysia at 25.3%; and Thailand at 24.7% (Table 2.2). This indicates significant amounts of processing manufacturing. While Malaysia's FVA export portion drastically declined from 40.2% in 2000 to 25.3%, its weight on processing manufacturing remains significant. The PRC's FVA export share edged up, from 13.8% in 2000 to 14.1% in 2015. Japan's FVA grew significantly, from 6.6% to 12.1% in the period, which could have benefitted from expanding production offshoring activities of parts and components, driven by strengthening outward foreign direct investment (FDI).

Diagnosing Channels of the Brexit Impact: Trade and Investment Linkages

The Brexit impact on Asia through trade and investment linkages may not be sizeable; but some economies may face additional costs due to value chain and indirect investment linkages.

The United Kingdom's (UK) decision to leave the EU (Brexit) rattled the global financial market, triggering a flight to safe-haven assets such as the United States

Table 2.1: Asia's Link to Global and Regional Value Chains (% of total per component)

Exporter/ Importer	2000					2015				
	East Asia	South Asia	Southeast Asia	Oceania	Rest of the World	East Asia	South Asia	Southeast Asia	Oceania	Rest of the World
Domestic Value Added										
East Asia	24.3	1.0	7.3	1.8	65.5	21.1	3.7	6.5	2.2	66.5
South Asia	11.3	3.1	4.1	1.6	79.8	9.3	5.4	8.8	2.0	74.5
Southeast Asia	29.6	1.4	11.4	2.7	55.0	26.9	4.8	11.2	4.1	52.9
Oceania	41.1	1.2	8.9	—	48.8	49.4	4.3	12.3	—	34.0
Foreign Value Added										
East Asia	37.5	0.3	23.4	1.5	37.3	33.6	0.8	7.9	1.4	56.4
South Asia	10.9	0.8	9.7	0.9	77.7	14.6	3.1	19.1	1.6	61.6
Southeast Asia	29.3	0.5	38.6	3.9	27.7	35.2	2.9	27.8	4.7	29.4
Oceania	45.5	0.9	16.0	—	37.7	66.7	2.1	14.0	—	17.2
Returned Domestic Value Added										
East Asia	23.3	1.0	7.0	1.9	66.8	20.4	3.8	6.6	2.2	67.1
South Asia	10.8	3.2	3.9	1.6	80.5	9.3	5.4	8.8	2.0	74.6
Southeast Asia	32.4	1.5	10.8	3.4	51.9	27.8	4.9	11.3	4.5	51.5
Oceania	41.4	1.2	8.8	—	48.6	49.9	4.3	12.0	—	33.9
Purely Double-Counted Terms										
East Asia	27.4	1.2	4.6	1.9	64.9	20.7	4.1	5.9	2.3	67.1
South Asia	14.0	3.0	3.9	1.9	77.2	8.7	6.3	7.4	2.2	75.5
Southeast Asia	25.0	1.4	11.6	1.6	60.4	23.5	4.9	10.2	2.9	58.4
Oceania	38.7	1.4	8.4	—	51.5	41.9	5.7	15.7	—	36.7

— = data unavailable.

Note: Data for the Pacific unavailable.

Sources: ADB calculations using ADB Multi-Regional Input-Output Tables and methodology by Wang, Wei, and Zhu (2014).

Table 2.2: Select Individual Asian Economies Export Component (% of total exports)

2000	AUS	PRC	IND	INO	JPN	KOR	MAL	TAP	THA	VIE
DVA (% of total)	86.5	81.6	85.1	80.2	89.1	69.4	47.6	63.7	59.2	75.6
FVA (% of total)	10.1	13.8	11.9	15.0	6.6	22.8	40.2	26.7	33.6	20.4
RDV (% of total)	0.3	0.8	0.2	0.2	1.9	0.3	0.1	0.3	0.2	0.1
PDC (% of total)	3.1	3.8	2.9	4.6	2.4	7.5	12.1	9.3	6.9	4.0
2015	AUS	PRC	IND	INO	JPN	KOR	MAL	TAP	THA	VIE
DVA (% of total)	90.2	81.5	86.1	90.6	83.9	72.8	68.8	65.8	71.1	65.7
FVA (% of total)	7.3	14.1	11.8	7.3	12.1	21.4	25.3	25.4	24.7	31.0
RDV (% of total)	0.4	1.5	0.3	0.4	0.9	0.3	0.2	0.2	0.2	0.1
PDC (% of total)	2.1	2.9	1.7	1.7	3.1	5.5	5.7	8.6	4.1	3.2

AUS = Australia; DVA = domestic value added; FVA = foreign value added; IND = India; INO = Indonesia; JPN = Japan;

KOR = Republic of Korea; MAL = Malaysia; PDC = purely double-counted terms; PRC = People's Republic of China;

RDV = returned domestic value added; TAP = Taipei, China; THA = Thailand; VIE = Viet Nam.

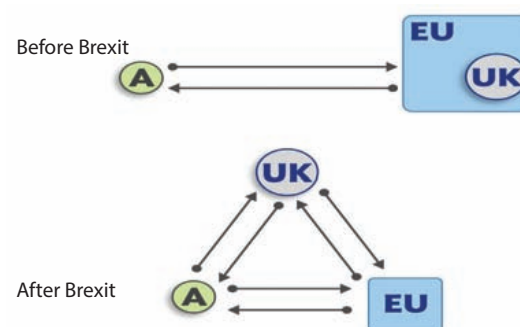
Sources: ADB calculations using ADB Multi-Regional Input-Output Tables and methodology by Wang, Wei, and Zhu (2014).

(US) dollar and Japanese yen, and tightened financial markets. The global financial market quickly stabilized, however, supported by ultra-loose monetary policy in major advanced economies and slimmer prospects for further increases in the US interest rates in the near future. The International Monetary Fund (IMF), in its July 2016 *World Economic Outlook*, estimated minimal global spillover from Brexit, particularly in large economies such as the PRC and the US. However, it noted that the negative impact could be larger in “downside” or “severe” scenarios with tighter financial conditions and lower business and consumer confidence than the baseline; or where financial stress intensifies, especially in advanced European economies, leading to sharp tightening of financial conditions and a drop in confidence (IMF 2016).

Macroeconomic repercussions and financial market spillovers caused by the anticipated lengthy procedures culminating in the UK departure from the EU could themselves pose risks to the global economy and individual economies with relatively close UK economic ties. But the actual Brexit impact on the real sector will likely appear through trade and investment channels. The UK is one of the most open economies in the world. For non-EU trading partners, Brexit implies higher transaction costs. Before Brexit, country A in Figure 2.10 faced a common trade regime with the EU with the UK as a part, which included common tariffs and other trade-related systems. If a country already has a free trade agreement (FTA) with the EU, it could enjoy preferential treatment trading with the EU, including the UK.

With Brexit, however, country A faces a different trade regime from the EU’s when trading with the UK. Even if the UK provides the same or similar treatment as the EU to country A, it would still face higher transaction costs due to separate compliance requirements for trading with the UK, including separate documentation of certificates of origin, and so on. The same applies to the country’s trade with the EU, though to a lesser extent. If the country has an existing FTA with the EU, it loses flexibility in using UK resources and inputs in qualifying for EU preferential treatment, thus having to use non-UK-produced inputs in manufacturing final products to avail of EU preferential treatment. This implies additional transaction costs. As depicted below, shifting from a single transaction point to multiple ones entails higher costs to the trading partner both with the UK and the EU.

Figure 2.10: Trade and Investment Channels of Brexit Impact



EU = European Union, UK = United Kingdom.
Source: ADB.

Brexit impact: Trade channel

We now examine which economies in the EU and Asia could be more affected by Brexit by investigating their value chain linkages with the UK. We use the gross export decomposition methodology by Wang, Wei, and Zhu (2014), using the ADB Multi-Regional Input-Output tables. It covers 27 EU members, 14 Asian economies, Brazil, Canada, Mexico, the Russian Federation, Turkey, and the UK. If an economy in the EU or Asia has a deeper value chain linkage with the UK by sharing segments of a production network, the economy will likely suffer more from Brexit because transaction costs will rise due to the need for separate trading engagements with the UK, the increase in costs exacerbated by multiple border-crossings of products with respect to the UK.

In exports to the UK in 2015, Malta and Ireland are the EU economies with higher value chain linkage with the UK relative to gross export linkage (Table 2.3). In Figure 2.11, economies above the 45-degree line have higher value chain linkage than linkage through gross exports.

Among Asian economies’ value chain linkages with the UK, several are exposed to greater value added export linkages with the UK than others (Table 2.4). However, Asian economies overall are much less exposed to value chain linkages with the UK than EU economies. Sri Lanka has the highest export weight for the UK in gross terms, but its weight is around a half in terms of value chain linkages. Others with relatively higher value chain linkages with the UK are India and Australia (Figure 2.12).

Table 2.3: Top 10 EU Exporters to UK, 2015

Exporter	Gross Exports to UK (%) ^a	FVA+RDV+PDC Exports (%) ^b	FVA+RDV+PDC Exports (%) ^c
Malta	13.6	19.2	14.8
Ireland	13.7	18.8	13.8
Netherlands	11.9	9.5	7.2
Belgium	8.8	6.2	8.4
Denmark	7.2	6.2	4.9
Cyprus	8.5	5.7	2.2
Sweden	8.0	5.5	4.4
France	8.2	5.0	3.6
Germany	6.3	4.8	5.4
Portugal	7.9	4.3	3.2

EU = European Union, FVA = foreign value added, RDV = returned domestic value added, PDC = purely double-counted terms, UK = United Kingdom.

^a Share in gross exports to the world.

^b Share of FVA + RDV + PDC exports to the world.

^c Share of gross exports to the UK.

Sources: ADB calculations using ADB Multi-Regional Input-Output Tables and methodology by Wang, Wei, and Zhu (2014).

Table 2.4: Top Asian Exporters to the UK, 2015

Exporter	Gross Exports to UK (%) ^a	FVA+RDV+PDC Exports (%) ^b	FVA+RDV+PDC Exports (%) ^c
Sri Lanka	10.1	5.4	1.4
India	6.4	3.6	1.8
Australia	7.9	3.0	1.2
Philippines	4.4	2.7	2.7
Thailand	3.9	2.6	4.3
Bangladesh	4.3	2.6	1.8
Malaysia	2.3	1.8	6.9
PRC	2.9	1.0	2.2
Taipei, China	2.2	1.0	5.4
Indonesia	3.1	0.9	0.8
Republic of Korea	1.8	0.9	4.1
Japan	1.8	0.9	2.7
Viet Nam	1.7	0.9	3.5
Mongolia	0.7	0.4	6.1

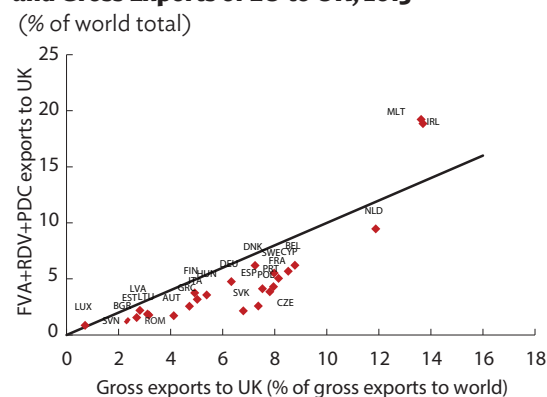
PRC = People's Republic of China, FVA = foreign value added, PDC = purely double-counted terms, RDV = returned domestic value added, UK = United Kingdom.

^a Share in gross exports to the world.

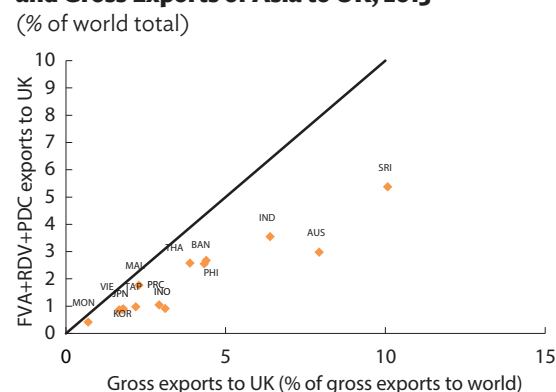
^b Share of FVA + RDV + PDC exports to the world.

^c Share of gross exports to the UK.

Source: ADB calculations using ADB Multi-Regional Input-Output Tables and methodology by Wang, Wei, and Zhu (2014).

Figure 2.11: Global Value Chain Link (Exports) and Gross Exports of EU to UK, 2015

Sources: ADB calculations using ADB Multi-Regional Input-Output Tables and methodology by Wang, Wei, and Zhu (2014).

Figure 2.12: Global Value Chain Link (Exports) and Gross Exports of Asia to UK, 2015

Sources: ADB calculations using ADB Multi-Regional Input-Output Tables, and methodology by Wang, Wei, and Zhu (2014).

Brexit impact: FDI channel

The higher transaction costs to Asian investors after Brexit include those associated with “passporting rights”, which for now facilitate the economy’s FDI into the EU through the UK and vice versa. In this sense, examining indirect FDI routes through the EU and the UK is useful in determining how much an economy could be exposed to additional transaction costs, including potential relocation costs if needed, which is not captured by sheer FDI exposure. In this analysis, indirect FDI refers to investments by a parent company through a subsidiary. We look at indirect investments from Asia to the UK through any member of the EU, and to any member of the EU through the UK. For example, Appco Group, a UK-based company, invested in business services in France in 2015. Appco is a subsidiary of Cobra Group International, which is incorporated and headquartered in Hong Kong, China. In this case, Hong Kong, China is the source of indirect investments to France through the UK.

Among major Asian investors to the UK, Japan and India show the largest number of “greenfield” investments in 2015—\$3.9 billion and \$3.1 billion, respectively (Figure 2.13).⁹ The Republic of Korea and Singapore greenfield FDI are geared more toward non-UK, EU economies. For indirect FDI into the UK and EU, India was relatively high in 2015, heading mainly to the EU through the UK (amounting to \$1.5 billion in 2015). The Republic of Korea appears different: most indirect FDI went through the EU to the UK.

Updates on Regional Trade Policy

While trade liberalization is advancing centered on continued efforts to reach bilateral and regional free trade agreements, concern is growing about rising protectionism globally and regionally.

⁹ A greenfield investment is a form of foreign direct investment where a parent company builds its operations in a foreign country from the ground up. In addition to the construction of new production facilities, these projects can also include the building of new distribution hubs, offices, and living quarters.

Recent FTA trends

As of August 2016, based on the Regional Trade Agreements Information System Database of the World Trade Organization (WTO), which covers FTAs of all WTO members, only one FTA—Japan–Mongolia Economic Partnership Agreement (EPA)—entered into force in the first half of 2016 (Figure 2.14).

Free trade agreement activities in Asia remain robust, although the global trend on launching new FTAs stagnated after agreement on the Trans-Pacific Partnership (TPP)—a “mega FTA”—and amid ongoing negotiations on the Regional Comprehensive Economic Partnership (RCEP), another regional mega FTA¹⁰ (Figures 2.15, 2.16). In addition to the Japan–Mongolia FTA, the Republic of Korea–Colombia FTA came into force in July 2016. Another, the Viet Nam–Eurasian Economic Union FTA takes effect in October 2016.¹¹ In addition, seven FTAs had been proposed or launched for negotiation as of August 2016 (Table 2.5).

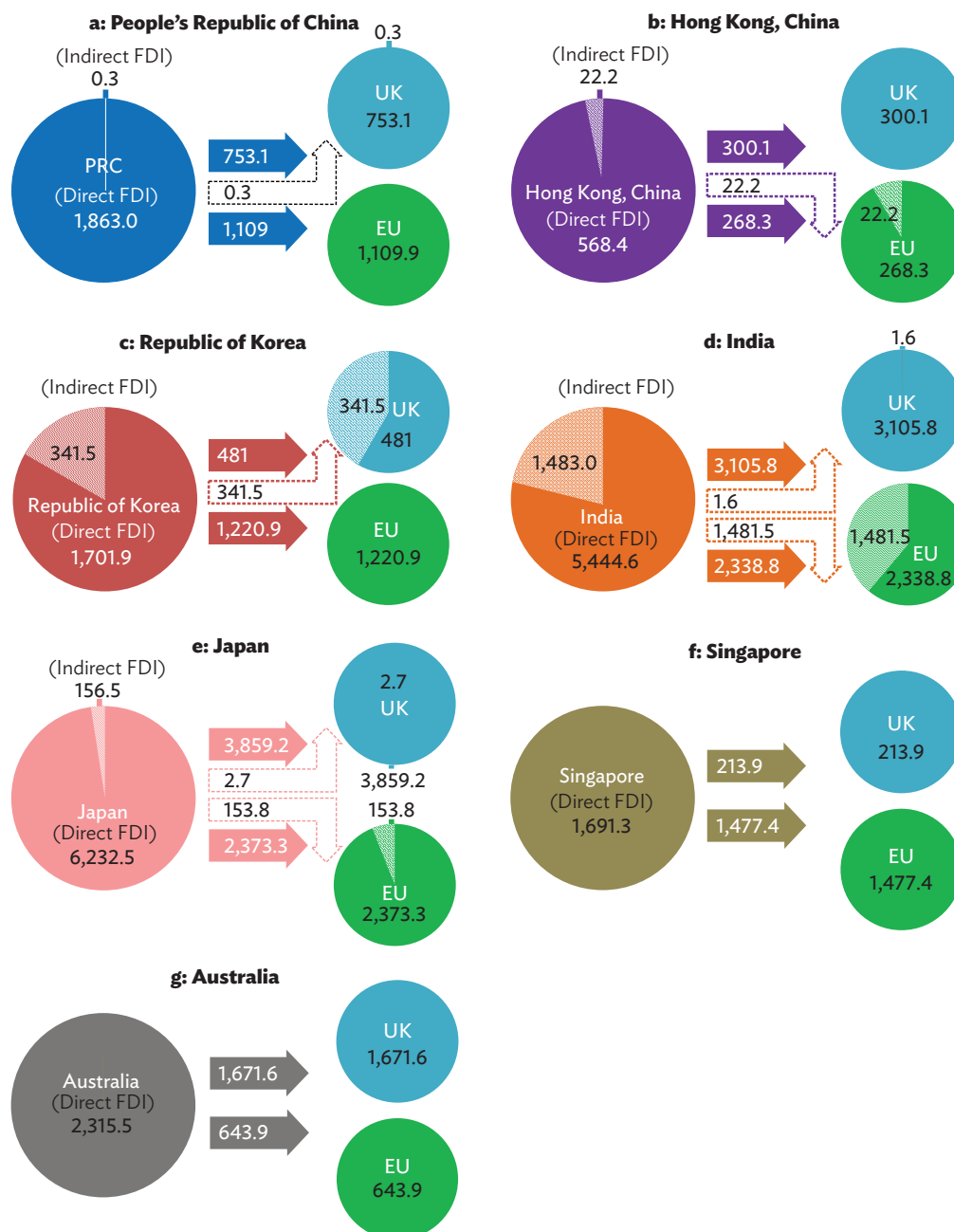
Trans-Pacific Partnership

After 5 years of negotiations, the TPP—a free trade and investment agreement—was signed by Australia, Brunei Darussalam, Chile, Canada, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the US, and Viet Nam on 4 February 2016 in Auckland, New Zealand. The next step is for TPP member legislatures to pass the agreement and to ratify it within 2 years. If one or more members miss the ratification deadline, the TPP can survive if at least six original signatories—accounting for 85% of the region’s 2013 GDP—complete the ratification, preferably but not necessarily within 2 years. Failure by either Japan or the US to ratify the agreement,

¹⁰ Based on the World Trade Organization Regional Trade Agreements database. Of the nine FTAs that came into force in 2015, seven involve Asia. RCEP member economies include (1) Australia, (2) Brunei Darussalam, (3) Cambodia, (4) Indonesia, (5) the Lao People’s Democratic Republic, (6) Malaysia, (7) Myanmar, (8) the People’s Republic of China, (9) the Philippines, (10) Singapore, (11) Thailand, (12) Viet Nam, (13) India, (14) Japan, (15) the Republic of Korea, and (16) New Zealand.

¹¹ The FTA consists of Armenia, Belarus, Kazakhstan, the Kyrgyz Republic, and the Russian Federation.

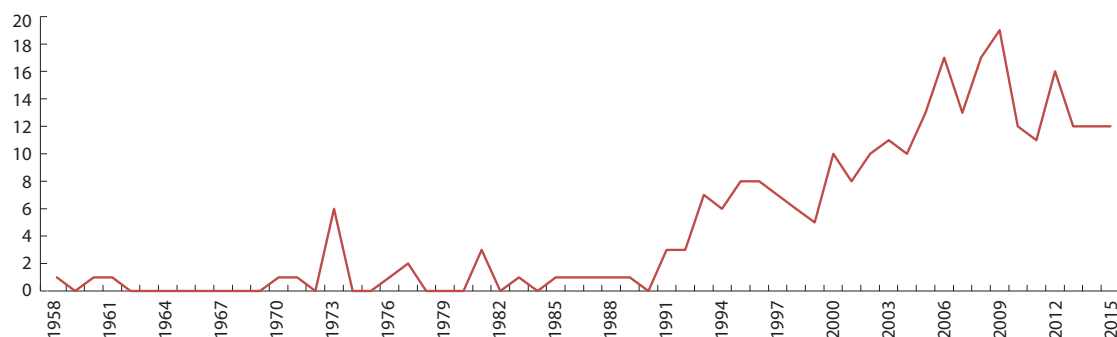
Figure 2.13: Direct and Indirect Greenfield Foreign Direct Investment to the UK and EU from Asian Economies, 2015



EU = European Union, FDI = foreign direct investment, PRC = People's Republic of China, UK = United Kingdom.

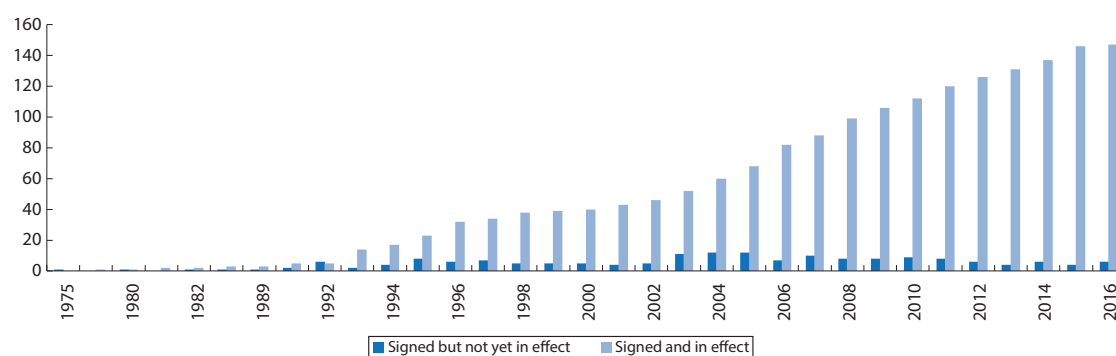
Notes: Indirect FDI refers to investment by a parent company through a subsidiary. fDi Markets tracks greenfield FDI by source economy, which is the location of the parent company, and by investing company information. In the analysis, we look at indirect investments from Asia to the UK through any EU member and to any member of the EU through the UK. Values are in \$ million.

Source: ADB calculations using data from Financial Times. fDi Markets.

Figure 2.14: Number of Newly Effective FTAs—World

FTA = free trade agreement.

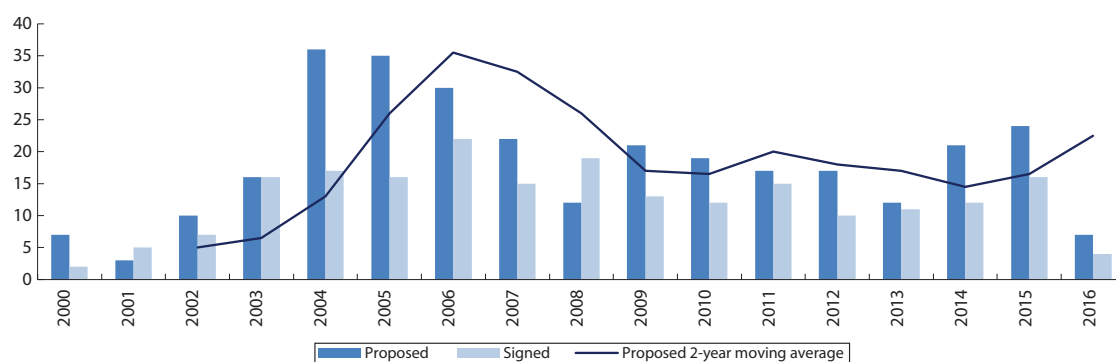
Source: World Trade Organization, Regional Trade Agreement Information System. <http://rtais.wto.org> (accessed August 2016).

Figure 2.15: Number of Signed FTAs—Asia (cumulative since 1975)

FTA = free trade agreement.

Notes: Includes bilateral and plurilateral FTAs with at least one of ADB's 48 regional members as signatory. The year 2016 covers FTAs that came into effect from January to July and FTAs that are expected to come into force within the year based on official statements.

Source: ADB, Asia Regional Integration Center FTA Database. <https://aric.adb.org/fta> (accessed September 2016).

Figure 2.16: Number of FTAs Proposed and Signed by Year—Asia

FTA = free trade agreement.

Notes: Includes bilateral and plurilateral FTAs with at least one of ADB's 48 regional members as signatory. The year 2016 covers FTAs that came into effect from January to July, and FTAs that are expected to come into force within the year based on official statements. "Signed" includes FTAs that are signed but not yet in effect, and signed and in effect. "Proposed" includes FTAs that are (i) proposed (the parties consider an FTA, governments or ministries issue a joint statement on the FTA's desirability, or establish a joint study group and joint task force to conduct feasibility studies); (ii) framework agreement signed and under negotiation (the parties, through ministries, negotiate the contents of a framework agreement that serves as a framework for future negotiations); and (iii) under negotiation (the parties, through ministries, declare the official launch of negotiations, or start the first round of negotiations).

Source: ADB, Asia Regional Integration Center FTA Database. <https://aric.adb.org/fta> (accessed September 2016).

Table 2.5: Recently Proposed FTAs in Asia

2013	2014	2015	2016
Japan–EU	ASEAN–Hong Kong, China	EEU–Iran	Hong Kong, China–Georgia
Japan–Turkey	Indonesia–Chile	India–EEU	Hong Kong, China–Maldives
Pakistan–Thailand	Indonesia–Peru	India–Iran	Singapore–Sri Lanka
Pakistan–Republic of Korea	Pakistan–US	Japan–Sri Lanka	Republic of Korea–Israel
PRC–Japan–Republic of Korea	Peru–India	Philippines–Canada	Nepal–PRC
PRC–Israel	Philippines–Australia	Philippines–Chile	Thailand–Sri Lanka
RCEP	Philippines–EU	Philippines–Mexico	Indonesia–EU
Thailand–EU	Philippines–EFTA	PRC–Maldives	
Thailand–Colombia	PRC–EU	PRC–Georgia	
Viet Nam–EEU	PRC–Sri Lanka	Thailand–Jordan	
	New Zealand–EU	Pakistan–Viet Nam	
	Singapore–Turkey	Pakistan–EEU	
	Taipei, China–India	Australia–EU	
		Singapore–EEU	

ASEAN = Association of Southeast Asian Nations, EEU = Eurasian Economic Union, EFTA = European Free Trade Association, EU = European Union, FTA = free trade agreement, PRC = People's Republic of China, RCEP = Regional Comprehensive Economic Partnership, US = United States.

Source: ADB. Asia Regional Integration Center FTA Database. <https://aric.adb.org/fta> (accessed September 2016).

constituting slightly less than 80% of total GDP of all TPP members, would effectively block the agreement.

United States. While President Barack Obama unequivocally supports TPP ratification, President-elect Donald Trump does not, and it is unlikely the US plans to take up the issue anytime soon. Neither Republicans nor Democrats have given clear indication of their support. Recent developments suggest bleak prospect of the US ratifying the agreement soon.

Nonetheless, a diverse group of US economic and industry leaders has endorsed the agreement, including the National Association of Manufacturers, the Business Roundtable, the US Chamber of Commerce, the National Small Business Association, and the American Farm Bureau Federation. The groups recognize the TPP's economic benefits, which range from substantial tariff elimination to protecting innovation (Office of the United States Trade Representative 2016).

Japan. Although some economic sectors are against the TPP—particularly agriculture, which fears competition with imports from Australia and the US—Japan strongly supports the TPP. In July 2016, the economy top business leaders asked Prime Minister Shinzo Abe to push for the ratification of the TPP during the Diet session in

September (Prime Minister of Japan and His Cabinet 2016a). Prime Minister Abe reiterated his determination for quick ratification, calling the agreement “pivotal” to Japan's economic growth.¹² He also urged the US government to secure ratification as soon as possible, stressing that the success or failure of the agreement “will sway the direction of the global free trade system” (Prime Minister of Japan and His Cabinet 2016b). Japan's lower house of Parliament voted to ratify the TPP on 10 November 2016.

New Zealand parliament has also passed the bill that allows the government to ratify the TPP. Meanwhile, leaders of TPP member economies have indicated the possibility that TPP membership could expand.

Regional Cooperation Economic Partnership

Another mega trade deal, the RCEP, is also being negotiated. As noted, the RCEP would bind the 10 ASEAN members and six economies with which ASEAN

¹² This is the response of Prime Minister Abe to questions against TPP during debate in the Diet sessions where TPP ratification is under deliberation (*Japan Times* 2016).

has existing FTAs. These 16 states have agreed to conclude negotiations before the end of 2016 (Malaysia Ministry of International Trade and Industry 2016). However, according to the latest reports, RCEP will miss its agreed timeframe for concluding negotiations. The Joint Leader's Statement on RCEP released 8 September 2016 reiterated "the importance of advancing negotiations" and calls to "intensify negotiations in a cooperative manner for the swift conclusion of the RCEP negotiations" (ASEAN 2016). But the statement indicates no timeframe on concluding talks.

Several complex issues, including on services, are holding back the negotiations. Although members have now agreed to a single-tier system of tariff relaxation from the earlier three-tier system, talks have been slow (Business Standard 2016).

According to officials, RCEP participants are planning to accelerate negotiations by holding rounds of talks through the end of 2016 (Bangkok Post 2016). As of

October 2016, 15 rounds of negotiations, which include working groups on trade in goods, trade in services, and investment, have been conducted since 2013 (Ministry of Foreign Affairs of Japan 2016). The sixteenth round of negotiations will be held on 2–10 December 2016 in Indonesia (Australian Government Department Foreign Affairs and Trade 2016).

Trade Remedies

Rising protectionism worldwide attracts increasing attention from policy makers and academia (Box 2.3). While the *Asian Economic Integration Report 2015* highlighted a fast-growing number of trade remedies amid the slowdown in international trade, this trend continued in 2015 (Figure 2.17). Antidumping duties are the most prevalent trade remedies imposed on Asian exporters (Table 2.6). There was a spike in the number of trade remedies involving Asia in 2013–2015. Base metals and chemicals are the most affected sectors in the

Box 2.3: Rising Protectionism

The World Trade Organization recently downgraded its forecast for world trade growth to 1.7% in 2016 from 2.8% in April. It also cut its growth projections for 2017 to 1.8%–3.1% from the previous forecast of 3.6%. Tepid world trade growth does not bode well for a still sluggish global economic recovery marked by weak domestic demand, unable to offset slack external demand.

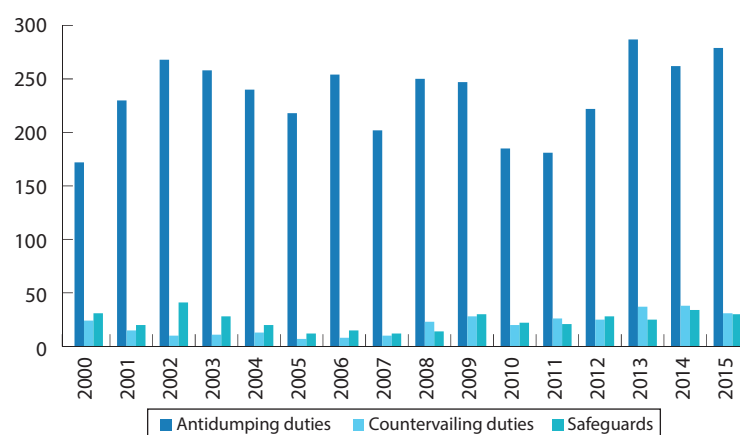
More worrying is the bleak landscape surrounding the future of international trade. Rising protectionism in the run-up to the peak of election cycles and on the back of growing geopolitical tensions arising out of refugee and migration issues is looming over international trade. If history is any guide, protectionism in the 1930s—through increased tariff barriers and the forming of currency blocs—exacerbated conflicts that led to World War II. Nevertheless, politics, which are prone to weigh short-term (and domestic) benefits against long-term gains, tend to be susceptible to populist sentiments that blame globalization for growing income inequality and diminishing job opportunities in domestic economies. Making matters worse, the phenomenon seems to have a domino effect, be it through political rhetoric or more frequent issuance of nontariff barriers.

Given the multipolar international trade environment, growing tensions in trade may trigger a downward spiral of negative-sum games, prompting mutual retaliation through administrative trade policy tools and undermining the nascent status of global economic growth. Those administrative trade measures, such as trade remedies and nontariff barriers, are legitimate policy tools to restore a level playing field with the former and to protect national health and environment with the latter, including sanitary or phytosanitary measures and technical barriers to trade. But they are susceptible to the vested interests of domestic stakeholders and, thus, protectionism for the sake of safeguarding national interest at the expense of others.^a

Given the public good nature of open and liberalized international trade, the importance of concerted effort from the international community cannot be overemphasized—particularly at this juncture. In this context, the role that the Group of 20 and other international forums can play in upholding the growth of international trade by averting creeping protectionism and further supporting trade liberalization and facilitation efforts should be strengthened.

^a For more on rising protectionism, see Kang and Legal (2016).

Figure 2.17: Number of Trade Remedy Measures Affecting Asia
(by type)



Note: Trade remedy measures include both “initiated” and “in force.”
Safeguard measures are imposed on all members of the World Trade Organization; no bilateral data available.
Source: ADB calculations based on data from WTO. Integrated Trade Intelligence Portal.
https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2016).

Table 2.6: Trade Remedy Measures and WTO Cases, 2010–2016

Agreement	World Total	Asia ^a Total	Asia (Complainant) ROW (Respondent)	ROW (Complainant) Asia (Respondent)	Asia (Complainant) Asia (Respondent)
Antidumping (Article VI of GATT 1994)					
Number of measures implemented	888	719	346	103	270
Number of cases	33 (4%)	25 (3.5%)	14	7	4
Countervailing Measures					
Number of measures implemented	78	67	52	7	8
Number of cases ^b	27 (35%)	19 (28%)	9	9	1
Safeguards^c					
Number of measures implemented ^d	59	33	26	33	33
Number of cases	12 (20%)	5 (15%)	3	0	2
Total					
Number of measures implemented	1025	819	424	143	311
Number of cases	72 (7%)	49 (6%)	26	16	7

ROW = rest of the world, WTO = World Trade Organization.

^a Asia as implementing or affected region, which is equivalent to the global number of trade remedy measures less ROW-ROW (not shown in table).

^b Includes cases involving complaints on grant of subsidies and countervailing measures.

^c Safeguard measures are imposed on all WTO members; no bilateral data available.

^d Includes safeguard measures affecting all WTO members.

Note: Trade remedies include measures in force.

Sources: ADB calculations based on data from WTO. Integrated Trade Intelligence Portal.

https://www.wto.org/english/res_e/statis_e/itip_e.htm; WTO. Disputes by Agreement. https://www.wto.org/english/tratop_e/dispu_e/dispu_agreements_index_e.htm (accessed August 2016).

Table 2.7: Number of Trade Remedy Measures Affecting Asia, 2010–2016

HS Product Description	Total	Anti-dumping Duties	Countervailing Duties	Safeguards
Base metals and articles	491	379	71	41
Products of the chemical and allied industries	202	173	16	13
Resins, plastics and articles; rubber and articles	147	125	12	10
Machinery and electrical equipment	109	91	11	7

HS = harmonized system.

Note: Trade remedy measures include both initiated and in force.

Source: ADB calculations based on data from WTO. Integrated Trade Intelligence Portal.

https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2016).

region (Table 2.7). The PRC; the Republic of Korea; and Taipei, China are the Asian economies most affected by trade remedies (Table 2.8).

Sanitary and Phytosanitary and Technical Barriers to Trade Measures

An important goal for governments is to guarantee the safety of food for consumers and prevent or limit the spread of pests, outbreak of diseases among plants and animals, and other health risks arising from residues (of pesticides or veterinary drugs), contaminants (heavy metals), toxins or disease-causing organisms in food, beverages, or feed. Policies with these objectives are generally referred to as sanitary (human and animal health) and phytosanitary (plant health) measures, more commonly known as sanitary and phytosanitary (SPS) measures, which include all relevant laws, decrees, regulations, requirements and procedures.

In response to consumer demand for greater product safety and stricter environmental protection, governments have tightened existing rules or implemented new policies. Economies have therefore

Table 2.8: Number of Implemented Trade Remedy Measures—Top Affected Asian Economies, 2010–2016

Economy Affected	Number of Measures Implemented		
	ROW	Asia	Total
PRC	253	136	389
Republic of Korea	56	66	122
Taipei, China	58	63	121

PRC = People's Republic of China, ROW = rest of the world.

Notes: Trade remedies include measures in force. Safeguard measures are applied to all WTO members, hence the number of measures implemented include measures that are applied to all WTO members.

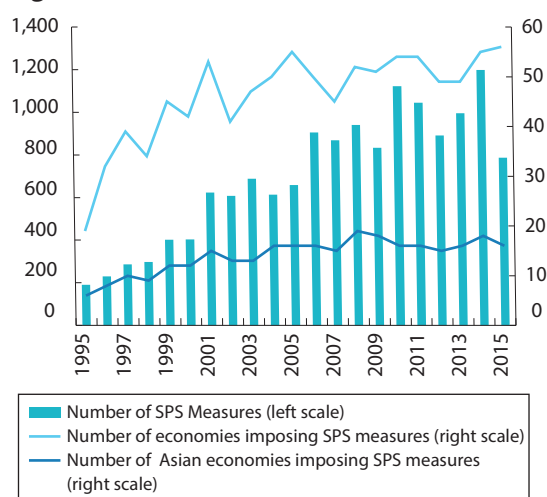
Source: ADB calculations based on data from WTO. Integrated Trade Intelligence Portal.

https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2016).

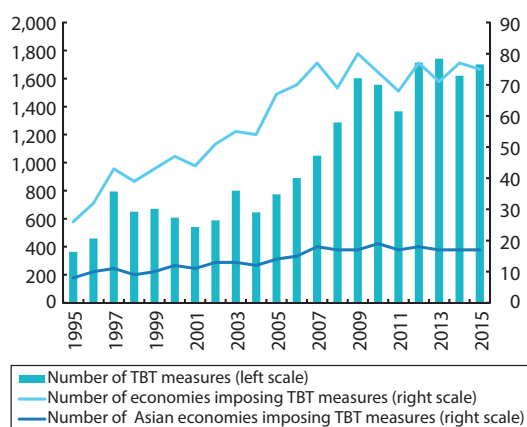
increased technical regulations (which are mandatory) and standards (which are voluntary). These regulations and standards, also known as technical barriers to trade (TBTs), define either the specific characteristics of a product (for example, shape, size, or design and performance) or can pertain to the process and methods used in production (WTO 2012).

Despite their legitimate national health and security rationale, stringent SPS and TBT measures and delays in unexpected procedures concerned could harm trade flows by acting as nontariff barriers, due to high compliance costs for businesses and the perishable nature of some exported products. The incidence of SPS and TBT measures has grown. As of August 2016, 14,123 SPS measures and 21,399 TBT measures had been notified to the World Trade Organization (WTO). Figures 2.18 and 2.19 show the number of notifications to the WTO and the number of notifying economies since 1995 for SPS and TBT measures—both trending upward.

The majority of SPS and TBT measures are imposed on all WTO members, although some are bilateral. On average, 46 WTO economies were notified as imposing SPS measures from 1995–2015; 30% from Asia. For the same period, an average of 59 WTO economies

Figure 2.18: Number of SPS Measures

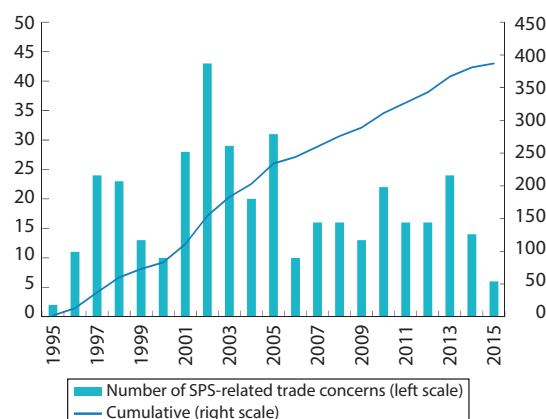
SPS = sanitary and phytosanitary, TBT = technical barriers to trade
 Note: SPS and TBT measures include both initiated and in force.
 Source: ADB calculations based on data from World Trade Organization. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/status_e/itip_e.htm (accessed August 2016).

Figure 2.19: Number of TBT Measures

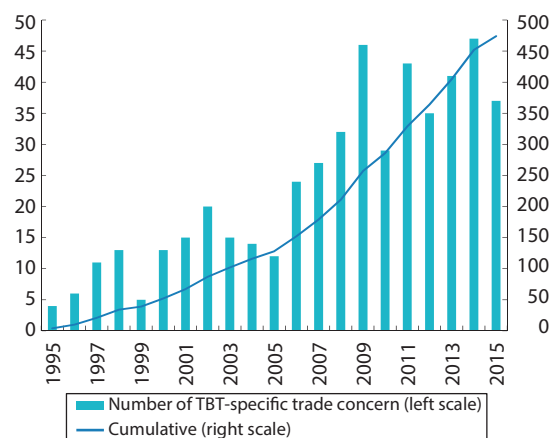
SPS = sanitary and phytosanitary, TBT = technical barriers to trade,
 Note: SPS and TBT measures include both initiated and in force.
 Source: ADB calculations based on data from World Trade Organization. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/status_e/itip_e.htm (accessed August 2016).

notified imposing TBT measures, with a quarter of these from Asia.

The evidence of upward trends in the number of SPS and TBT measures notified is supported by complaint-based information contained in the Specific Trade Concerns Database (Figures 2.20, 2.21). Trends also show that more TBT than SPS measures were imposed, and that more

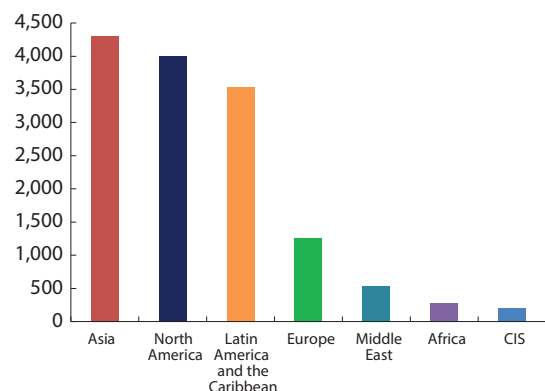
Figure 2.20: Number of Specific Trade Concerns Raised to the WTO SPS Committee

SPS = sanitary and phytosanitary, WTO = World Trade Organization.
 Source: ADB calculations based on data from WTO. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/status_e/itip_e.htm (accessed August 2016).

Figure 2.21: Number of Specific Trade Concerns Raised to the WTO TBT Committee

TBT = technical barriers to trade, WTO = World Trade Organization.
 Source: ADB calculations based on data from WTO. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/status_e/itip_e.htm (accessed August 2016).

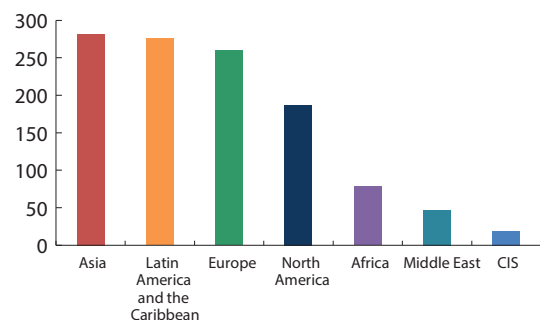
economies imposed TBT measures than SPS measures. Asia imposed the most TBT (4,948) and SPS (4,297) measures, followed by North America, with 4,001 SPS measures and 2,337 TBT measures. Asia was most targeted by bilateral SPS measures (282) or SPS measures

Figure 2.22: Number of SPS Measures Imposed by Region, 1995–2015

CIS = Commonwealth of Independent States, SPS = sanitary and phytosanitary.

Note: SPS measures include both initiated and in force.

Source: ADB calculations based on data from World Trade Organization. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2016).

Figure 2.23: Number of Bilateral SPS Measures Affecting Each Region, 1995–2015

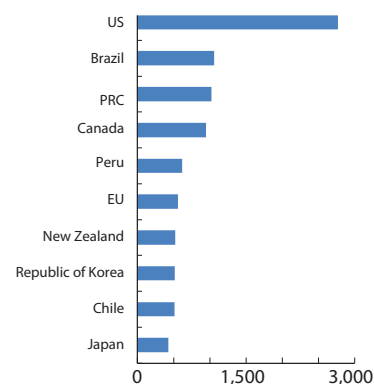
CIS = Commonwealth of Independent States, SPS = sanitary and phytosanitary.

Note: SPS measures include both initiated and in force.

Source: ADB calculations based on data from World Trade Organization. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2016).

that are imposed on a particular economy and not on all WTO members (Figures 2.22, 2.23).¹³

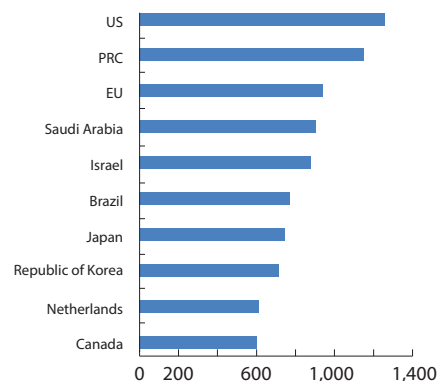
The US has imposed the most number of SPS (2,769) and TBT (1,256) measures. The PRC is second in TBT measures and third in SPS measures. Japan and the Republic of Korea are in the top 10 economies

Figure 2.24: Top 10 Economies Imposing SPS, 1995–2015 (number of measures)

PRC = People's Republic of China, EU = European Union, SPS = sanitary and phytosanitary, US = United States.

Note: SPS measures include both initiated and in force.

Source: ADB calculations based on data from World Trade Organization. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2016).

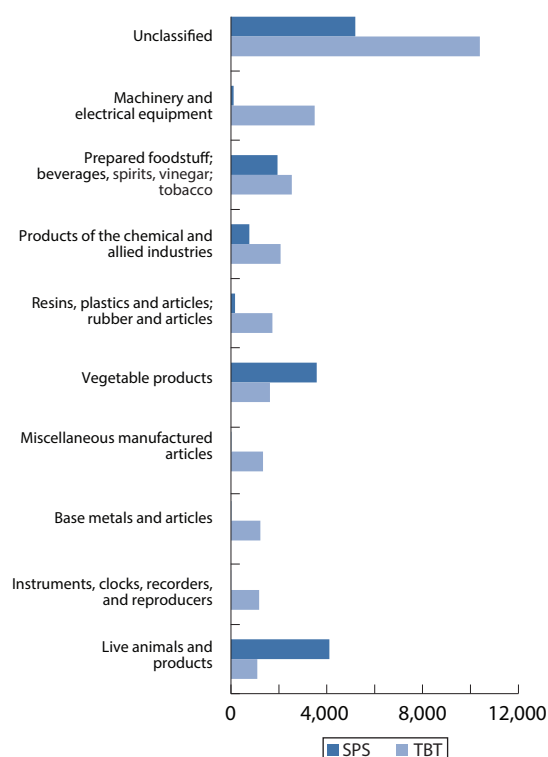
Figure 2.25: Top 10 Economies Imposing TBT, 1995–2015 (number of measures)

PRC = People's Republic of China, EU = European Union, TBT = technical barriers to trade, US = United States.

Note: TBT measures include both initiated and in force.

Source: ADB calculations based on data from World Trade Organization. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2016).

¹³ No bilateral data are available on TBT measures.

Figure 2.26: Number of SPS and TBT Measures Imposed on Product Groups, 1995–2015

SPS = sanitary and phytosanitary, TBT = technical barriers to trade.
 Note: SPS and TBT measures include both initiated and in force.
 Source: ADB calculations based on data from World Trade Organization. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statistics_e/itip_e.htm (accessed August 2016).

imposing the most number of SPS and TBT measures (Figures 2.24, 2.25).

Product groups subject to large numbers of SPS measures include (i) live animals and products; (ii) vegetable products; (iii) prepared foodstuff, beverages, spirits, vinegar, tobacco; (iv) products of the chemical and allied industries; and (v) animal and vegetable fats, oils and waxes (Figure 2.26).

Product groups subject to high numbers of TBT measures include (i) machinery and electrical equipment; (ii) prepared foodstuff, beverages, spirits, vinegar, tobacco; (iii) products of the chemical and allied industries; (iv) resins, plastics and articles; rubber and articles; and (v) vegetable products.

Despite their growing importance, there is a dearth of knowledge on the impact of SPS and TBT measures on

trade. Economic theory offers no straightforward forecast of how these measures impact international flows of goods. Instead, theory proposes that the effect of SPS and TBT measures on trade may vary and does not always reduce trade. For example, Thilmany and Barrett (1997) differentiate informative and non-informative regulatory measures. The former contains information addressing consumer concerns about product quality or safety; the latter does not. Evaluating the diverse effects of SPS and TBT measures remains an empirical issue.

SPS and TBT measures are estimated to forge significantly negative impact on exports from developing economies, particularly on Asia's intraregional trade in agricultural products.

SPS and TBT agreements require WTO members to notify the WTO Secretariat on the SPS and TBT measures they impose. These notifications are collected, complemented by information based on national sources, and analyzed by the United Nations Conference on Trade and Development, which are available through the World Bank's World Integrated Trade Solution. For economies with no SPS and TBT data available under the World Integrated Trade Solution, we gather data from WTO's Integrated Trade Intelligence Portal (I-TIP).

Using these data, we estimate various econometric models on the trade impact of SPS and TBT measures (Box 2.4). Model estimation results show that the positive impact of SPS and TBT on trade flows is mainly driven by exports of advanced economies, followed by Asian exports, while the majority of developing and least developed economies in the rest of the world face negative impacts from SPS and TBT. We further examine whether different impacts of SPS and TBT on trade exist by separately testing the impact of SPS and TBT. The results indicate that positive impacts largely stem from TBT, while the impact of SPS is insignificant. Developing Asia's exports, in particular, are negatively affected by SPS measures. Developing Asia's exports in agriculture sector are even more susceptible to SPS measures. Further, intraregional trade among developing Asia is also being hurt by SPS measures. These results suggest policy makers in the region need to act more proactively in resolving nontariff barriers across borders, in particular, by focusing on SPS. Stronger regional cooperation through subregional and regional dialogue should help.

Box 2.4: Impact of Nontariff Measures on Trade Flows

Following Feenstra (2004), which measured the impact of sanitary and phytosanitary (SPS) and technical barriers to trade (TBT) measures on trade in agriculture, we estimate the gravity equation model using fixed effects for each exporting and importing economy. These fixed effects consider the size effects, including the price and number of varieties of the exporting economy for each sector and the size of demand and the price index of the importing partner. To control for various types of economy and sector-specific factors that may affect trade flows, we include a set of importer, exporter, and sector fixed effects, which can also mitigate potential endogeneity problems.

To measure transport costs, bilateral distance between both partners (d) are used. These distances are obtained from the CEPII database. In addition, a dummy variable “contiguity” ($contig$), which equals one if both economies share a border, is also included. Bilateral trade can be enhanced by economies’ cultural proximity. We therefore control for this proximity by introducing two dummy variables, respectively equal to 1 if there is a common official or primary language spoken in both economies ($comlang_off$) or if both partners have had colonial ties (col). Data are also derived from the CEPII database. The dependent variable x refers to bilateral import data of country j (importer) from country i (exporter) at the four-digit level of the Harmonized System classification. The source is the United Nations Commodity Trade database. Notifications and tariff data are compiled from 2012 to 2014 in our sample. To address the problem that the error terms are likely to exhibit correlation patterns for a given country-pair, we cluster the robust standard errors at the country-pair and four-digit product code level. Our model specification is analogous to the Disidier et al. (2008) approach.

The estimated base equation using pooled ordinary least squares (OLS) and panel regression method is

$$\ln x_{ijt}^{hs_4} = \mu_i f e_i^{hs} + \alpha_j f e_j^{hs} + \delta_1 \ln GDP_{it} + \delta_2 \ln GDP_{jt} + \delta_3 \ln d_{ij} + \delta_4 contig_{ij} + \delta_5 comlang_off_{ij} + \delta_6 col_{ij} + \delta_7 tar_{ijt}^{hs_4} + \delta_8 NTM_{ijt}^{hs_4} + \varepsilon_{ij}^{hs_4}$$

To investigate the impact of SPS and TBT measures on the exports of different exporter and importer groups and income groups, we also add regional and income group dummy for different regression models.

The regression results across all models confirm the expected impact of gravity factors. Gross domestic product (GDP) levels of both exporter and importer have significantly positive impact on trade. The same applies to border contiguity, use of common language, and historical colonial ties. Geographical distance

shows highly significant and negative effect on bilateral trade flows. As expected, *ad valorem* equivalent bilateral applied tariff rate (weighted average) exert a significantly negative impact on trade.

As shown in box table 1a, existence of SPS or TBT increases trade in both pooled OLS and panel regressions. According to the basic model, SPS and TBT increase average worldwide bilateral trade by 15% to 19%. Regional differences are revealed in the regression results under columns (3) and (4). Compared with economies of the Organisation for Economic Co-operation and Development (OECD), Asia’s exports to the world are more positively affected by the SPS and TBT measures of importers. On the other hand, exports of non-Asia, non-OECD economies are hurt by SPS and TBT measures, as evidenced by the significant, negative coefficient of -0.38 (in pooled OLS) and -0.17 (in the panel regression). On average, exports of non-Asia, non-OECD economies are 13% lower due to SPS and TBT measures of importers, according to the pooled OLS regression. It is worth noting that, in our analysis, non-Asia, non-OECD economies constitute the largest sample, with 91 economies in Africa, the Middle East, Latin America, and Eastern Europe.

The regression results presented for the agriculture sector reveal interesting implications (box table 1b). When importers are OECD economies, the positive impact of SPS and TBT on exports from Asia and non-Asian, non-OECD economies are very much subdued, while OECD-to-OECD trades are greatly boosted. For Asian importers, the positive impact of SPS and TBT on exports from OECD economies in the agriculture sector is much smaller, at 27%. While this positive impact is significantly boosted for imports from non-Asia, non-OECD economies, the impact for imports from Asian economies is significantly dampened by SPS and TBT measures, making the overall impact -7% . For agriculture, SPS and TBT measures hurt intraregional trade in Asia.

Testing the impact of SPS and TBT separately reveals interesting results (box table 2). While Asia’s exports to the world are hurt by SPS measures of importing economies particularly in agricultural sector, TBT measures have positive impact on exports. The opposite results are demonstrated for non-Asia, non-OECD economies. Their exports are significantly larger due to SPS measures of importers, but are significantly lower due to TBT measures. When the effects of SPS and TBT are tested separately, SPS measures show large negative impact on intraregional trade. Intraregional trade among developing Asian economies is being hurt by SPS.

Box 2.4. continued.

1a: Influence of SPS/TBT—Full Sample, 2012–2014

Dependent variable: Log(bilateral imports)	(1) Pooled OLS	(2) Panel-Random Effects	(3) Pooled OLS	(4) Panel - Random Effects
Importer	All WTO member economies		All WTO member economies	
Exporter	All WTO member economies		All WTO member economies	
Bilateral applied tariff AVE(weighted average)	-0.01** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)	-0.01*** (0.00)
SPS/TBT dummy (at least 1 SPS or TBT at HS6 level) ^a	0.19*** (0.01)	0.15*** (0.01)	0.27*** (0.01)	0.18*** (0.01)
Exporter dummy (base = OECD)				
Asia			0.67*** (0.10)	1.24*** (0.07)
Non-Asia, non-OECD			2.94*** (0.14)	-1.54*** (0.11)
Interaction: SPS/TBT dummy and exporter dummy				
Asia			0.09*** (0.02)	0.08*** (0.02)
Non-Asia, non-OECD			-0.38*** (0.02)	-0.17*** (0.02)
Number of observations	2,448,182	2,448,182	2,448,182	2,448,182
R-squared	0.39	0.31	0.39	0.31

1b: Influence of SPS/TBT—Agriculture Sector, 2012–2014

Dependent variable: Log(bilateral imports)	(5)	(6)	(7)	(8)
Importer	OECD Economies		Asian Economies	
Exporter	All WTO Member Economies		All WTO Member Economies	
Bilateral applied tariff AVE (weighted average)	-0.003*** (0.00)	-0.003*** (0.00)	-0.001*** (0.00)	-0.001*** (0.00)
SPS/TBT dummy (at least 1 SPS or TBT at HS6 level) ^a	0.90*** (0.13)	1.35*** (0.13)	0.38*** (0.04)	0.27*** (0.06)
Exporter dummy(base = OECD)				
Asia		0.31 (0.34)		1.03*** (0.40)
Non-Asia, non-OECD		-3.05*** (0.80)		-2.11* (1.09)
SPS/TBT dummy X exporter dummy				
Asia		-0.70*** (0.11)		-0.34*** (0.12)
Non-Asia, non-OECD		-1.01*** (0.10)		0.79*** (0.12)
Number of observations	157,006	157,006	146,137	146,137
R-squared	0.32	0.32	0.24	0.25

*** = significant at 1%, ** = significant at 5%, * = significant at 10%.

AVE = ad valorem equivalent, HS = harmonized system, OECD = Organisation for Economic Co-operation and Development, OLS = ordinary least squares, SPS = sanitary and phytosanitary, TBT = technical barriers to trade, WTO = World Trade Organization.

^a To clarify, four-digit level of the harmonized system (HS) classification is considered equal to 1 if the importing economy notifies at least one SPS or TBT measure at the six-digit level, which is under the four-digit level of the HS classification.

Note: Robust standard errors in parentheses. Based on pooled OLS, models (1) and (3) include exporter, importer, and sector (four-digit level) fixed effects (no interaction). Panel regression (random effects) models (2) and (4) include exporter, importer, and sector (two-digit level) fixed effects (no interaction). Pooled OLS models 5–8 include exporter and sector (two-digit level) specific importer fixed effects (with interaction) in all estimations. Usual gravity model variables were included, but not shown for brevity.

Sources: ADB calculations using data from Institute for Research on the International Economy. <http://www.cepii.fr/CEPII/en/cepil/cepil.asp>; United Nations. Commodity Trade Database. <https://comtrade.un.org>; World Bank. World Integrated Trade Solution. <https://wits.worldbank.org>; and WTO. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (all accessed August 2016).

Box 2.4. continued.

2: Influence of SPS and TBT Separately, 2012–2014

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(bilateral imports)	SPS	TBT	SPS	TBT	SPS	TBT	SPS	TBT
Importer	All WTO members						Developing Asia	
Exporter	All WTO members						All WTO members	
Sector	All sectors				Agriculture		All sectors	
Bilateral applied tariff	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.06***	-0.06***
AVE (weighted average)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
SPS (TBT) dummy ^a	-0.002	0.09***	-0.03	0.34***	-0.20***	0.67***	-0.37***	0.32***
	(0.02)	(0.04)	(0.02)	(0.04)	(0.04)	(0.07)	(0.02)	(0.00)
Exporter dummy (base = OECD)								
Developing Asia			1.28***	0.89*	7.02***	6.55***	2.22	2.44
			(0.48)	(0.48)	(1.06)	(1.07)	(3.33)	(3.33)
Non-Developing Asia, non-OECD			1.82***	2.82***	9.68***	10.26	3.51	4.74
			(0.57)	(0.58)	(1.22)	(1.22)	(3.83)	(3.83)
Interaction: SPS (TBT) dummy and exporter dummy								
Developing Asia			-0.50***	0.20***	-0.39***	0.04	-0.51***	0.42***
			(0.04)	(0.08)	(0.09)	(0.12)	(0.10)	(0.13)
Non-Developing Asia, non-OECD			0.47***	-1.07***	0.29***	-0.93***	0.31***	-0.41***
			(0.04)	(0.07)	(0.08)	(0.11)	(0.10)	(0.12)
Number of observations	271,280	271,280	271,280	271,280	60,151	60,151	19,182	19,182
R-squared	0.38	0.38	0.38	0.38	0.16	0.16	0.44	0.44

*** = significant at 1%, ** = significant at 5%, * = significant at 10%.

AVE = ad valorem equivalent, HS = harmonized system, OECD = Organisation for Economic Co-operation and Development, OLS = ordinary least squares, SPS = sanitary and phytosanitary, TBT = technical barriers to trade, WTO = World Trade Organization.

^a To clarify, four-digit level of the harmonized system (HS) classification is considered equal to 1 if the importing economy notifies at least one SPS (TBT) measure at the six-digit level, which is under the four-digit level of the HS classification.

Note: Robust standard errors in parentheses. Based on panel regression which includes exporter, importer, and sector (four-digit level) fixed effects (no interaction). For brevity, the results of coefficients for usual gravity factors are not presented. Pooled regression was also done to confirm and compare the results.

Sources: ADB calculations using data from Institute for Research on the International Economy. <http://www.cepii.fr/CEPII/en/cepil/cepil.asp>; United Nations. Commodity Trade Database. <https://comtrade.un.org>; World Bank. World Integrated Trade Solution. <https://wits.worldbank.org>; and WTO. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (all accessed August 2016).

Annexes

Annex 2a: Gravity Model Estimation Results: Impact of Real Exchange Rates on Exports

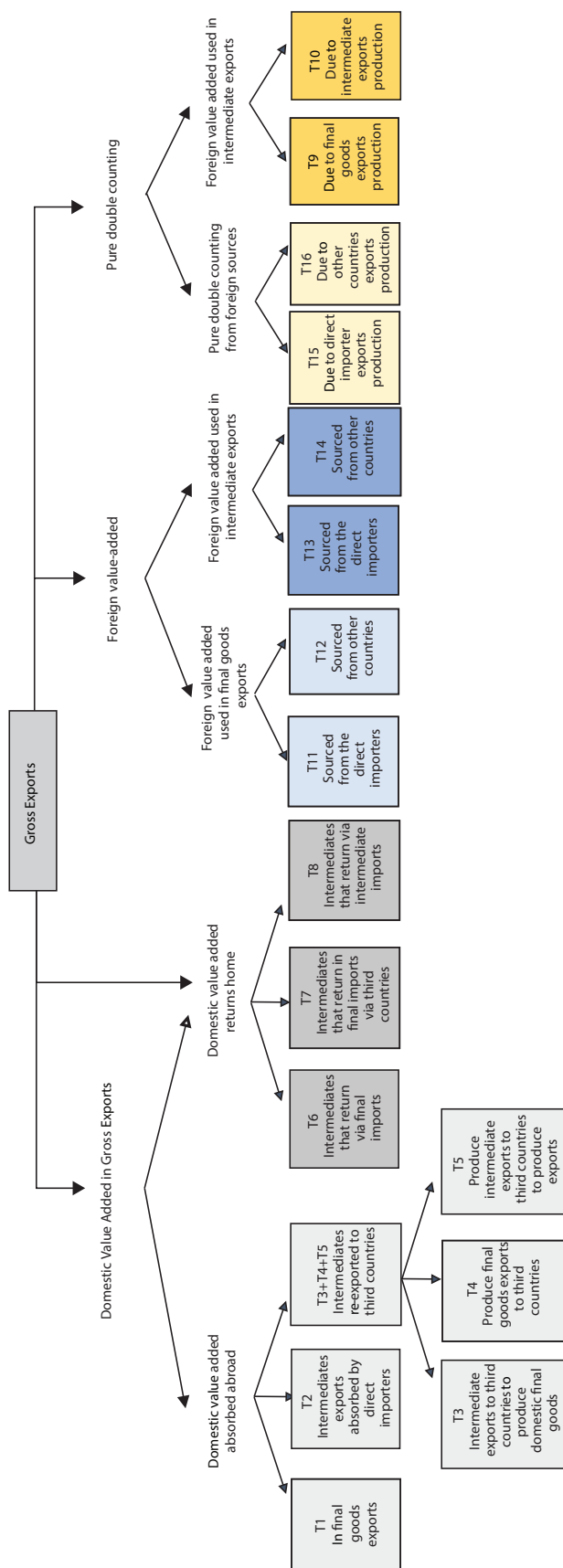
Dependent Variable: Log (bilateral exports volume)	Full Period	Pre-Global Financial Crisis	Global Financial Crisis	Post- Global Financial Crisis	Full Period	Pre-Global Financial Crisis	Global Financial Crisis	Post- Global Financial Crisis	Full Period	Pre-Global Financial Crisis	Global Financial Crisis	Post- Global Financial Crisis
Log(real GDP of exporter)	0.433*** (0.0692)	0.707** (0.316)	0.286 (0.188)	0.117 (0.310)	0.334*** (0.0680)	0.562* (0.322)	0.260 (0.189)	0.304 (0.311)	0.326*** (0.0691)	0.445 (0.314)	0.246 (0.190)	0.299 (0.319)
Log(distance)	-1.728*** (0.0286)	-1.736*** (0.0322)	-1.802*** (0.0322)	-1.699*** (0.0340)	-1.749*** (0.0286)	-1.737*** (0.0323)	-1.806*** (0.0324)	-1.716*** (0.0341)	-1.748*** (0.0289)	-1.730*** (0.0323)	-1.803*** (0.0331)	-1.702*** (0.0336)
Colonial relationship dummy	0.601*** (0.126)	0.722*** (0.134)	0.602*** (0.137)	0.553*** (0.141)	0.586*** (0.125)	0.723*** (0.134)	0.596*** (0.137)	0.559*** (0.140)	0.571*** (0.127)	0.725*** (0.135)	0.603*** (0.138)	0.562*** (0.138)
Common language dummy	0.867*** (0.0549)	0.741*** (0.0636)	0.845*** (0.0642)	0.864*** (0.0657)	0.848*** (0.0550)	0.738*** (0.0640)	0.849*** (0.0645)	0.854*** (0.0662)	0.861*** (0.0555)	0.746*** (0.0642)	0.841*** (0.0652)	0.874*** (0.0661)
Contiguity	0.513*** (0.151)	0.511*** (0.164)	0.458*** (0.170)	0.507*** (0.172)	0.583*** (0.152)	0.509*** (0.164)	0.458*** (0.173)	0.534*** (0.173)	0.593*** (0.153)	0.510*** (0.163)	0.446** (0.174)	0.579*** (0.174)
Log(real exchange rate)	0.130*** (0.0109)	0.661*** (0.112)	0.0878*** (0.0339)	0.274*** (0.0817)								
Log(real exchange rate _{t-1})					0.0576*** (0.00915)	0.222*** (0.0676)	0.0256 (0.0176)	0.197 (0.147)				
Log(real exchange rate _{t-2})									0.0416*** (0.00872)	0.0458 (0.0412)	0.00925 (0.0197)	0.0726 (0.0549)
Constant	13.72*** (1.905)	4.515 (7.949)	15.95*** (5.407)		11.40*** (1.606)	6.971 (7.241)		9.978 (6.952)	12.08*** (1.633)	9.641 (7.117)		7.831 (7.451)
Observations	128,046	32,361	33,863	30,407	127,716	32,151	33,682	31,295	119,989	31,933	33,514	31,707
Number of country-pairs	10,319	8,856	9,400	8,815	10,512	8,801	9,332	8,699	10,505	8,743	9,250	8,766

*** = significant at 1%, ** = significant at 5%, * = significant at 10%.

Note: Full-period covers 2001–2015, pre-global financial crisis covers 2003–2006, global financial crisis covers 2007–2010, and post-global financial crisis covers 2012–2015.

Sources: ADB calculations using data from Institute for Research on the International Economy, <http://www.cepii.fr/CEPII/en/cepil/cepil.asp>; United Nations, Commodity Trade Database, <https://comtrade.un.org>; and World Bank, World Development Indicators, data.worldbank.org/data-catalog/world-development-indicators (accessed September 2016).

Annex 2b: Decomposition of Gross Exports



Source: Wang, Wei, and Zhu (2014).

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