2

Trade and the Global Value Chain

Recent Trends in Asia's Trade

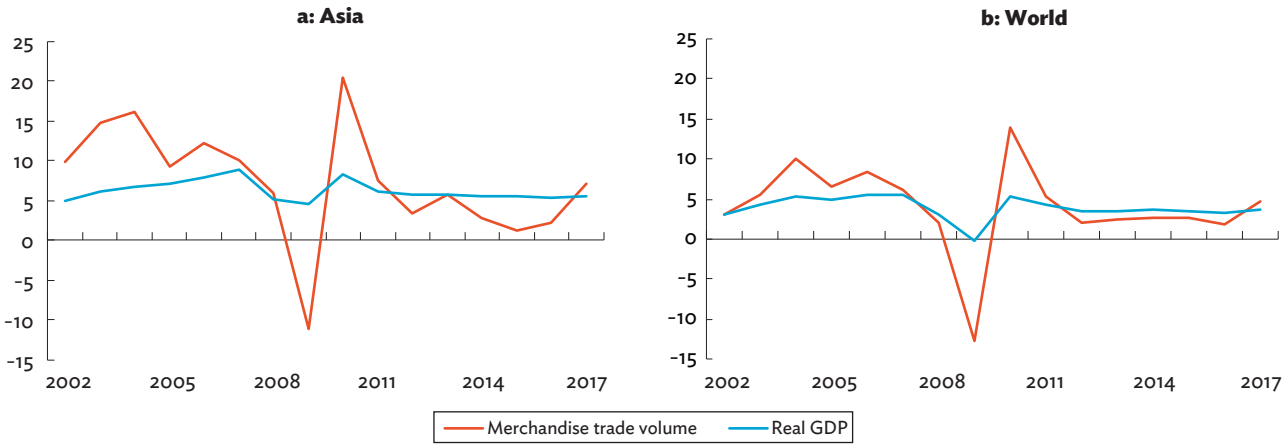
The recovery in global trade strengthened during 2017 with Asia leading the pace.[4]

By volume, global trade growth accelerated to 4.7% in 2017 from 1.8% in 2016, surpassing global economic growth for the first time since 2012 (Figure 2.1a). The broad-based upturn of the global trade was buoyed by economic recovery in advanced economies and strengthening global manufacturing output—also giving a significant boost to trade globally. Asia remained the key driver of the global trade recovery, contributing about 61.7% of volume growth. The region's trade volume expanded by 7.1% in 2017, the highest since 2011 (Figure 2.1b). Trade volume also grew strongly in North America (4.1%) and the European Union (EU) (2.9%) but at a slower pace in the Middle East (0.7%). The recovery also reached Latin America and the Caribbean (up 3.4%) and Africa (0.5%). Asia's trade growth was highest mostly due to the region's robust gross domestic product (GDP) growth.

Exports and imports contributed equally to Asia's accelerated trade volume growth.

Strengthening private consumption, along with strong domestic and cross-border investment, powered the region's import volume to grow by 7.7% in 2017, up from 1.6% in 2016. Strong external demand from within the region and developed economies boosted Asia's exports—with volume growth rising to 6.7% in 2017, well above the 1.8% growth in 2016. The People's Republic of China (PRC) accounted for 35.2% of the region's total trade volume growth (Figure 2.2). Japan; the Republic of Korea; Taipei,China; and Hong Kong, China are also largely credited for the increase in Asia's exports. India; Hong Kong, China; the Republic of Korea; and Australia likewise posted significant contributions in import growth.

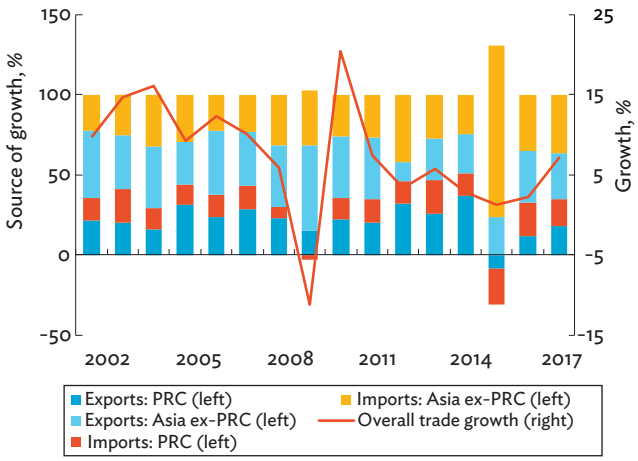
Figure 2.1: Merchandise Trade Volume and Real GDP Growth—Asia and World (%, year-on-year)



GDP = gross domestic product.
Note: Real GDP growth is weighted using nominal GDP in purchasing power parity.
Sources: ADB calculations using data from International Monetary Fund. World Economic Outlook April 2018 Database. https://www.imf.org/external/pubs/ft/weo/2018/01/weodata/index.aspx; and World Trade Organization. Statistics Database. http://stat.wto.org/Home/WSDBHome.aspx (both accessed May 2018).

[4] Asia refers to the 48 Asia and the Pacific members of the Asian Development Bank (ADB), which includes Japan and Oceania (Australia and New Zealand) in addition to the 45 developing Asian economies.

Figure 2.2: Sources of Trade Volume Growth—Asia

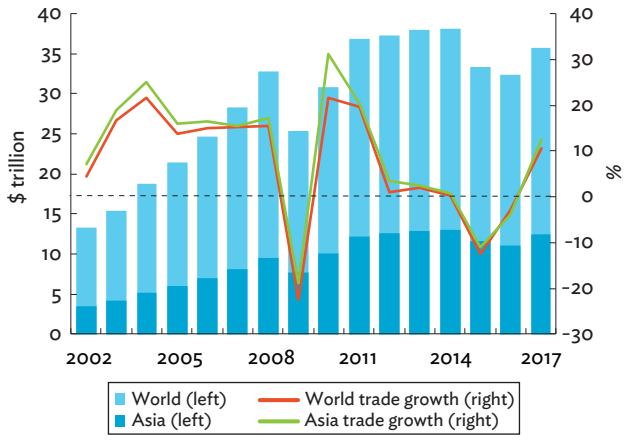


PRC = People's Republic of China.
Source: ADB calculations using data from World Trade Organization. Statistics Database. http://stat.wto.org/Home/WSDBHome.aspx (accessed May 2018).

The value of Asia's merchandise trade growth also rebounded strongly.

After contracting in 2015 and 2016, the region's merchandise trade value grew by 12.6% in 2017 (Figure 2.3). Aside from the volume increase, the growth in value also benefited from increased global commodity prices, such as energy and crude oil. This helped commodity-exporting countries like Malaysia, Indonesia, Mongolia, the Lao People's Democratic Republic (Lao PDR), Kazakhstan, Azerbaijan, and Papua New Guinea—all of which saw strong export growth. By contrast, commodity-importing economies like Bangladesh, India, Sri Lanka, the Philippines, and Thailand saw imports grow due to strong domestic expenditures.

Figure 2.3: Trade Value—Asia and World



Source: ADB calculations using data from World Trade Organization. Statistics Database. http://stat.wto.org/Home/WSDBHome.aspx (accessed May 2018).

Intermediate goods drove merchandise export growth across much of the region.

The growth in intermediate goods contributed most to the 2017 export rebound (Figure 2.4). As mentioned, commodity exporters gained from global price increases. For manufacturing export-oriented economies (such as the PRC, Japan, the Republic of Korea, Singapore, Malaysia, and Cambodia) strong external demand for electronic raw materials and products, machinery and equipment parts, and other industrial supplies—from both within the region and advanced economies—led to the export recovery.

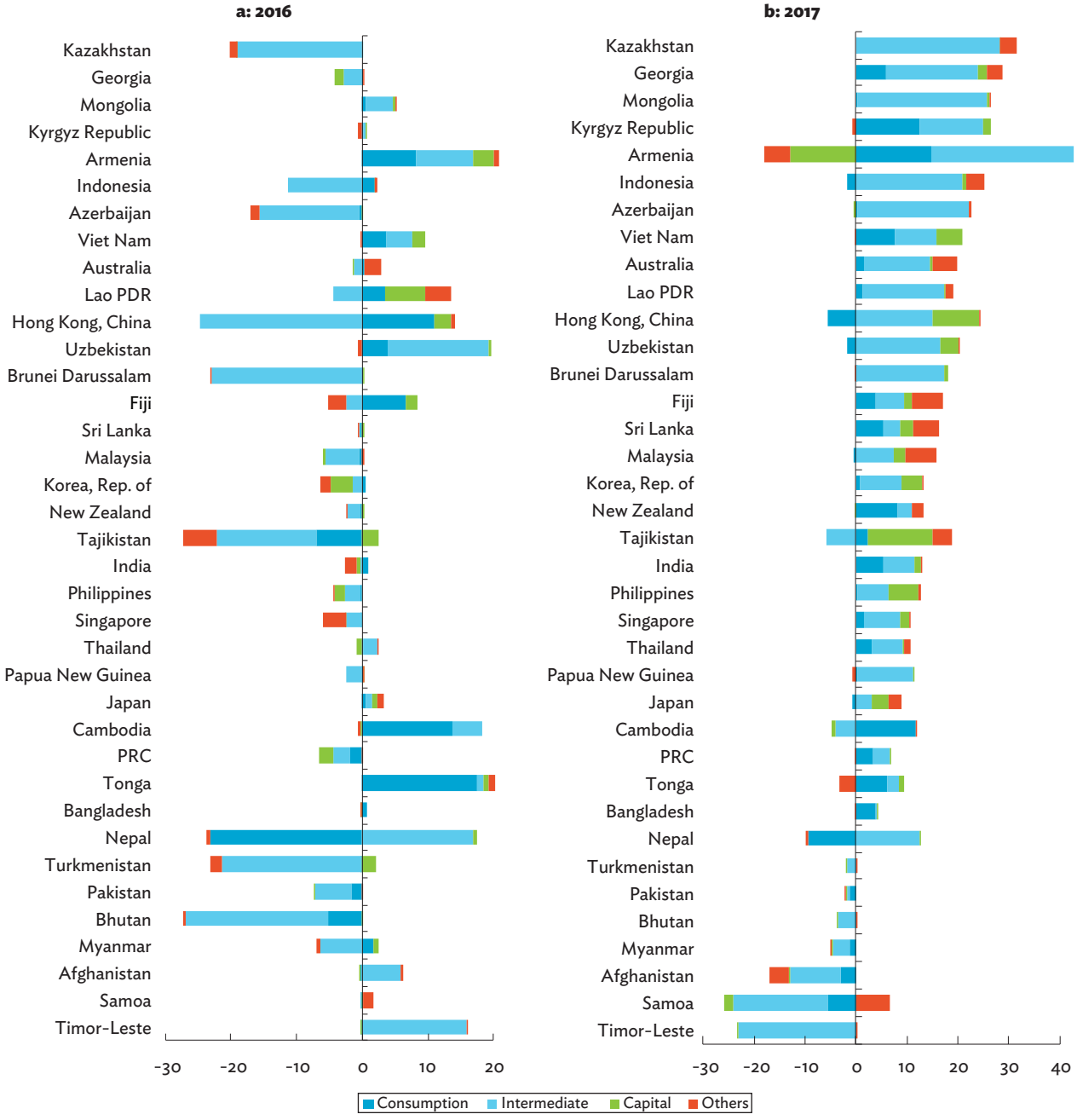
Asia's import growth was also propelled by intermediate goods, and capital goods to a lesser extent.

In most economies, the decline in import growth in 2016 reversed in 2017 (Figure 2.5). Imports of oil and industrial metals increased in countries where manufacturing expanded, while intermediate inputs to manufacturing for assembly into electronic products, machinery, and equipment also led to rapid import growth. This also reflected the rebuilding of raw material inventories for near-term production. The strong growth in both exports and imports of intermediate goods implies a strengthening of Asian economic integration into global and regional value chains. Also, capital goods imports grew in most Asian economies, suggesting continued near-term expansion in domestic investment.

Asia's trade growth remained robust in recent months, and will likely continue if current risks can be contained.

After record highs in the first half of 2017, Asia's trade sustained its growth momentum in the second half of 2017 and the first half of 2018 (Figure 2.6). In January 2018, trade value growth reached 20.7%, the highest since August 2012. Trade volume growth, on the other hand, kept its pace at more than 5% and peaked at 9.0% in February 2018. However, the region's trade expansion gradually moderated in the first half of 2018. Meanwhile, the global environment, in general, remains favorable on Asia's trade, but heightened risks could undermine trade prospects. Downside risks include the possible softening

Figure 2.4: Contribution to Exports Growth, by Commodity Type—Asia (%)

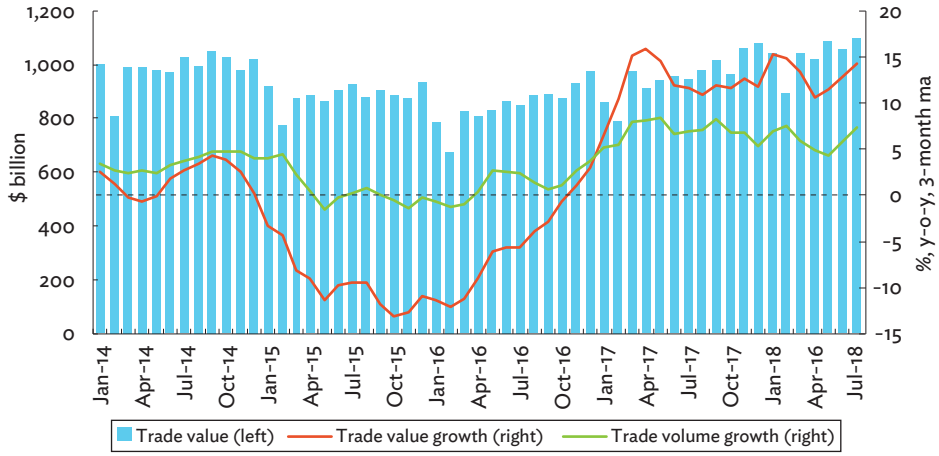


Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.
Notes: Based on Broad Economic Categories. Sorted by 2017 values.
Sources: ADB calculations using data from International Monetary Fund. Direction of Trade Statistics. https://www.imf.org/en/Data (accessed August 2018); and United Nations. Commodity Trade Database. https://comtrade.un.org (accessed May 2018).

Figure 2.5: Contribution to Imports Growth, by Commodity Type—Asia (%)

Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.
Notes: Based on Broad Economic Categories. Sorted by 2017 values.
Sources: ADB calculations using data from International Monetary Fund. Direction of Trade Statistics. https://www.imf.org/en/Data (accessed August 2018); and United Nations. Commodity Trade Database. https://comtrade.un.org (accessed May 2018).

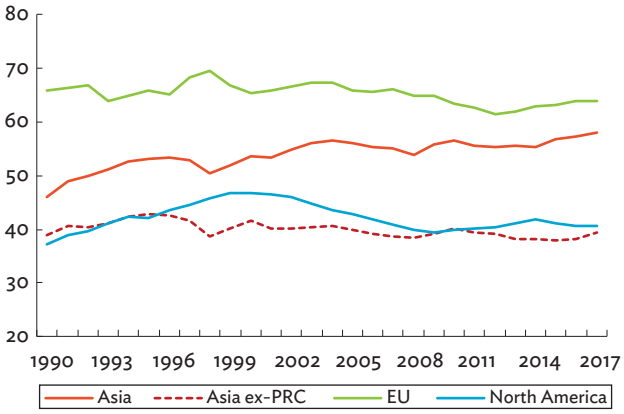
Figure 2.6: Monthly Trade, by Value and Volume—Asia



ma = moving average, y-o-y = year-on-year.
Notes: Trade volume growth rates were computed using volume indexes. For every period and trade flow type (i.e., imports and exports), the available data include an index for Japan and an aggregate index for selected Asian economies, which include Hong Kong, China; India; Indonesia; Malaysia; Pakistan; the People's Republic of China; the Philippines; the Republic of Korea; Singapore; Taipei,China; Thailand; and Viet Nam. To come up with an index for Asia, trade values were used as weights for the computations. On the other hand, trade value levels and growth rates were computed by aggregating import and export values of the same Asian economies.
Sources: ADB calculations using data from CEIC; and CPB Netherlands Bureau for Economic Policy Analysis. World Trade Monitor. https://www.cpb.nl/en/data (both accessed September 2018).

of global economic growth, intensifying bilateral trade frictions between the world's major trading countries, escalating trade policy uncertainty, and stagnation in the global value chain expansion. The trade conflict between the United States (US) and the PRC has escalated since early 2018, with the US imposing tariffs mostly on industrial inputs, such as machinery and transport equipment and parts, while the PRC mostly on agricultural products. The impact of tariffs on Asia's trade is estimated to be small, but persistent and deeper trade frictions could exert growing strains on Asia's trade growth. Further strengthening trade ties intraregionally could help shield Asia from these potential headwinds.

Figure 2.7: Intraregional Trade Share—Asia, European Union, North America (%)



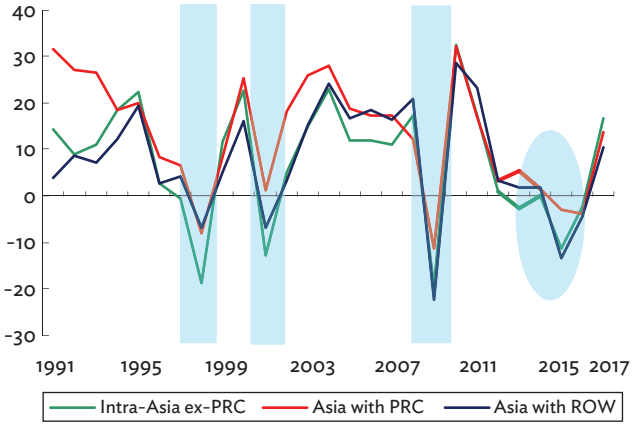
EU = European Union, PRC= People's Republic of China.
Notes: EU refers to aggregate of 28 EU members. North America covers Canada, Mexico, and the United States.
Source: ADB calculations using data from International Monetary Fund. Direction of Trade Statistics. https://www.imf.org/en/Data (accessed August 2018).

Asia's Intraregional Trade

Along with its strong trade performance in 2017, Asia's trade integration continues to strengthen.

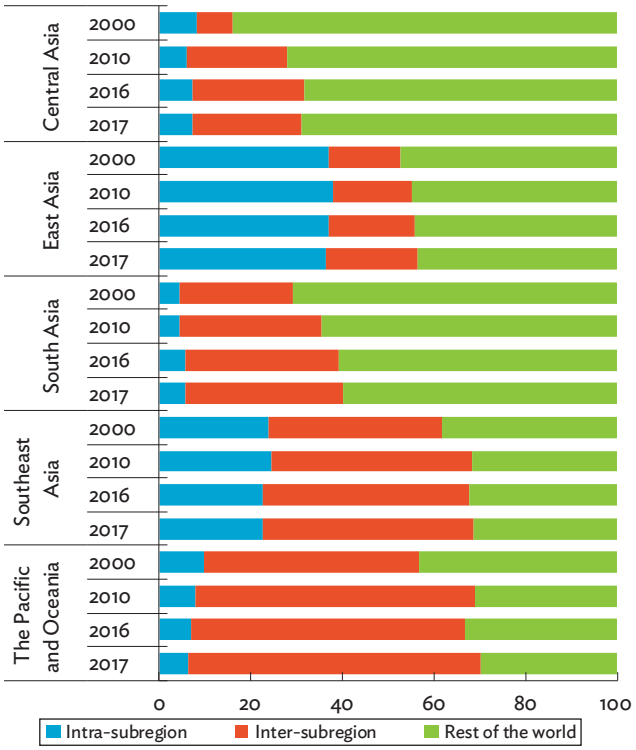
Bilateral trade within the region increased further. By value, the intraregional trade share reached a record 57.8% in 2017, above the 57.2% recorded in 2016—and 55.9% average during 2010–2015 (Figure 2.7). In contrast, intraregional trade share in the EU (63.8%) declined slightly by 0.1 percentage point in 2017 from 2016, while it remained the same at North America (40.7%). Trade linkages in Asia remained solid, as the region's intraregional trade grew by 13.9% in 2017 after 2 years of contraction—excluding the PRC, growth was 16.8% (Figure 2.8). The region's trade to non-Asian economies increased at 11.1% in 2017.

Figure 2.8: Trade Value Growth, Intraregional and Extraregional—Asia (%)



PRC = People's Republic of China, ROW = rest of the world.
Note: Shaded areas indicate 1997/98 Asian financial crisis, 2000/01 "dot.com" recession, 2008/09 global financial crisis, and the recent global trade growth slowdown.
Source: ADB calculations using data from International Monetary Fund. Direction of Trade Statistics. https://www.imf.org/en/Data (accessed August 2018).

Figure 2.9: Intraregional Trade Shares—Asia Subregions (%)



Source: ADB calculations using data from International Monetary Fund. Direction of Trade Statistics. https://www.imf.org/en/Data (accessed August 2018).

Nonetheless, trade relationships within Asia vary considerably, indicated by large differences between intra- and inter-subregional trade shares.

Intraregional trade grew across all subregions in 2017, except for Central Asia. In South Asia, Southeast Asia, and the Pacific and Oceania,[5] inter-subregional trade shares increased in 2017, supported by robust trade with regional trading partners. By subregion, East Asia consistently holds the highest intra-subregional trade share—although it declined slightly to 36.3% in 2017 from 36.9% in 2016 (Figure 2.9). Southeast Asia's intra-subregional trade share was second at 22.4% in 2017.

Inter-subregional trade shares remain much higher than intra-subregional trade shares in the Pacific and Oceania (64.0% inter-subregional share), South Asia (34.5%), and Central Asia (24.1%). Further analysis using gravity model estimation indicates similar results (Box 2.1).

[5] The Pacific and Oceania subregion includes ADB's Pacific developing member countries plus Australia and New Zealand.

Box 2.1: Gravity Model Estimation of Bilateral Exports

A gravity model on Asia's bilateral exports is estimated to give a snapshot of recent progress in regional trade integration. The model includes a dummy variable for "both in Asia" if both economies come from the region. The coefficient can be viewed as a trade integration index. The estimation implements a 5-year rolling panel regression using annual data (box table 1).

Asia's intraregional trade bias is strong and gained strength in 2017—although the coefficient of the intraregional trade dummy remains insignificant. Across all subregions, the intra-subregional trade bias strengthened in 2017 except for South Asia (box table 2). Inter-subregional trade bias is particularly significant in South Asia and Southeast Asia, strengthening further in 2017.

1: Gravity Model Estimation Results, 2013–2017
Dependent variable: Log(Bilateral Exports)

Variables	All Goods	Capital Goods	Consumption Goods	Intermediate Goods
Log(Distance)	-1.66***	-1.64***	-1.73***	-1.70***
	(0.02)	(0.02)	(0.02)	(0.02)
Colonial relationship dummy	0.84***	0.88***	0.94***	0.86***
	(0.09)	(0.09)	(0.10)	(0.10)
Common language dummy	0.99***	0.93***	1.07***	0.90***
	(0.04)	(0.04)	(0.04)	(0.04)
Contiguity dummy	0.98***	1.14***	1.19***	1.07***
	(0.10)	(0.10)	(0.10)	(0.11)
Regional dummies (base: Asia to ROW)				
Both in Asia dummy	0.45 [0.43]	0.11 [0.33]	0.40 [0.41]	-0.09 [-0.31]
	(0.35)	(0.36)	(0.41)	(0.34)
Importer in Asia dummy	2.44***	-2.24**	0.74	2.28***
	(0.66)	(0.97)	(0.82)	(0.72)
Both in ROW dummy	1.65***	-2.71***	-0.18	2.01***
	(0.51)	(0.84)	(0.64)	(0.64)
Rho (sample selection term)	0.14***	0.30***	0.21***	0.18***
Sample size	277,280	277,280	277,280	277,280
Censored observations	138,937	179,383	158,525	155,202
Uncensored observations	138,343	97,897	118,755	122,078

*** = significant at 1%, ** = significant at 5%, * = significant at 10%, ROW = rest of the world. Estimates for 2012–2016 are in brackets. Robust standard errors in parentheses.
Notes: 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 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/cepii/cepii.asp (accessed May 2018); and United Nations. Commodity Trade Database. https://comtrade.un.org (accessed May 2018).

2: Gravity Model Estimation Results, 2013–2017: Intra- and Inter-Subregional Trade (All Goods)

Variables	Central Asia	East Asia	South Asia	Southeast Asia	The Pacific and Oceania
Intra-subregional trade dummy	4.54***	6.46***	0.49	4.93***	1.79**
	[3.80***]	[6.40***]	[0.49]	[4.83***]	[1.23*]
Inter-subregional trade dummy	-0.15	0.30	4.28***	0.22***	-0.31
	[-0.11]	[0.27]	[4.21***]	(0.34)	[-0.38]

*** = significant at 1%, ** = significant at 5%, * = significant at 10%. Estimates for 2012–2016 are in brackets.
Notes: Base category (benchmark) is the subregion's trade with economies outside Asia. The usual gravity model variables and time-varying economy dummies are included but not shown for brevity. 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/cepii/cepii.asp (accessed May 2018); and United Nations. Commodity Trade Database. https://comtrade.un.org (accessed May 2018).

Sources: ADB staff using data from Institute for Research on the International Economy. http://www.cepii.fr/CEPII/en/cepii/cepii.asp (accessed May 2018); and United Nations. Commodity Trade Database. https://comtrade.un.org (accessed May 2018).

Progress of Global and Regional Value Chains

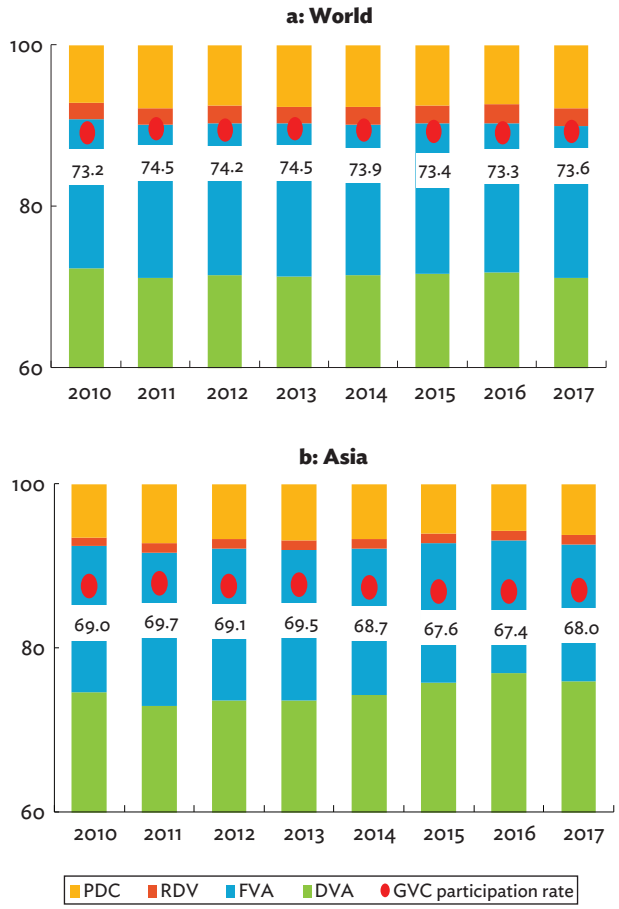
Global and regional value chain expansion returns.

The *Asian Economic Integration Report 2017* reported a continued slowdown in global and regional value chains in 2016. Asia's global value chain (GVC) participation—measured by the share of value-added content in gross exports used for further processing through cross-border production networks—indicated a deepening of GVC participation since 2000. It reached a peak of 74.5% in 2011, but slowed afterward through 2016. The latest ADB Multi-Regional Input–Output Tables—covering 62 economies including 26 economies in Asia—shows a new trend developing. Value-added components of gross exports globally showed signs of GVC expansion in 2017 (Figure 2.10a)—share of domestic value added declined between 2016 and 2017 (returned domestic value added declined slightly), while foreign value added and purely double counted terms increased. The GVC participation rate rose from 73.3% to 73.6%.

In Asia, the GVC participation rate peaked at 69.7% in 2011, but gradually declined to 67.4% in 2016. The trend reversed in 2017, with Asia's GVC participation climbing back to 68.0% (Figure 2.10b). Foreign value-added exports share also increased in 2017 compared with 2016, while domestic value added declined. This indicates that Asian firms imported more intermediate inputs for exported goods and services. The other two components of gross exports—returned domestic value added and purely double-counted terms—also hint at better GVC prospects. Box 2.2 analyzes GVC linkages at bilateral levels at greater length.

Evolution of GVC and its changing patterns are deeply inbred into the economic activities of individual economies and characterize the breadth and depth of international trade. While this might be a stern reality, less attention has been paid to the economic impact of expanding GVCs. Box 2.3 attempts to shed some light on this issue.

Figure 2.10: Components of Gross Exports (%)

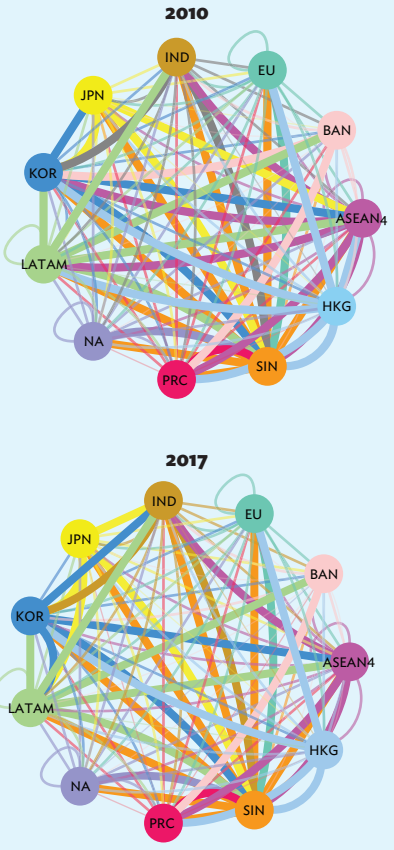


DVA = domestic value added, FVA = foreign value added, GVC = global value chain, PDC = purely double-counted terms, RDV = returned domestic value added.
Notes: The GVC participation rate is measured by the share of value-added contents of gross exports used for further processing through cross-border production networks. It is computed as the ratio of GVC components of exports (gross exports less domestic value added in final goods exports data from 2010 to 2017 to gross exports).
Sources: ADB calculations using data from 2010–2017 ADB Multi-Regional Input-Output Tables; and methodology by Wang, Wei, and Zhu (2014).

Box 2.2: Analysis of Bilateral Value Chains of Selected Asian Economies, European Union, Latin America, and North America

Based on the global value chain (GVC) decomposition methodology of Wang, Wei, Zhu (2014) and the 2010–2017 ADB Multi-Regional Input–Output Tables—covering 62 economies, including 26 economies in Asia—bilateral value chain participation ratios were calculated to analyze the changing patterns of production networks since 2010. The bilateral value chain participation ratio is computed as the ratio of GVC components of exports (gross exports less the sum of domestic value added in final goods exports) to gross exports. In addition to bilateral value chain linkages, this ratio also tracks how much each partner helps each other to be linked to the third countries through their value chain network. The lines on box figure 1 show the bilateral value chains ratio for 2010 and 2017 grouped into low, medium, and high scores. The thickest and densest lines pertain to a high bilateral value chain participation ratio above 80%, the medium lines correspond to ratios from 50% to 79%, and the thin and least dense lines to ratios of 49% and below.

1: Production Networks of Selected Asian Economies, European Union, Latin America, and North America



ASEAN4 = Indonesia, Malaysia, the Philippines, and Thailand; BAN = Bangladesh; EU = European Union; HKG = Hong Kong, China; IND = India; JPN = Japan; KOR = Republic of Korea; LATAM = Latin America (Brazil and Mexico); NA = North America (Canada and the United States); PRC = People's Republic of China; SIN = Singapore.
Note: Value chain participation ratio = Gross exports – Final goods exports for consumption in importing economy / Gross exports.
Sources: ADB calculations using data from the 2010–2017 ADB Multi-Regional Input–Output Tables; and methodology by Wang, Wei, and Zhu (2014).

Between 2010 and 2017, bilateral value chain links—as measured by the value chain participation ratio—among economies in Asia and other regions evolved differently for each pair. While some pairs showed stronger value chain links in 2017 than in 2010, others had weaker connections.

The Republic of Korea forged stronger value chain links with its partners, especially with India—increasing from 72.0% in 2010 to 85.4% in 2017 (box table). Japan strengthened value chain links with Latin America in 2017—rising from 77.4% to 80.7%—while its link with the Republic of Korea weakened slightly. Singapore and India maintained their value chain links with partners over the period. However, links between the ASEAN4 (Indonesia, Malaysia, the Philippines, and Thailand) and Hong Kong, China with trade partners had weakened by 2017 compared with 2010. ASEAN4 value chain links with Japan and the Republic of Korea weakened, while strong links remained with the PRC, India, and Singapore. The value chain link between Bangladesh and the Republic of Korea declined in 2017 from 2010, where the former's GVC linkage to the latter fell from 82.5% to 78.4%, and the latter's to the former fell from 69.0% to 64.4%. Hong Kong, China—a financial and production hub—had weaker links with the ASEAN4 and Latin America. North America and the European Union (EU) had strong links only with Singapore among Asian economies.

Apart from these notable shifts in value chain participation ratios between pairs, most of the links—especially medium links—remained the same. It is therefore more useful to look at the year-on-year changes (box figure 2). The thickness and density of the lines are configured the same way as box figure 1, except that box figure 2 only shows lines that have positive developments over the prior year. For example, the 2011 chart only shows the lines of bilateral value chain participation ratios that increased compared with 2010, while the 2012 chart only shows links that have increased or strengthened compared with 2011.

Thus, from 2011 to 2015, bilateral value chain links have weakened—as there are fewer and fewer lines (box figures 2a–2e). There were 66 visible lines in 2011, meaning there

Continued on next page

Box 2.2 *continued*

1: Value Chain Participation Ratio

a: 2010

Exporter/ Importer	ASEAN4		BAN		PRC		EU		HKG		IND		JPN		KOR		LATAM		NA	
ASEAN4	0.76																			
BAN	0.73	0.66																		
PRC	0.68	0.84	0.52	0.90																
EU	0.77	0.76	0.51	0.28	0.65	0.60	0.74													
HKG	0.88	0.55	0.59	0.67	0.92	0.49	0.84	0.62												
IND	0.76	0.88	0.58	0.63	0.55	0.61	0.65	0.72	0.36	0.79										
JPN	0.80	0.75	0.47	0.45	0.71	0.50	0.67	0.71	0.45	0.80	0.73	0.77								
KOR	0.83	0.81	0.69	0.83	0.77	0.75	0.67	0.70	0.61	0.91	0.72	0.92	0.81	0.85						
LATAM	0.87	0.80	0.86	0.46	0.77	0.64	0.71	0.73	0.44	0.84	0.88	0.80	0.65	0.77	0.88	0.73	0.66			
NA	0.77	0.63	0.51	0.24	0.66	0.43	0.74	0.70	0.54	0.66	0.76	0.65	0.68	0.54	0.69	0.65	0.78	0.68	0.68	
SIN	0.89	0.90	0.70	0.40	0.93	0.87	0.90	0.90	0.71	0.98	0.83	0.87	0.83	0.92	0.92	0.88	0.88	0.91	0.82	0.87

b: 2017

Exporter/ Importer	ASEAN4		BAN		PRC		EU		HKG		IND		JPN		KOR		LATAM		NA	
ASEAN4	0.72																			
BAN	0.64	0.63																		
PRC	0.65	0.85	0.48	0.91																
EU	0.73	0.75	0.53	0.22	0.66	0.57	0.77													
HKG	0.80	0.51	0.60	0.47	0.90	0.46	0.81	0.60												
IND	0.73	0.90	0.51	0.52	0.53	0.60	0.64	0.72	0.37	0.76										
JPN	0.79	0.70	0.53	0.35	0.73	0.46	0.68	0.68	0.44	0.73	0.81	0.75								
KOR	0.80	0.80	0.64	0.78	0.79	0.75	0.72	0.69	0.58	0.83	0.85	0.90	0.79	0.87						
LATAM	0.85	0.76	0.92	0.42	0.70	0.62	0.73	0.74	0.45	0.78	0.88	0.77	0.57	0.81	0.80	0.80	0.72			
NA	0.71	0.65	0.45	0.22	0.64	0.46	0.75	0.70	0.57	0.62	0.75	0.64	0.66	0.59	0.69	0.70	0.80	0.68	0.70	
SIN	0.88	0.89	0.73	0.27	0.93	0.84	0.90	0.88	0.73	0.98	0.81	0.83	0.83	0.91	0.90	0.86	0.86	0.94	0.82	0.86

ASEAN4 = Indonesia, Malaysia, the Philippines, and Thailand; BAN = Bangladesh; EU = European Union; HKG = Hong Kong, China; IND = India; JPN = Japan; KOR = Republic of Korea; LATAM = Latin America (Brazil and Mexico); NA = North America (Canada and the United States); PRC = People's Republic of China; SIN = Singapore.

Notes: Value chain participation ratio = (Gross exports – Final goods exports for consumption in importing economy)/Gross exports. Value chain exports and gross exports used for computation exclude the exports of agriculture, mining, and fishery; mining and quarrying; and other nonmetallic mineral sectors.

Sources: ADB calculations using data from the 2010–2017 ADB Multi-Regional Input–Output Tables; and methodology by Wang, Wei, and Zhu (2014).

were 66 links that strengthened between 2011 and 2010, that fell to 46 in 2012 and 34 in 2015.

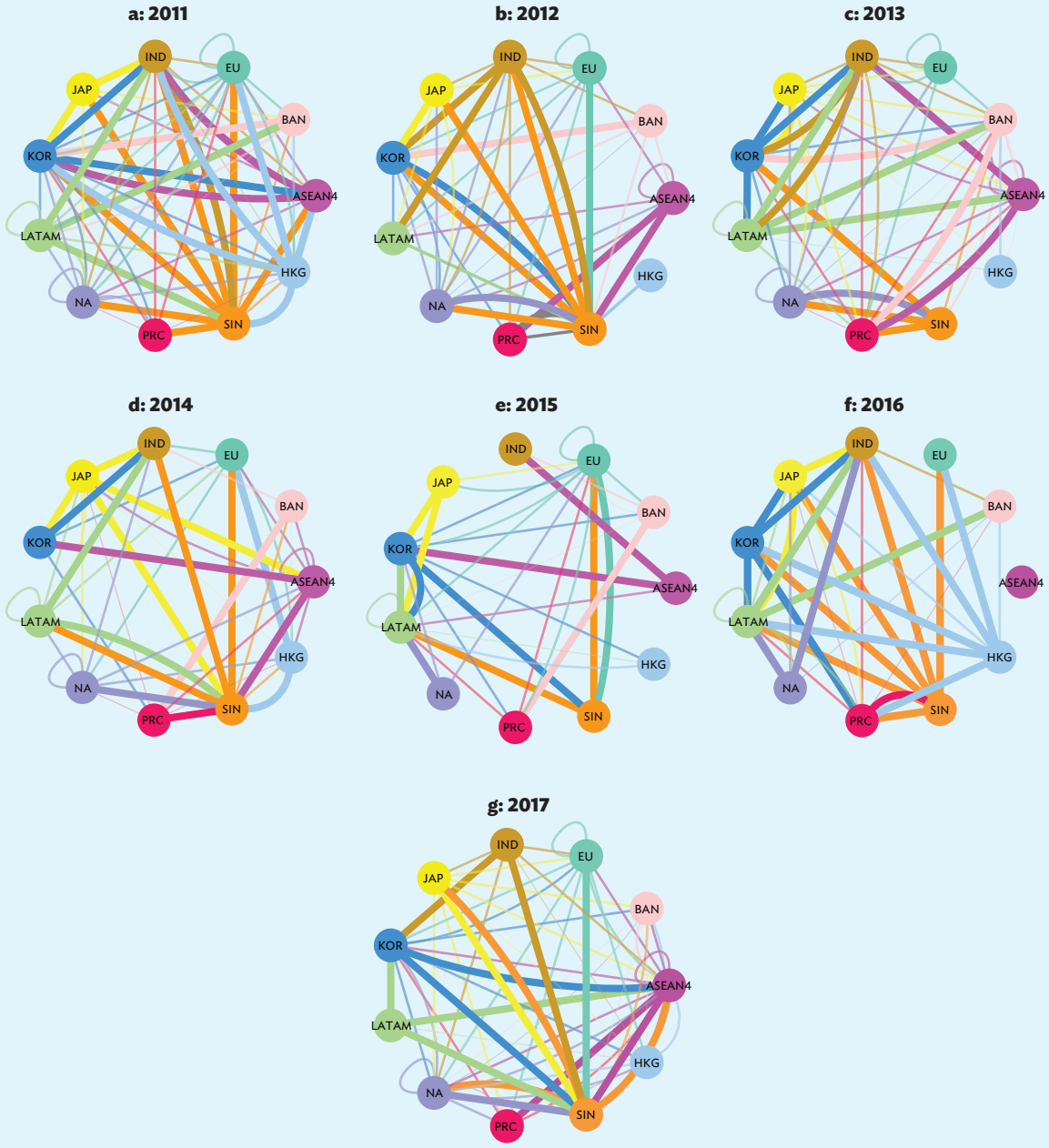
The weakening trend of bilateral value chain links reversed in 2016 (box figure 2f). Hong Kong, China and the Republic of Korea's value chain links strengthened, while all of ASEAN4's weakened. Stronger links were also formed between Latin America and India, Latin America and Bangladesh, as well as North America and India. Singapore's value chain links surged in 2016. This suggests bilateral GVC linkages already started to recover in 2016 before the aggregate GVC participation ratio showed a broader recovery in 2017.

In 2017, 62 bilateral value chain links strengthened (box figure 2g). Notably, ASEAN4 and the EU regained strong value chain links with trade partners. For the ASEAN4, value chain exports of food, beverages, and tobacco; basic metals and fabricated metals; as well as wholesale trade boosted the group's links—especially with the PRC and Singapore. The EU increased GVC exports of transport, electrical and optical equipment, and renting of machinery equipment including other business activities to Singapore; the PRC; Hong Kong, China; and the Republic of Korea. In 2017, among Asian economies, the PRC, Singapore, and ASEAN4 showed the most progress in building value chain linkages with trading partners.

Continued on next page

Box 2.2 *continued*

2: Trends in Production Network of Selected Asian Economies, European Union, Latin America, and North America



ASEAN4 = Indonesia, Malaysia, the Philippines, and Thailand; BAN = Bangladesh; EU = European Union; HKG = Hong Kong, China; IND = India; JPN = Japan; KOR = Republic of Korea; LATAM = Latin America (Brazil and Mexico); NA = North America (Canada and the United States); PRC = People's Republic of China; SIN = Singapore.
Notes: Value chain participation ratio = Gross exports – Final goods exports for consumption in importing economy / Gross exports.
Sources: ADB calculations using data from the 2010–2017 ADB Multi-Regional Input–Output Tables; and methodology by Wang, Wei, and Zhu (2014).

Sources: ADB staff using data from the 2010–2017 ADB Multi-Regional Input–Output Tables; and methodology by Wang, Wei, and Zhu (2014).

Box 2.3: Impact of the Global Value Chain on Productivity Growth

Expanding global value chain (GVC) is known to contribute to productivity growth—by prompting innovation and technological intensity and leveraging economies of scale and specialization. Most empricial studies focus on the country or industry level impact of GVC participation. Here, the impact of GVC expansion on productivity growth using cross-country panel data is explored. Based on a standard Cobb–Douglas production function,[a] the regression equation is:

$$\ln y_{it} = \beta_0 + \beta_1 \ln IGDPC_i + \beta_2 INF_{it} + \beta_2 AGRI_{it} + \beta_3 GOV_{it} + \beta_4 \Delta \ln AWGI_{it} + \beta_5 FDI_{it} + \beta_6 FGCF_{it} + \beta_7 FL_i + \beta_8 EDUC_i + \beta_9 \ln FTAit + \beta_{10} \ln GVC_{it} + \delta_{it}$$

where ln y_{it} is the natural log of labor productivity, ln $IGDPC_i$ is natural log of initial gross domestic product (GDP) per capita, INF_{it} is the inflation rate, $AGRI_{it}$ is the share of agriculture to total value added of economy i, GOV_{it} is government expenditure expressed as share of total GDP, Δln $AWGI_{it}$ is the change in natural log of the average World Governance Index score, FDI_{it} is net foreign direct investment inflow expressed as a share of GDP, $FGCF_{it}$ is gross fixed capital formation (% of GDP), FL_i is the initial level of female labor participation rate as share of total labor force, $EDUC_i$ is the initial level of labor force with advanced education as share of total working age population, ln FTA_{it} is the natural log of cumulative number of counterpart countries in free trade agreements, and ln GVC_{it} is the natural log of GVC exports. The GVC participation ratio is computed using the gross export decomposition methodology of Wang, Wei, and Zhu (2014) and data from the 2010–2017 ADB Multi-Regional Input–Output Tables.

The results of the ordinary least squares (OLS) panel regression are in Annex Table 2a.1. Model 1 shows the results of the random effects regression, while Model 2 shows the fixed effects results. Initial GDP per capita has the expected sign and significance. A 1% increase in $IGDPC_i$ leads to a 0.9% increase in productivity growth. This suggests that a higher initial level of income results in higher labor productivity growth.

Meanwhile, ln $AWGI_{it}$, which measures the quality of institutions, has a positive coefficient indicating that the quality of governance and institutions matters for labor productivity. Inflation has a negative and significant coefficient of 0.02. A 1 percentage point increase in capital formation, $FGCF_{it}$, results in 0.5% increase in labor productivity.

ln GVC_{it} has a positive and significant effect on labor productivity growth. Exporters with higher GVC exports are expected to have higher labor productivity growth, holding other factors constant. A 1% increase in GVC_{it} results in 0.04% increase in productivity based on the random effects regression results and 0.4% based on the fixed effects regression.

To test for the robustness of these results—and to control for possible endogeneity due to omitted variable bias—a Two Stage Fixed Effects Least Squares estimation is used. The ln GVC_{it} was instrumented by ln *total trade*$_{it}$ in Model 3 which is the natural log of total exports and imports of country i. Using ln *total trade*$_{it}$ as instrument variable in the first stage estimation for the ln GVC_{it} yields a coefficient of 0.9 and is significant at the 1% level. This means that a 1% increase in GVC_{it} will likely result in 0.9% increase in labor productivity. An additional instrument for ln GVC_{it} is introduced in Model 4, $CA/Exports_{it}$, which is the current account balance as share of exports to further check the robustness of the results. In this model, a 1% increase in GVC_{it} results in 1.0% increase in labor productivity and significant at the 1% level.

---

[a] Y_i is the output of country i at time t, and the production function is specified as follows:

$$Y_i = K_i^{\alpha} (A_i H_i)^{1-\alpha} \quad (1)$$

where K_i is physical capital, H_i is human capital augmented labor utilized in production. A_i is the labor-augmenting measure of productivity, defined as $A_i = f(GVC_i, X_i)$. GVC_i is GVC exports and X_i is a vector of other specific control variables affecting A_i. It is assumed that labor, L_i, is homogenous and each unit of labor has been endowed with education, E_i. The human capital-augmented labor is defined as

$$H_i = e^{\phi(E_i)} L_i \quad (2)$$

where $\phi(E_i)$ is the efficiency of labor with education compared to the case where education is zero, $\phi(0)=0$. Equation (1) is rewritten and expressed as output per worker, $y_i \equiv Y_i/L_i$, as follows:

$$Y_i = \left(\frac{K_i}{Y_i}\right)^{\frac{\alpha}{1-\alpha}} h_i f_i(GVC_i, X_i) \quad (3)$$

and $h_i \equiv H_i/L_i$ is human capital per unit of labor. For the empirical analysis, equation (3) is expressed in natural logarithmic form. For a given time t,

$$\ln y_i = \left(\frac{K_i}{Y_i}\right)^{\frac{\alpha}{1-\alpha}} \ln h_i + \ln GVC_i + \ln X_i) \quad (4)$$

The level of labor productivity, ln y_i is modeled as a function of formation of physical and human capital, GVC exports and other control variables such as macroeconomic stability, quality of institutions, and trade liberalization. Note that here $y_i = \left(\frac{Y_i}{L_i}\right)$ where Y_i is nominal gross domestic product and L_i is the total labor force of economy i.

Sources: ADB staff using data from 2010–2017 ADB Multi-Regional Input-Output Tables; and methodology by Wang, Wei, and Zhu (2014).

Updates on Regional Trade Policy

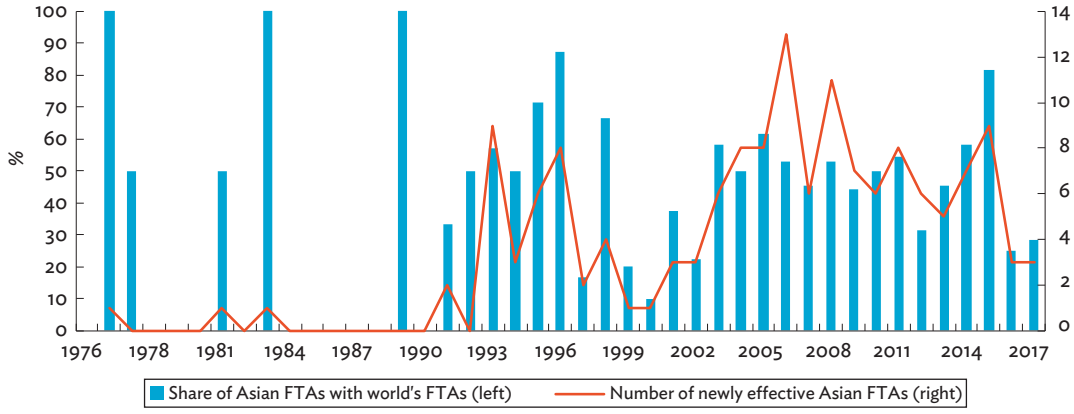
Despite a slowdown of the region's growth in free trade agreements, Asia's push for greater market access through extraregional trade ties and deepening existing free trade agreements gives fresh impetus to trade openness.

The slowdown in the growth of Asia's free trade agreements (FTAs) in effect continued in 2017 (Figure 2.11). Using the World Trade Organization Regional Trade Agreements database, however, the share of Asian FTAs to the world total increased slightly in 2017, from 25.0% to 28.6%. Two Asian FTAs took effect in 2017 (down from three in 2016)—between Hong Kong, China and Macau, China; and between the European Free Trade Association (EFTA) and Georgia. The FTA between the People's Republic of China (PRC) and Georgia came into force 1 January 2018. Two more bilateral FTAs took effect in 2018, namely those between (i) Tapei,China and Paraguay; and (ii) Singapore and Sri Lanka. The plurilateral FTA between the Philippines and the EFTA also entered into force in 2018.

There was a slight rebound in the number of FTAs signed in 2017 (Figures 2.12, 2.13), including the plurilateral Pacific Agreement on Closer Economic Relations (PACER) Plus 10[6] and the FTA between ASEAN and Hong Kong, China—the first ASEAN FTA signed in a decade. As of August 2018, three bilateral FTAs between the following economies were signed: (i) Singapore and Sri Lanka which also took effect on 1 May 2018; (ii) Hong Kong, China and Georgia; and (iii) Australia and Peru. During the same period, five plurilateral FTAs were also signed between the following economies and trade blocs: (i) the Republic of Korea and Central America,[7] (ii) Eurasian Economic Union[8] and the PRC, (iii) Eurasian Economic Union and Iran, (iv) Japan and the European Union (EU), and (v) the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). The FTA signed between Japan and the EU, which have a combined GDP accounting for about a quarter of the world GDP, reaffirms these big economies commitment to open and rules-based trade.

Two key trends continue to shape Asia's FTA landscape. First, Asia's push for market access in economies outside the region continues unabated (Figure 2.14). In the last quarter of 2017, the PRC launched negotiations for bilateral FTAs with Mauritius and Moldova. It has also initiated a joint feasibility study with Panama in

Figure 2.11 Newly Effective Free Trade Agreements—Asia



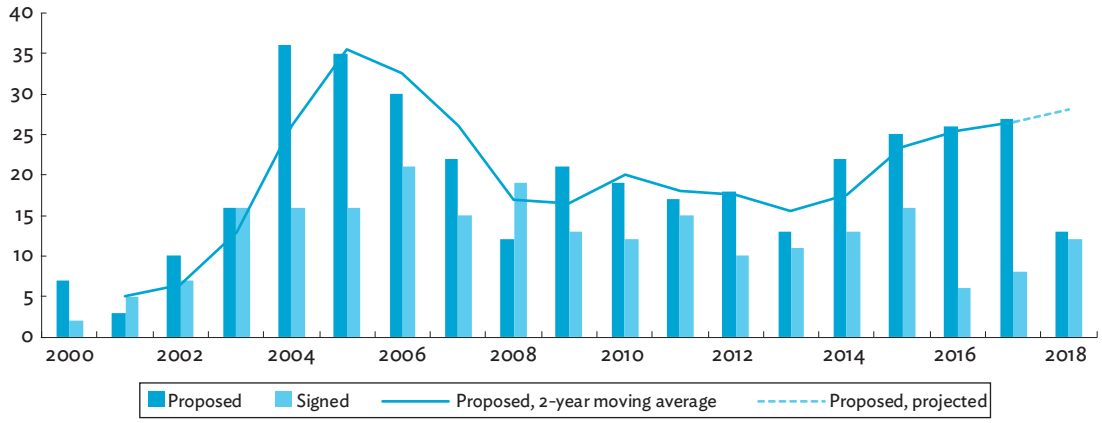
FTA = free trade agreement.
Sources: ADB calculations using data from ADB. Asia Regional Integration Center FTA Database. https://aric.adb.org/fta; and World Trade Organization. Regional Trade Agreement Information System. http://rtais.wto.org (both accessed August 2018).

[6] PACER Plus 10 includes Australia, the Cook Islands, the Federated States of Micronesia, Kiribati, the Marshall Islands, Nauru, New Zealand, Niue, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.

[7] Central America is a trading bloc consisting of Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.

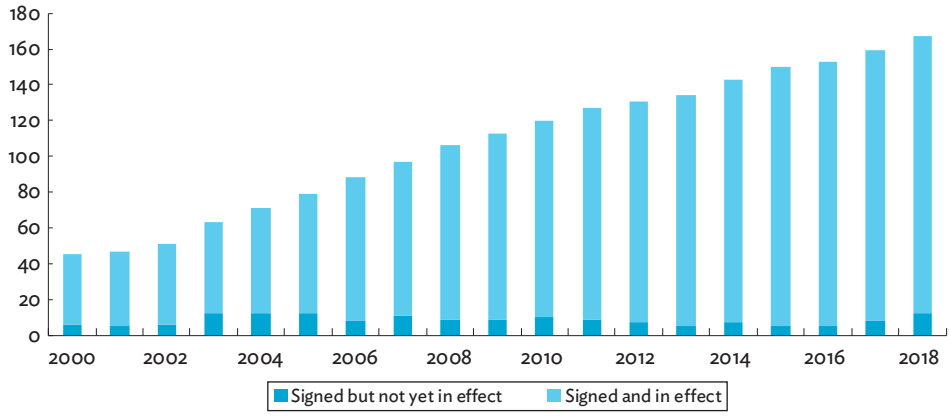
[8] The Eurasian Economic Union is composed of Armenia, Belarus, Kazakhstan, the Kyrgyz Republic, and the Russian Federation.

Figure 2.12: Number of Proposed and Signed Free Trade Agreements—Asia



FTA = free trade agreement.
Notes: Includes bilateral and plurilateral FTAs with at least one of ADB's 48 regional members as signatory. "Signed" includes FTAs that are signed but not yet in effect, and those 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 agreements 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 a first round of negotiations). 2018 covers FTAs that are signed and proposed from January to July.
Source: ADB. Asia Regional Integration Center FTA Database. https://aric.adb.org/fta (accessed August 2018).

Figure 2.13: Number of Signed Free Trade Agreements—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. 2018 covers FTAs that are signed from January to July.
Source: ADB. Asia Regional Integration Center FTA Database. https://aric.adb.org/fta (accessed August 2018).

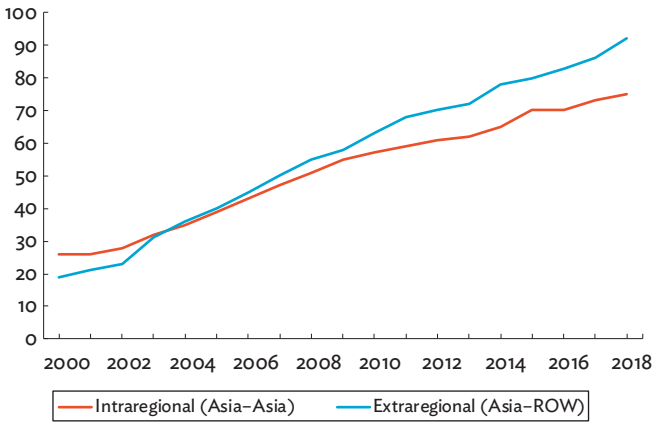
early 2018. Six of the eight FTAs signed in 2018 involve non-Asian partners. Meanwhile, Indonesia has launched FTA negotiations with African economies such as Mozambique and Tunisia. Australia has started FTA talks with the EU, while Singapore and the Republic of Korea are currently negotiating bilateral FTAs with Mercosur.[9]

In addition, the Republic of Korea had initiated the process of seeking associate membership of the Pacific Alliance[10] trade bloc, which will result in an FTA with Mexico. Bilateral FTAs exist between the Republic of Korea and Chile, Colombia, and Peru, but none with Mexico, the largest economy in the alliance. Asia's drive

[9] Mercosur or *Mercado Comun del Sur* (Southern Common Market) is a subregional bloc composed of Argentina, Brazil, Paraguay, and Uruguay.

[10] The Pacific Alliance is a Latin American trading bloc consisting of South American neighbors Chile, Colombia, and Peru, and non-neighbor Mexico.

Figure 2.14: Number of Signed Free Trade Agreements, Intraregional and Extraregional (cumulative since 1975)



FTA = free trade agreement, ROW = rest of the world.
Notes: Includes bilateral and plurilateral FTAs with at least one of ADB's 48 regional members as signatory. "Signed" includes FTAs that are signed but not yet in effect, and those signed and in effect. 2018 covers FTAs that are signed from January to July.
Source: ADB. Asia Regional Integration Center FTA Database. https://aric.adb.org/fta (accessed August 2018).

to strengthen trade links with non-Asian partners and nontraditional markets reflects its close GVC links and its commitment to trade openness.

Second, there is a sharp upsurge in the number of Asian FTAs in various stages of being upgraded or the deepening of existing liberalization commitments to include "behind-the-border" issues such as investment, trade facilitation, competition, and government procurement. While a staggered improvement toward greater trade openness is not a new strategy, the growing trend of Asian FTA upgrading is fairly new—and intensified in the last 2 years. The upgraded FTA between Singapore and Australia—which originally took effect in 2003—came into force 31 December 2017. The upgraded FTA between the PRC and Chile was signed in 2017, while the FTA between the Republic of Korea and the United States (US) clinched renegotiations this year. Overall, 15 Asian FTAs are currently going through an upgrading process. Although the growth of Asia's FTAs seems to be reaching a plateau, the deepening of existing FTA commitments is a new way of advancing trade openness and creating new trade opportunities despite global trade uncertainties.

Comprehensive and Progressive Agreement for Trans-Pacific Partnership

Following the US departure from the Trans-Pacific Partnership (TPP) agreement, the remaining 11 TPP members signed the CPTPP on 8 March 2018 in Chile.[11] The ministers who signed the CPTPP "expressed their determination to complete their domestic processes to bring the Agreement into force expeditiously" (New Zealand Government Official Website 2018). The ministerial statement also welcomed the expression of interest of several other economies to join in the future. The CPTPP will enter into force 60 days after at least six (over 50%) signatories ratify the agreement. At present, three CPTPP members—Japan, Mexico, and Singapore—have completed the respective domestic processes necessary to ratify the trade deal.

Regional Cooperation Economic Partnership

Another "mega" trade deal, the Regional Cooperation Economic Partnership (RCEP),[12] remains under negotiation. RCEP would cover the 10 ASEAN members and six economies with existing FTAs with ASEAN. In the Joint Media Statement of the Sixth RCEP Ministerial Meeting held on 30–31 August 2018 in Singapore, RCEP ministers "welcomed the conclusion of two additional chapters at the 23rd round of negotiations, namely the Chapters on Customs Procedures and Trade Facilitation and Government Procurement, bringing the total concluded chapters to date to four" (ASEAN Secretariat 2018). They adopted "a package of year-end deliverables" and "expressed the hope that completion of the package would signify the substantial conclusion of the RCEP negotiations this year."

[11] The 11 TPP members include Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Viet Nam.

[12] RCEP is composed of 10 ASEAN members, and its six FTA partners namely, Australia, India, Japan, New Zealand, the People's Republic of China, and the Republic of Korea.

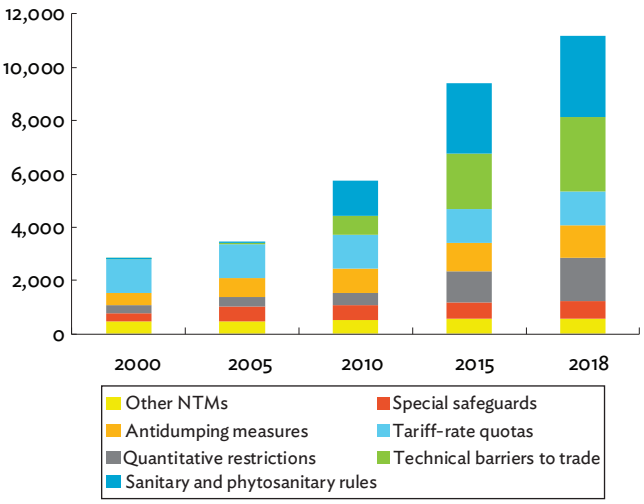
Trade Remedies

Significant administrative tariff and nontariff barriers remain.

The increase in administrative tariff and nontariff measures continued into 2018 (Figure 2.15). New tariffs imposed may reduce trade and damage GVC exports (see Box 2.4 for analysis of the impact of antidumping duties on GVC exports).

Not all nontariff measures, however, are intended to impede trade. Some have legitimate purposes, such as sanitary and phytosanitary measures that protect food safety for consumers and prevent or limit the spread of pests and diseases among plants and animals. Antidumping duties remain the most widely used trade remedy globally against Asia's exporters (Table 2.1).

Figure 2.15: Trade-Related Measures—Asia



NTM = nontariff measures.
Notes: Based on cumulative number of measures in force as of end of each year. 2018 covers measures that are in force and will be enforced in 2018. Other NTMs include countervailing measures, safeguards, and export subsidies.
Source: ADB calculations using data from World Trade Organization. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2018).

Table 2.1: Trade Remedy Measures[a] and World Trade Organization Cases,[b] 2010–2018

Measures	World Total	Asia[c] Total	**Asia** (Complainant / Affected)–**ROW** (Respondent / Imposing)	**ROW** (Complainant/ Affected)–**Asia** (Respondent / Imposing)	**Asia** (Complainant/ Affected)–**Asia** (Respondent/ Imposing)
Anti-dumping (Article VI of GATT 1994)					
Number of measures implemented	1,303	1,033	478	145	410
Number of cases	46	33	18	9	6
	(3.5%)	(3.2%)			
Subsidies and Countervailing Measures					
Number of measures implemented	122	104	82	8	14
Number of cases[d]	36	23	11	11	1
	(29.5%)	(22.1%)			
Safeguards[e]					
Number of measures implemented	81	48[f]	33[f]	48[f]	48[f]
Number of cases	23	10	7	0	3
	(28.4%)	(20.8%)			
Total					
Number of measures implemented	1,506	1,257	593	201	463
Number of cases	105	66	36	20	10
	(7.0%)	(5.3%)			

GATT = General Agreement on Tariffs and Trade, ROW = rest of the world.
Notes: Numbers in parentheses are percentage share of cases to total measures implemented. 2018 covers trade remedies in force as of February 2018 and WTO dispute settlement cases that have requested consultation as of July 2018.
[a] Trade remedy measures are trade rules or policies implemented by an economy. In the table, trade remedies include measures which are in force.
[b] WTO cases are disputes on trade measures among WTO members that are brought before the WTO Dispute Settlement Body.
[c] Asia as implementing/affected region equals the number of global trade remedy measures minus ROW–ROW measures (not shown in table).
[d] Includes cases involving complaints on the grant of subsidies and countervailing measures.
[e] Safeguard measures are imposed on all WTO members; no bilateral data available.
[f] Includes multilateral safeguard measures affecting all WTO members.
Sources: ADB calculations using data from WTO. Disputes by agreement. https://www.wto.org/english/tratop_e/dispu_e/dispu_agreements_index_e.htm; and WTO. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (both accessed August 2018).

Box 2.4: Impact of Antidumping Duties on Global Value Chain Exports

Since the beginning of 2018, global trade tensions have escalated. An initial series of tariffs on washing machines and solar cells in January was initiated by the United States, followed by tariffs on aluminum and steel announced early March. A further $34 billion of products imported from the People's Republic of China (PRC) was targeted in July, with an additional $16 billion in August. The tariffs triggered immediate tit-for-tat countermeasures by those affected—particularly Canada, the PRC, and the European Union.

Most economists and policy makers are deeply concerned about how rising tariffs will affect global trade—and in particular their impact on global production networks. Assessing their potential impact is difficult due to a lack of historical data—given that global tariff rates have declined significantly over time and remain low. Thus, there is no plausible benchmark for assessing the impact of higher tariff rates.

One alternative is to use antidumping (AD) cases, as they are levied as duties against specific sectors. Nevertheless, the purpose and level of AD duties could be quite different from those of the tariffs under implementation and contemplation recently. In this sense, the empirical exercise below, while providing some analogy in understanding the potential impact of tariff barriers, needs to be viewed mainly from the angle of impact of trade remedies. The impact of AD on targeted imports has long been a popular topic for researchers. However, less frequent are studies on their impact on global value chains (GVCs). Here, empirical work is conducted to assess whether importing countries' AD case initiations in a sector harms their own GVC exports in other sectors due to industrial linkages and spillover effects.

The fixed effects panel ordinary least squares (OLS) model estimated takes the following form:

$$\begin{aligned}\ln X^{j}_{odt} = \beta_1 + \beta_2 \ln IO^{j}_{ot} + \beta_3 \ln IO^{j}_{dt} + \beta_4 \ln dist_{od} + \\ \beta_5 contig_{od} + \beta_6 comlangoff_{od} + \beta_7 col_{od} \\ +\beta_8 \ln tar^{j}_{odt} + \beta_9 AD^{i}_{odt} + \mu_o fe^{j}_{o} + \gamma_d fe^{j}_{d} + \alpha_t year_t + \varepsilon^{j}_{odt}\end{aligned} \quad (1)$$

where fe^{j}= importer or exporter fixed effects alone or interacted with International Standard Industrial Classification (ISIC) 3 sections and subsections, depending on the model specification. To measure the lagged impact of initiating AD on GVC exports, the antidumping variable AD^{i}_{odt} is equal to 1 if the importer (*d*) initiates AD on exporter (*o*) in sector *i* at least once during the past 3 years, and 0 otherwise. X^{j}_{odt} is the GVC exports of AD initiating country *d* to country *o* in sectors other than *i* at period *t*. Other country bilateral variables follow the general gravity model specification (*i.e.,* $dist_{od}$, $contig_{od}$, $comlangoff_{od}$, and col_{od}) except for IO^{j}_{ot} and IO^{j}_{dt}, which control for industrial output of the exporter and importer, respectively, at time *t*. The $year_t$ dummy controls for time-specific cross-country common factors. The bilateral GVC exports data are derived from the ADB Multi-Regional Input–Output Table, which covers 48 economies and spans the years 2000, 2005, 2008, 2011, and 2015.

The fixed effects panel OLS regression results indicate a significantly negative impact of AD cases on GVC exports of the AD initiating countries in other sectors (Annex Table 2c.1). When a country initiates an AD case on coke, for example, its GVC exports in other sectors decline between 9% and 30%, depending on the fixed effects model (Annex Table 2c.1, columns 4 to 6). Other sectors could have a variety of industrial linkages with the AD initiating sector through backward and forward linkages. Thus, protecting a specific sector through AD can make GVC exports of other sectors suffer.

A generalized method of moments (GMM) regression is used to check for robustness. Equation (1) is revised to include a one-period lag GVC exports as an explanatory variable and reestimated using the system GMM regression technique developed by Blundell and Bond (1998), which combines the regression in first differences with an estimation run in levels, using both lagged levels and lagged differences as instruments. Equation (1) is rewritten as:

$$\begin{aligned}\ln X^{k}_{odt} = \beta_1 + \beta_2 \ln X^{k}_{od(t-1)} + \beta_3 \ln IO^{k}_{ot} + \beta_4 \ln IO^{k}_{dt} + \\ \beta_5 \ln tar^{k}_{odt} + \beta_6 AD^{i}_{odt} + \alpha_t year_t + \varepsilon^{k}_{odt}\end{aligned} \quad (2)$$

where *k* is a specific sector other than sector *i*.

The complete set of time-invariant gravity variables is not included in the specification because, with the system GMM estimator, we can obtain efficient estimates while controlling for time-invariant unobserved heterogeneity, simultaneity, and the dynamic relationship between current values of the explanatory variables and lagged values of the dependent variable. In effect, this addresses omitted variables bias. The autocorrelation test and the robust estimates of the coefficient standard errors rest on the assumption of no correlation across individuals in the idiosyncratic disturbances. To make this assumption likely to hold, we include time dummies $year_t$.

System GMM results show that the AD initiating country's GVC exports in other sector can suffer when AD is initiated (Annex Table 2c.2). Given the short production network involved, however, agricultural products and wood do not seem to cause significant negative spillovers to GVC exports in other sectors.

Sources: ADB staff using data from 2015 ADB Multi-Regional Input–Output Table; Bown (2016); Institute for Research on the International Economy. http://www.cepii.fr/CEPII/en/cepii/cepii.asp (accessed May 2018); United Nations Statistics Division. National Accounts Main Aggregates Database. https://unstats.un.org/unsd/snaama/dnlList.asp (accessed January 2018); and World Integrated Trade Solutions. https://wits.worldbank.org/ (accessed February 2018).

Based on the latest data on trade remedies notified to the World Trade Organization, antidumping measures against Asia increased to 132 in 2017 from 121 in 2016 (Annex Table 2b.1). Base metals and chemicals were the most targeted (Annex Table 2b.2). The PRC; the Republic of Korea; and Taipei,China were most affected (Annex Table 2b.3).

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Annexes

Annex Table 2a: Impact of Global Value Chain Exports on Labor Productivity Growth

Table 2a.1: Regression Results
Dependent variable: Log(Labor Productivity$_{it}$)

Variables	Random Effects (1)	Fixed Effects (2)	Fixed Effects 2SLS (1 IV) (3)	Fixed Effects 2SLS (2 IV) (4)
Log(Initial GDP per capita)$_i$	0.873***			
	(0.050)			
Inflation$_{it}$	-0.019***	-0.011	0.001	0.003
	(0.007)	(0.008)	(0.006)	(0.006)
Government expenditure/GDP$_{it}$	-0.015	-0.008	0.015	0.018**
	(0.010)	(0.012)	(0.009)	(0.009)
D.Log(Ave. WGI)$_{it}$	0.061***	0.060**	0.070*	0.071
	(0.022)	(0.029)	(0.042)	(0.044)
Agriculture VA/Total VA$_{it}$	-0.009	-0.012	-0.0007	0.001
	(0.012)	(0.016)	(0.016)	(0.017)
FDI net inflows/GDP$_{it}$	0.068	0.004	-0.071	-0.082
	(0.087)	(0.072)	(0.061)	(0.064)
Initial female LF participation/LF$_i$	-0.003			
	(0.008)			
Initial LF with advanced education/LF$_i$	0.001			
	(0.001)			
Log(Cumulative number of FTAs)$_{it}$	-0.008	-0.269	-0.116	-0.093
	(0.024)	(0.242)	(0.174)	(0.181)
Gross fixed capital formation/GDP$_{it}$	0.006**	0.006***	0.010***	0.010***
	(0.002)	(0.001)	(0.002)	(0.003)
Log(GVC exports)$_{it}$	0.035*	0.396***	0.945***	1.025***
	(0.019)	(0.124)	(0.179)	(0.173)
Constant	1.841***	7.627***		
	(0.591)	(2.185)		
Time fixed effects included	Yes	Yes	Yes	Yes
Observations	237	237	237	237
R-squared within	0.567	0.665	0.503	0.452
F-statistic			31.64	18.95
Anderson canonical correlation LM statistic			28.89	33.78
Sargan Statistic				1.237

*** = significant at 1%, ** = significant at 5%, * = significant at 10%. Robust standard errors are in parentheses.
2SLS = two-stage least squares, FDI = foreign direct investments, FTA = free trade agreement, GDP = gross domestic product, GVC = global value chain, IV = instrumental variable, LF = labor force, OLS = ordinary least squares, VA = value added, WGI = World Governance Index.
Notes: In column (3), the instrument used is the total trade expressed in natural logarithm. The same variable is also used for column (4), as well as the current account.
Sources: ADB calculations using data from 2010–2017 ADB Multi-Regional Input-Output Tables; World Bank. World Development Indicators. http://databank.worldbank.org/data/source/world-development-indicators# (accessed March 2018); World Bank. World Governance Index. http://info.worldbank.org/governance/wgi/#home (accessed March 2018); World Trade Organization. Disputes by agreement. https://www.wto.org/english/tratop_e/dispu_e/dispu_agreements_index_e.htm (accessed August 2018); and methodology by Wang, Wei, and Zhu (2014).

Annex Table 2b: Trade Remedy Measures—Asia

Table 2b.1: Number of New Trade Remedy Measures Involving Asia

	a: Asia as Imposing Party				b: Asia as Affected Party			
Year	AD	CV	SG	Total	AD	CV	SG	Total
2010	59	3	1	63	99	13	5	117
2011	57	3	10	70	77	6	11	94
2012	62	2	3	67	81	10	6	97
2013	70	3	2	75	135	13	4	152
2014	62	2	11	75	108	7	19	134
2015	70	2	11	83	135	11	18	164
2016	78	2	5	85	121	20	7	148
2017	97	5	5	107	132	16	9	157

AD = antidumping, CV = countervailing measures, SG = safeguards, WTO = World Trade Organization.
Notes: Trade remedy measures include measures which are 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 using data from WTO. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2018).

Table 2b.2: Number of Trade Remedy Measures Affecting Asia, 2010–2018—Top Affected Sectors

HS Product Description	Total	Antidumping Duties	Countervailing Duties	Safeguards
Base metals and articles	443	362	54	27
Products of the chemical and allied industries	184	164	12	8
Resins, plastics and articles; rubber and articles	124	113	9	2
Machinery and electrical equipment	101	84	11	6

HS = harmonized system, WTO = World Trade Organization.
Notes: Trade remedy measures include measures which are 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. 2018 covers trade remedies in force as of February 2018.
Source: ADB calculations using data from WTO. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2018).

Table 2b.3: Number of Implemented Trade Remedy Measures, 2010–2018—Top Affected Asian Economies

	Number of Measures Implemented		
Economy Affected	ROW	Asia	Total
People's Republic of China	338	205	543
Republic of Korea	87	99	186
Taipei,China	76	87	163

ROW = rest of the world, WTO = World Trade Organization.
Notes: Trade remedies include measures which are in force. 2018 covers trade remedies in force as of February 2018.
Source: ADB calculations using data from WTO. Integrated Trade Intelligence Portal. https://www.wto.org/english/res_e/statis_e/itip_e.htm (accessed August 2018).

Annex 2c: Impact of Antidumping Case Initiations on Global Value Chain Exports

Table 2c.1: Panel Ordinary Least Squares (All countries)
Dependent variable: Log(Bilateral GVC Exports ISIC 3 level)

Sector Initiated with AD case	Basic Metals and Fabricated Metal			Coke, Refined Petroleum and Nuclear Fuel			Chemicals and Chemical Products			Electrical and Optical Equipment		
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Contiguity (=1 or 0)	1.010***	1.505***	0.677***	0.992***	1.499***	0.729***	0.797***	1.254***	0.681***	0.950***	1.442***	0.692***
	(0.191)	(0.239)	(0.218)	(0.168)	(0.204)	(0.183)	(0.188)	(0.233)	(0.212)	(0.184)	(0.228)	(0.197)
Common official language (=1 or 0)	-0.146	0.201	-0.112	-0.228	0.129	-0.090	-0.163	0.228	-0.184	-0.108	0.303**	-0.118
	(0.177)	(0.17)	(0.219)	(0.149)	(0.144)	(0.186)	(0.164)	(0.160)	(0.213)	(0.152)	(0.149)	(0.200)
Colonial relations (=1 or 0)	0.388**	0.753***	0.356*	0.422***	0.727***	0.311	0.402**	0.772***	0.384*	0.320**	0.686***	0.323*
	(0.164)	(0.203)	(0.204)	(0.150)	(0.164)	(0.190)	(0.168)	(0.200)	(0.210)	(0.158)	(0.180)	(0.192)
Log(distance)	-0.816***	-0.519***	-0.906***	-0.874***	-0.518***	-0.900***	-0.915***	-0.564***	-0.979***	-0.984***	-0.593***	-1.011***
	(0.067)	(0.061)	(0.093)	(0.064)	(0.055)	(0.076)	(0.068)	(0.063)	(0.088)	(0.066)	(0.058)	(0.084)
Bilateral applied tariff (simple average)	-0.021***	-0.016***	-0.020***	-0.025***	-0.018***	-0.025***	-0.022***	-0.017***	-0.020***	-0.020***	-0.015***	-0.018***
	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)	(0.004)
Industrial output (exporter)	0.570***	0.566***	1.095***	0.550***	0.538***	1.055***	0.520***	0.514***	1.078***	0.513***	0.524***	1.090***
	(0.103)	(0.102)	(0.04)	(0.094)	(0.093)	(0.030)	(0.092)	(0.090)	(0.038)	(0.094)	(0.093)	(0.037)
Industrial output (importer)	0.417***	0.911***	0.410***	0.408***	0.924***	0.388***	0.473***	0.935***	0.401***	0.405***	0.913***	0.374***
	(0.101)	(0.022)	(0.096)	(0.097)	(0.021)	(0.093)	(0.095)	(0.022)	(0.091)	(0.093)	(0.022)	(0.089)
AD case initiation on sector (=1 or 0)	-0.047	-0.229***	-0.127*	-0.151***	-0.301***	-0.092**	-0.137**	-0.096*	-0.275***	-0.160***	-0.209***	-0.240***
	(0.070)	(0.068)	(0.070)	(0.049)	(0.052)	(0.047)	(0.057)	(0.053)	(0.054)	(0.061)	(0.059)	(0.060)
Constant	-16.80***		-25.91***	-9.859***	-27.23***	-24.56***	-10.55***	-26.56***	-24.41***	-7.951**	-26.04***	-23.94***
	(3.617)		(2.526)	(3.434)	(2.381)	(2.394)	(3.381)	(2.394)	(2.372)	(3.351)	(2.421)	(2.309)
No. of observations	3,892	3,892	3,892	4,254	4,254	4,254	4,202	4,202	4,202	4,401	4,401	4,401
Exporter - ISIC 3 FE	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Importer - ISIC 3 FE	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GVC export sector excluded	Basic Metals and Fabricated Metal			Coke, Refined Petroleum and Nuclear Fuel			Chemicals and Chemical Products			Electrical and Optical Equipment		
Overall R-squared	0.919	0.889	0.793	0.924	0.896	0.812	0.918	0.887	0.794	0.916	0.884	0.794
Within R-Squared	0.289	0.282	0.279	0.317	0.307	0.308	0.309	0.302	0.299	0.297	0.289	0.284
Between R-squared	0.956	0.925	0.824	0.958	0.929	0.854	0.954	0.923	0.827	0.953	0.920	0.828

*** = significant at 1%, ** = significant at 5%, * = significant at 10%. Robust standard errors are in parentheses.
AD = antidumping, FE = fixed effects, GVC = global value chain, ISIC = International Standard Industry Classification.
Sources: ADB calculations using data from ADB. 2015 ADB Multi-Regional Input–Output Table; Bown (2016); Institute for Research on the International Economy. http://www.cepii.fr/CEPII/en/cepii/cepii.asp (accessed May 2018); United Nations Statistics Division. National Accounts Main Aggregates Database. https://unstats.un.org/unsd/snaama/dnlList.asp (accessed January 2018); World Integrated Trade Solutions. https://wits.worldbank.org/ (accessed February 2018); and methodology by Wang, Wei, and Zhu (2014).

Table 2c.2: System Generalized Method of Moments (All countries)
Dependent variable: Log(Bilateral GVC Exports ISIC 3 level)

Sector Initiated with AD Case	**Agriculture, Hunting, Forestry, and Fishing**	**Wood and Products of Wood and Cork**	**Food, Beverages, and Tobacco**	**Manufacturing, NEC**	**Manufacturing, NEC**	**Pulp, Paper, Printing, and Publishing**	**Basic Metals and Fabricated Metal**
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(GVC exports)$_{t-1}$	0.687***	0.695***	0.394***	0.558***	0.823***	0.496***	0.503**
	(0.188)	(0.163)	(0.132)	(0.135)	(0.114)	(0.142)	(0.245)
Bilateral applied tariff (simple average)	-0.037	-0.025	0.039	-0.072***	-0.056	-0.053***	-0.049
	(0.036)	(0.029)	(0.061)	(0.023)	(0.051)	(0.017)	(0.040)
Industrial output (exporter)	0.348	0.430*	0.998**	0.646**	0.366	0.740***	0.596*
	(0.277)	(0.260)	(0.397)	(0.255)	(0.258)	(0.258)	(0.306)
Industrial output (importer)	0.204	0.166	0.644***	0.183	0.298**	0.193	0.531
	(0.356)	(0.295)	(0.206)	(0.141)	(0.130)	(0.169)	(0.449)
AD case initiated on sector (=1 or 0)	-0.037	-0.497	-0.840**	-0.460**	-0.744*	-0.596*	-0.788*
	(0.401)	(0.415)	(0.357)	(0.233)	(0.413)	(0.317)	(0.402)
Constant	-12.62		-41.02***	-19.11**			
	(15.190)		(15.710)	(8.002)			
No of observations	148	148	88	298	265	298	148
GVC exports sector	Electrical and Optical Equipment		Rubber and Plastics	Basic Metals and Fabricated Metal	Coke, Refined Petroleum, and Nuclear Fuel	Basic Metals and Fabricated Metal	Electrical and Optical Equipment
AR(2) p-value	0.352	0.434	0.877	0.522	0.467	0.239	0.652
Hansen p-value	0.671	0.773	0.812	0.229	0.159	0.424	0.592
No. of instruments	45	43	23	53	53	53	35

*** = significant at 1%, ** = significant at 5%, * = significant at 10%. Robust standard errors are in parentheses.
AD = antidumping, FE = fixed effects, GVC = global value chain, ISIC = International Standard Industry Classification, NEC = not elsewhere classified.
Sources: ADB calculations using data from ADB. 2015 ADB Multi-Regional Input–Output Table; Bown (2016); Institute for Research on the International Economy. http://www.cepii.fr/CEPII/en/cepii/cepii.asp (accessed May 2018); United Nations Statistics Division. National Accounts Main Aggregates Database. https://unstats.un.org/unsd/snaama/dnlList.asp (accessed January 2018); World Integrated Trade Solutions. https://wits.worldbank.org/ (accessed February 2018); and methodology by Wang, Wei, and Zhu (2014).