GLOBAL TRADE WATCH

TRADE DEVELOPMENTS IN 2016:
Policy Uncertainty Weighs on World Trade

Cristina Constantinescu, Aaditya Mattoo, and Michele Ruta

February 21, 2017

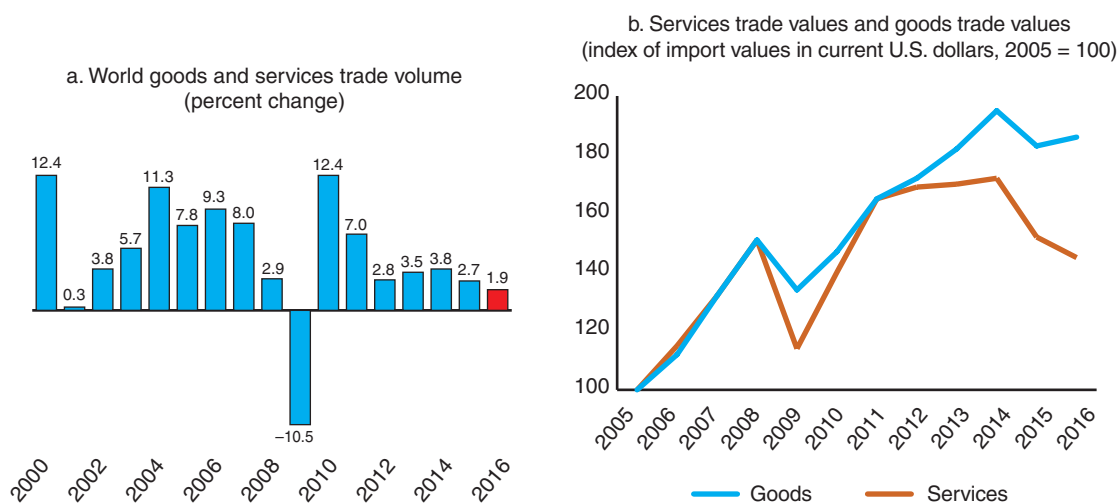**WORLD BANK GROUP**

Executive Summary

In this edition of Trade Watch, we address three questions concerning recent trade developments: What is happening? Why? Does it matter?

What Is Happening?

2016 is the fifth consecutive year of sluggish trade growth and the year with the weakest trade performance since the aftermath of the 2008 global financial crisis (figure ES1a). Current estimates of growth in the volumes of trade in goods and services range from 1.9 percent to 2.5 percent, but preliminary high-frequency data suggest that merchandise trade volumes may have grown by only about 1 percent. The year 2016 is different from the other post crisis years, in that trade sluggishness is a characteristic of *both* advanced and emerging economies.

Since 2008, trade values of services and trade values of goods have followed different trajectories, with growth in services trade more resilient during the global financial crisis and the global trade slowdown of recent years (figure ES1b).

FIGURE ES1: Trade growth in 2016 (goods and services) is the lowest since the crisis

a. World goods and services trade volume (percent change)

b. Services trade values and goods trade values (index of import values in current U.S. dollars, 2005 = 100)

Source: International Monetary Fund World Economic Outlook, CPB Netherlands Bureau of Economic Policy Analysis, World Trade Organization services database, and authors' calculations.
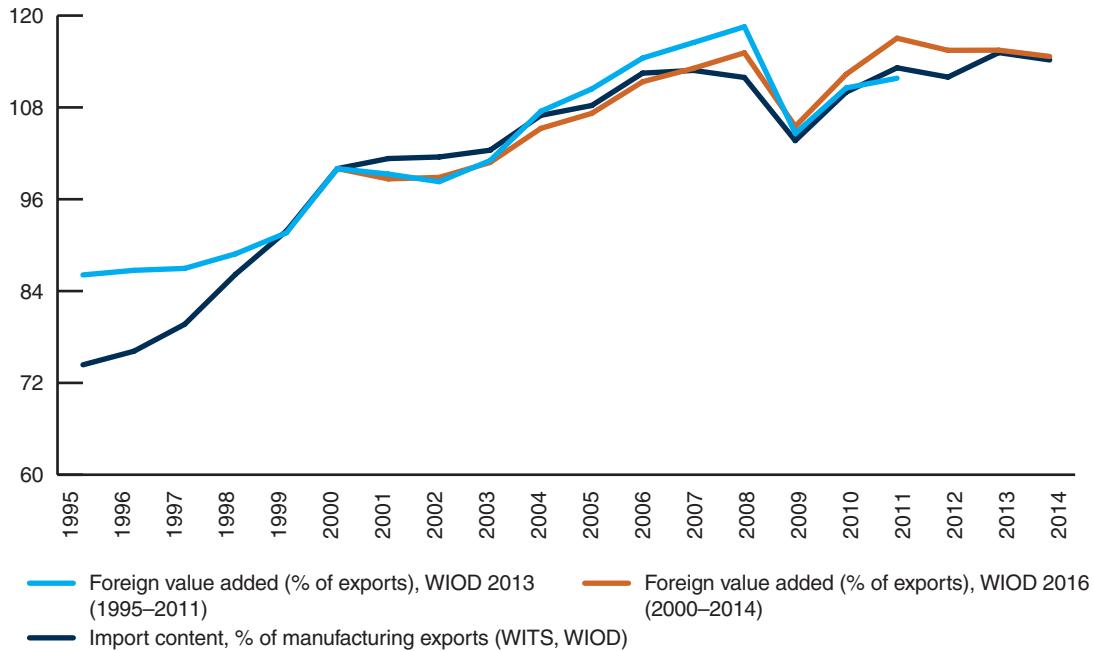*Notes:* (a) Trade is calculated as the average of exports and imports of goods and services. (b) 2016 estimates of goods and services trade values are obtained by applying year-over-year growth rates to 2015 levels (11 months used for goods and 3 quarters for services).

Why?

Trade developments in 2016 continued to reflect enduring structural determinants, such as the maturing of global value chains (GVCs) and the slower pace of trade liberalization, and cyclical factors, notably slow global growth, the trough in commodity prices, and macroeconomic rebalancing in China (figure ES2).

FIGURE ES2: **Measures of world vertical specialization, 1995–2014**

Foreign value added (% of exports), WIOD 2013 (1995–2011)

Foreign value added (% of exports), WIOD 2016 (2000–2014)

Import content, % of manufacturing exports (WITS, WIOD)

Source: The 2013 and 2016 releases of World Input-Output Database (WIOD 2013 and WIOD 2016) (Timmer et al. 2015), UN Comtrade (World Integrated Trade Solution (WITS)), and authors' calculations.
Notes: The measures of vertical specialization based on WIOD 2013 and 2016 data are shares of foreign value added in gross exports of goods and services. The third measure relies on manufacturing trade data from the UN Comtrade (obtained via WITS) and output data from WIOD.

The increase in policy uncertainty may also have contributed to trade slowing down further in 2016 (figure ES3). The negative association between economic policy uncertainty and trade growth that emerges from the prima facie evidence is confirmed when we look at a broader sample spanning 18 countries over 30 years (figure ES4). The regression analysis in Chapter 1 indicates that a 1 percent increase in uncertainty is associated with a 0.02-percentage point reduction in goods and services trade volume growth. This implies that the increase in uncertainty in 2016 may have reduced trade growth by about 0.6 percentage points, which is equivalent to 75 percent of the difference between trade growth rates in 2015 and 2016.

FIGURE ES3: World import growth and policy uncertainty, from mid-2012 to 2016
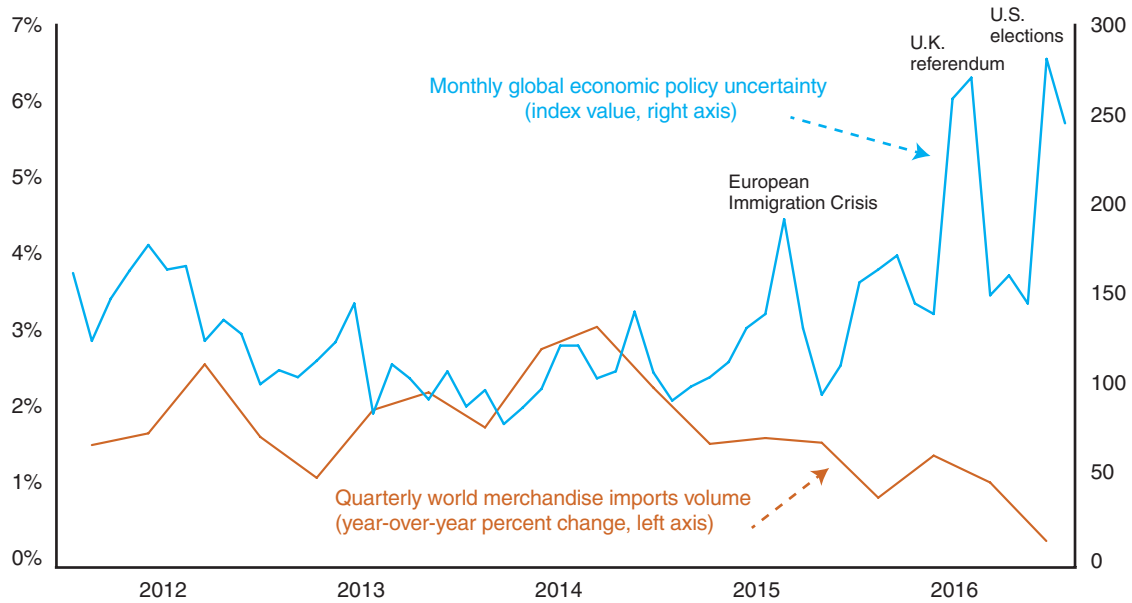
Source: CPB Netherlands Bureau of Economic Policy Analysis, www.PolicyUncertainty.com, Baker, Bloom and Davis (forthcoming), and authors' calculations.

FIGURE ES4: Goods and services import volume growth and policy uncertainty, by country and year
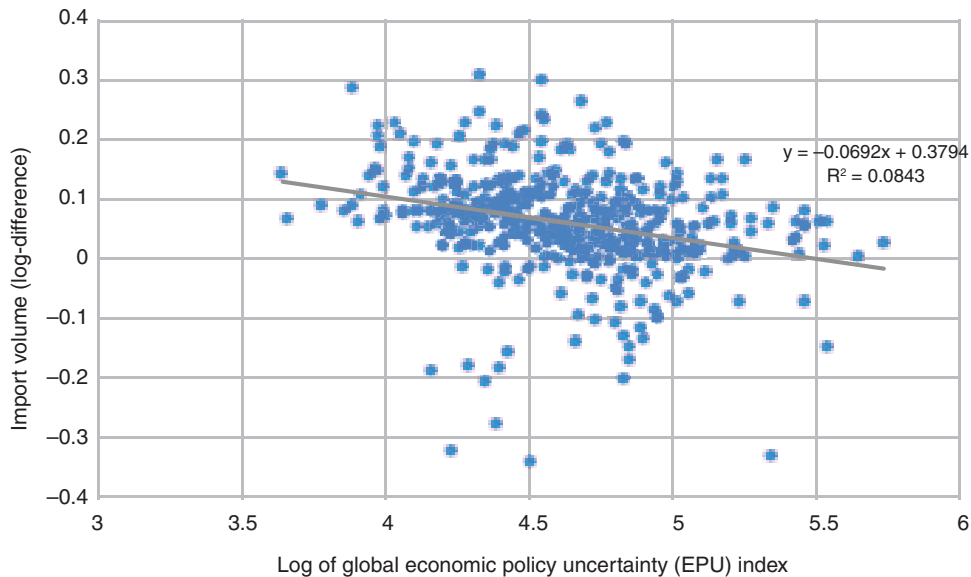
Source: International Monetary Fund World Economic Outlook, World Trade Organization, www .PolicyUncertainty.com, Baker, Bloom and Davis (forthcoming), and authors' calculations.
*Notes:* Data for 18 countries from 1985 to 2015.

3

Recent research indicates that trade agreements have contributed to trade growth and that recent growth would have been even lower in their absence. The evidence presented here suggests that even the threat to unravel such agreements may hurt trade growth by adding to policy uncertainty.

Does It Matter?

The trade slowdown, insofar as it is attributable to the stagnation of GVCs, may also help to explain part of the recent productivity slowdown. The slower pace of GVC expansion could be diminishing the scope of productivity growth through a more efficient international division of labor and diffusion of technologies.

Analysis of manufacturing data according to country and year reveals a link between labor productivity and GVCs. The data point to a positive association between growth in real labor productivity per employee in manufacturing and growth in vertical specialization (figure ES5). A formal econometric analysis based on a panel estimation covering 13 sectors in 40 countries over 15 years suggests that participation in GVCs is a significant driver of labor productivity. An increase of 10 percent in the level of GVC participation increased average productivity by 1.7 percent.

FIGURE ES5: Manufacturing industries: vertical specialization and labor productivity, 1995–2009
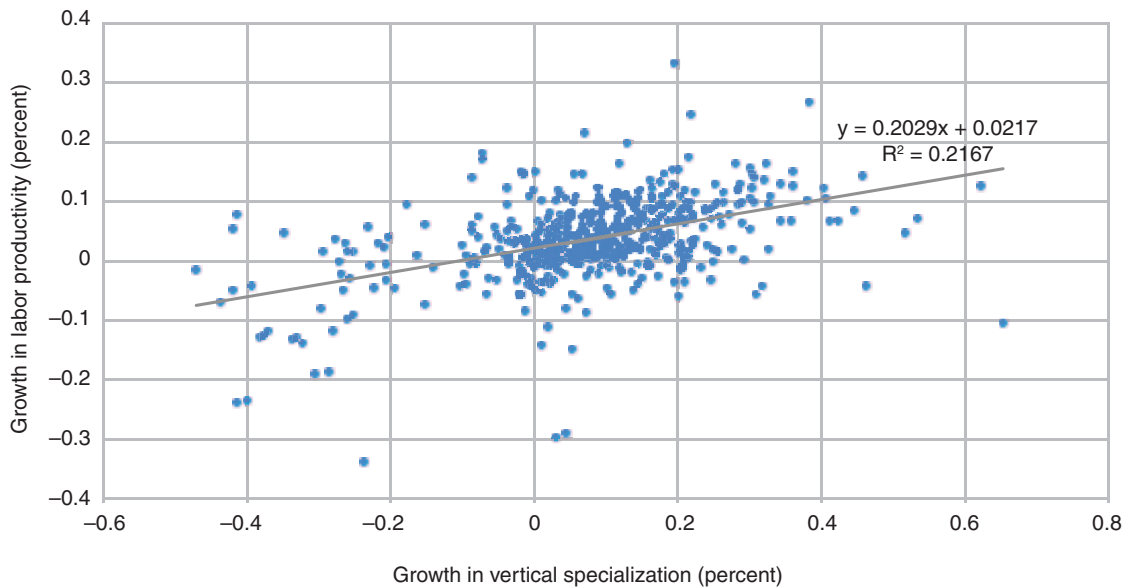
Source: Constantinescu, Mattoo and Ruta (2017) based on data from the 2013 Release of the World Input-Output Database (WIOD 2013) (Timmer et al. 2015).
Notes: Each dot represents a country–year combination. Petrochemicals are excluded from the manufacturing aggregate. Labor productivity is computed as the real value added divided by the number of persons employed. Vertical specialization in manufacturing for each country and year includes the foreign value added embodied in exports (backward linkages) as well as the domestic value added embodied in exports that the direct importer exports further or that returns home as imports (forward linkages).

Chapter 1: Trade Developments in 2016

Overview of Trade Developments

2016 is the fifth consecutive year of sluggish trade growth and the year with the weakest trade performance since the aftermath of the 2008 global financial crisis. Current estimates of growth in the volumes of trade in goods and services range from 1.9 percent to 2.5 percent; preliminary high-frequency data suggest that merchandise trade volumes may have grown by slightly above 1 percent. The year 2016 is different from the other post crisis years, in that trade sluggishness is a characteristic of *both* advanced and emerging economies.

World trade performance in 2016 appears to be the weakest since the aftermath of the 2008 global financial crisis. The latest estimates of growth in the volume of trade in goods and services range from 1.9 percent to 2.5 percent.[1] Despite the differences in magnitudes of the reported statistics, there is a consensus across data sources that 2016 will register the lowest growth in trade volumes since the Great Recession of 2008–2009.[2,3] Figure 1 illustrates this trend using data from the International Monetary Fund (IMF) World Economic Outlook.

FIGURE 1: Trade growth in 2016 (goods and services) is the lowest since the crisis

World goods and services trade volume
(percent change)
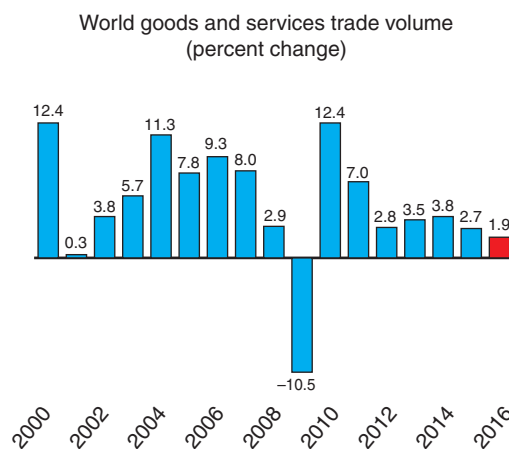
Source: International Monetary Fund World Economic Outlook.
Note: Trade is calculated as the average of exports and imports of goods and services.

---

[1] Estimates and projections include 1.9 percent according to the January update of the IMF World Economic Outlook, 2.5 percent in the January 2017 issue of the World Bank Global Economic Prospects (World Bank Group, 2017), a projection of 1.9 percent in the Organisation of Economic Co-operation and Development Economic Outlook of November 2016 (OECD, 2016), and a projection of 1.7 percent for merchandise trade in the World Trade Organization Press Release of September 2016.

[2] Estimates of growth in world trade volume vary by data source for a variety of reasons. These include: different cut-off dates and estimates for missing quarterly national accounts data, different aggregation methods, or use of alternative indicators for goods and services trade volumes when national account data is not available.

[3] See World Bank Group (2017), World Trade Organization Press Release of September 2016, and the IMF WEO Oct 2016 database with January 2017 updates.

High-frequency statistics also point to slowing growth in world merchandise trade for most of 2016, whereas services trade was more dynamic. Preliminary high-frequency data from the World Trade Monitor that the Central Planning Bureau Netherlands Bureau of Economic Policy Analysis (CPB) has issued suggest that merchandise trade volumes may have grown by only 1.1 percent in the first 11 months of 2016 relative to the corresponding 11 months in 2015 (figure 2a)[4]. High-frequency data available from the World Trade Organization (WTO) for the first three quarters of 2016 indicate a fledgling recovery in the growth of service trade values after the decline in 2015. Since 2008, trade values of services and of goods have followed different trajectories, with growth in services trade more resilient during the global financial crisis and the global trade slowdown of recent years (figure 2b).

FIGURE 2: Growth so low that world merchandise trade volumes almost stagnated in 2016; growth in trade values more resilient for services than for goods

a. Global merchandise trade volume
(average of imports and exports)

b. Services trade values and goods trade values
(index of import values in crt. US dollars, 2005 = 100)

Percent change, q/q annualized
Index (2012Q1 = 100, RHS)
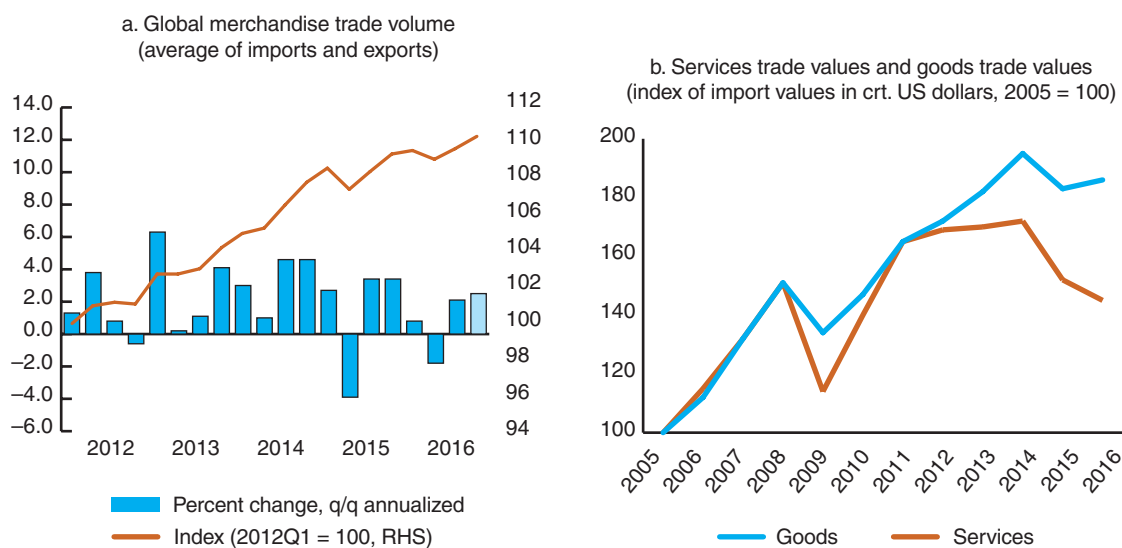
Goods   Services

Sources: CPB Netherlands Bureau of Economic Policy Analysis for trade in goods, World Trade Organization database for trade in services, and authors' calculations.
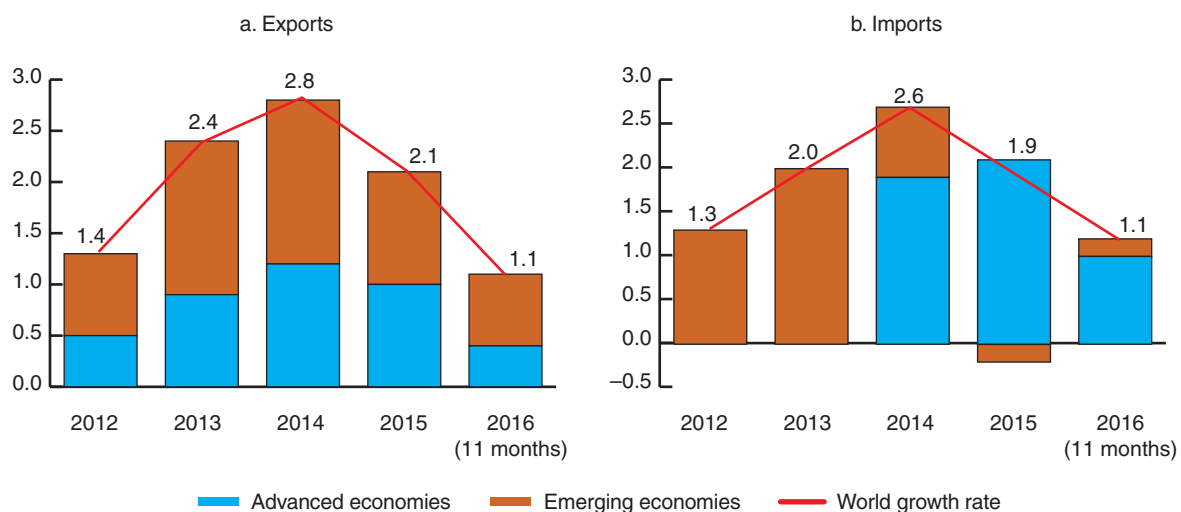*Note:* (a) Volumes based on seasonally adjusted data. The 2016Q4 figure is estimated using data for October and November. (b) 2016 estimates of goods and services trade values were obtained by applying year-over-year growth rates to 2015 levels (11 months used for goods and 3 quarters for services).

Trade sluggishness in 2016 is a characteristic of advanced and emerging economies. In 2012 and 2013, the dynamism of emerging economies largely sustained world trade growth as advanced economies struggled to recover from the financial crisis. This situation was reversed in 2014 and 2015, with declining commodity prices and macroeconomic rebalancing in China affecting emerging economies

---

[4] A caveat in comparing different estimates is that high-frequency data are expected to be revised in the near future as new information arrives (see also footnote 2 for a list of reasons why estimates from various sources may differ from each other).

more strongly (Constantinescu, Mattoo and Ruta 2016a). Different from the other post crisis years, in 2016, trade sluggishness is a characteristic of advanced and emerging economies (figure 3). Within each group, however, there is evidence of heterogeneity, with some countries or regions doing better than others, as illustrated by the breakdown of contributions to the growth in global merchandise trade volumes by region provided in the Annex (figure A3).

FIGURE 3: Contributions to growth in merchandise trade volume, percentage

a. Exports   b. Imports

■ Advanced economies   ■ Emerging economies   — World growth rate

Source: CPB Netherlands Bureau of Economic Policy Analysis and authors' calculations.
Note: Based on seasonally adjusted data.

Understanding Trade Developments

Trade developments in 2016 continued to reflect enduring structural determinants, such as the maturing of global value chains (GVCs) and the slower pace of trade liberalization, as well as cyclical factors, notably slow global growth, the trough in commodity prices, and macroeconomic rebalancing in China. The increase in policy uncertainty may account for up to 75 percent of the worsening of the trade slowdown in 2016.

Recent trade developments should be seen in the context of a deceleration in trade growth since the early 2000s and particularly since the global financial crisis. In previous work (Constantinescu, Mattoo, and Ruta 2015), we estimated the relationship between world trade and gross domestic product (GDP) in the last four decades and found that the long-term trade elasticity rose significantly in the 1990s and then declined in the 2000s. Trade appears to have grown more slowly not only because global growth is lower, but also because that growth has become less trade intensive.

Structural factors continue to contribute to the trade slowdown, including a slower pace of trade liberalization and maturation of GVCs. First, the slower pace of trade liberalization may have contributed to the decline in growth of world trade relative to world output in recent years. Box 1 shows the contribution of trade agreements to trade growth. Second, changes in international vertical specialization underlie the slowdown in world trade. Trade growth raced ahead of output growth

as production fragmented internationally into GVCs, leading to a rapid surge in trade in parts and components. As this process matured, trade growth decreased.[5] Chapter 2 provides new evidence of the evolution of GVCs and its effect on productivity growth.

The two mutually reinforcing factors driving weak trade growth in 2015, lower commodity prices and China's transition to a new growth path, although still at work, were attenuated in 2016.

- Prices of commodities, particularly fuels, which experienced large declines starting in mid-2014, bottomed out in early 2016, arresting the deterioration in the terms of trade of commodity exporting countries. However, prices remained low throughout the year, preventing a significant increase in the export and hence import values of these countries (figure 4).

FIGURE 4: Values, volumes, and prices of world merchandise exports, 2010–2015
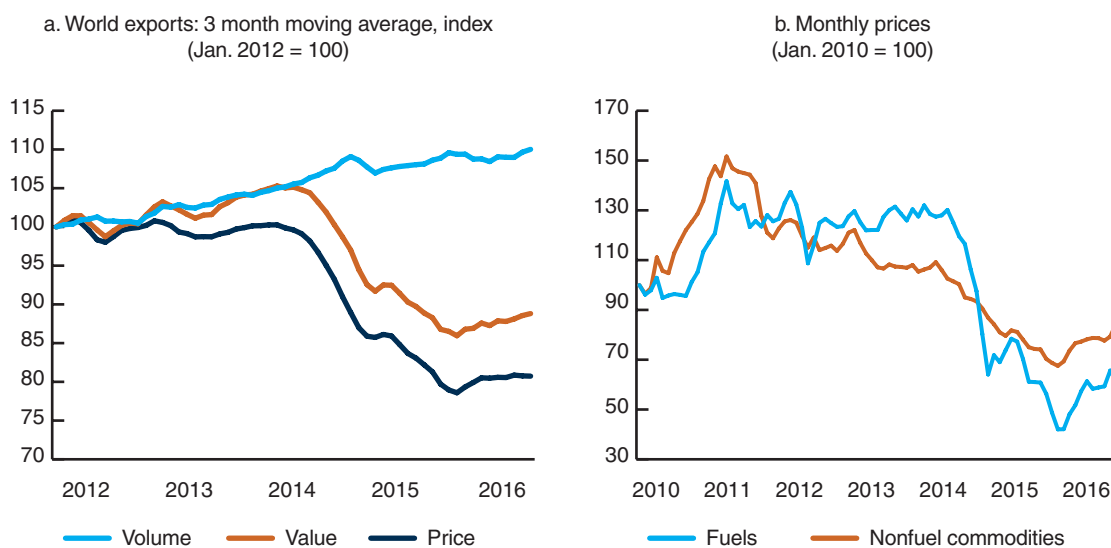
a. World exports: 3 month moving average, index (Jan. 2012 = 100)

b. Monthly prices (Jan. 2010 = 100)

Legend (a): Volume, Value, Price
Legend (b): Fuels, Nonfuel commodities

Source: CPB Netherlands Bureau of Economic Policy Analysis and authors' calculations.
Note: Seasonally adjusted data. Export values are in current U.S. dollars. Export volumes are based on constant 2010 U.S. dollars.

- China's transition to a new growth path that is less dependent on exports, investment, and industrial production continued. Export and import levels remained below the pre-2015 trend. Exports in 2016 were also slightly below the level in 2015, a reflection of weak global demand (figure 5).

A surge in economic policy uncertainty in 2016 may have contributed to trade sluggishness. Economic policy uncertainty may influence trade through two main channels. First, a rise in economic policy

---

[5] Research by Haugh et al. (2016), the IMF (2016), and Timmer et al. (2015) has since confirmed these findings.

FIGURE 5: **China's merchandise trade volumes: 3-month moving average, index (January 2012 = 100)**
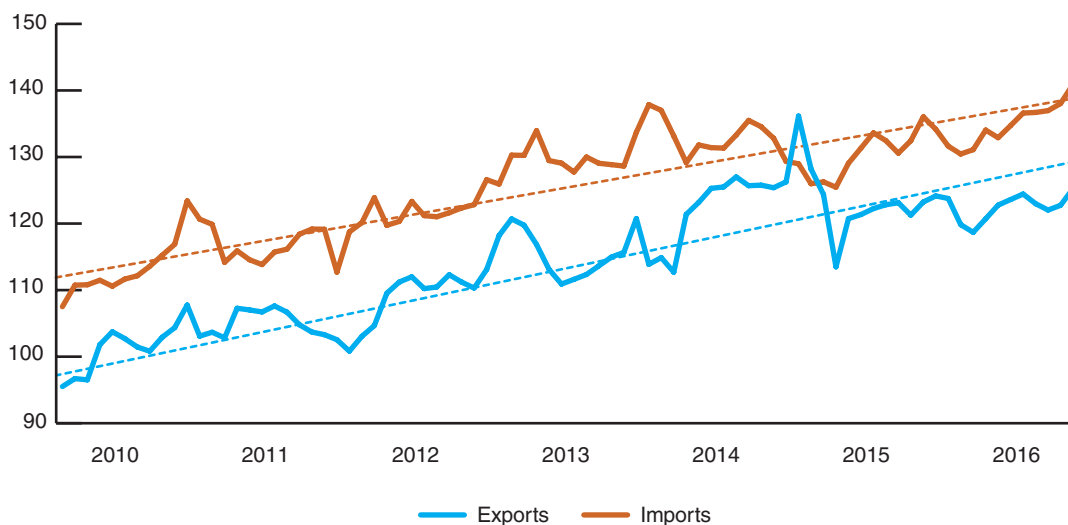
Source: World Bank Global Economic Monitor and authors' calculations.
Note: Seasonally adjusted data. Indexes of trade volumes are based on constant 2010 U.S. dollars.

uncertainty reduces trade by reducing GDP growth. In a less-certain environment, firms may choose to postpone investment decisions, consumers may cut back spending, and banks may increase the cost of finance.[6] Second, to the extent that the surge in economic policy uncertainty is due to trade policy uncertainty in particular, this may affect trade directly. Handley and Limao (2015) find that trade policy uncertainty delays firms' entry into foreign markets.

The pattern of world trade is closely associated with economic policy uncertainty.[7] Figure 6 shows that trade growth from 2012 to 2016 tracks economic policy uncertainty with a lag of a few months.[8] The negative association between economic policy uncertainty and trade growth is visible when examining a broader sample spanning 18 countries and up to 30 years (figure 7). Regression analysis confirms a statistically significant relationship between economic policy uncertainty and trade growth: a 1 percent increase

---

[6] Indeed, Chapter 3 in World Bank Group (2017) documents the link between uncertainty and investment as well as the high-import intensity of the latter.

[7] The measure of economic policy uncertainty used is from Baker, Bloom and Davis (forthcoming), who developed an index for the United States and other large economies using frequency counts of newspaper articles that contain terms pertaining to the economy, policy, and uncertainty. The data and additional information can be accessed at http://www.policyuncertainty.com.

[8] In Baker, Bloom and Davis (forthcoming), Vector Autoregressive (VAR) models fit to United States data as well as to an international panel indicate that industrial production and unemployment rates deteriorate rapidly during the first 6 months after policy uncertainty shocks.

9

FIGURE 6: World import growth and policy uncertainty, from mid-2012 to 2016
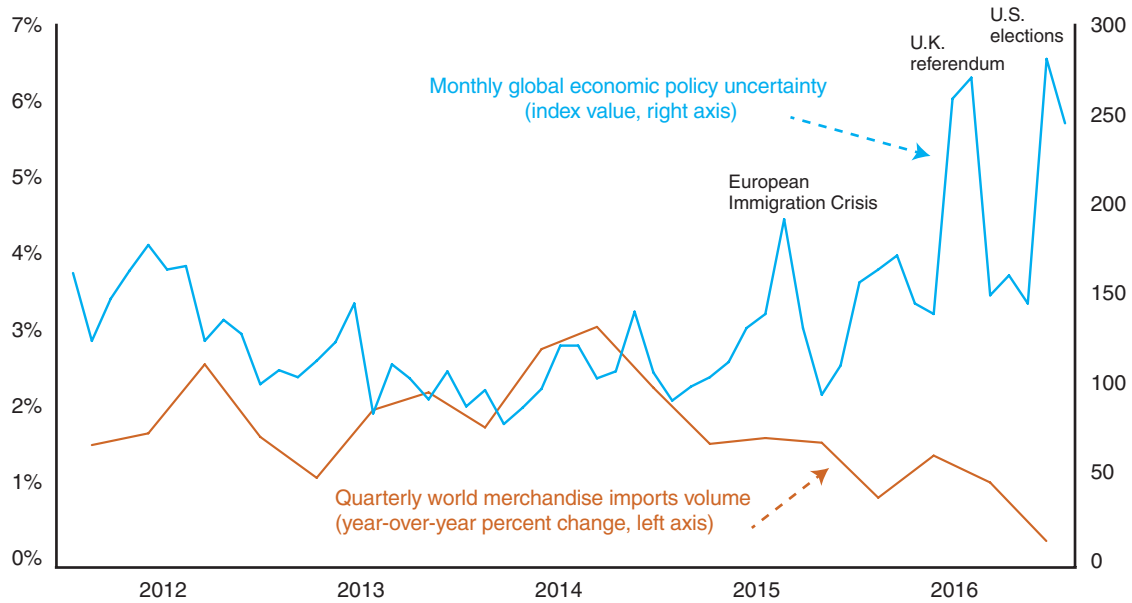
Source: CPB Netherlands Bureau of Economic Policy Analysis, www.PolicyUncertainty.com, Baker, Bloom and Davis (forthcoming), and authors' calculations.

FIGURE 7: Goods and services import volume growth and policy uncertainty, by country and year
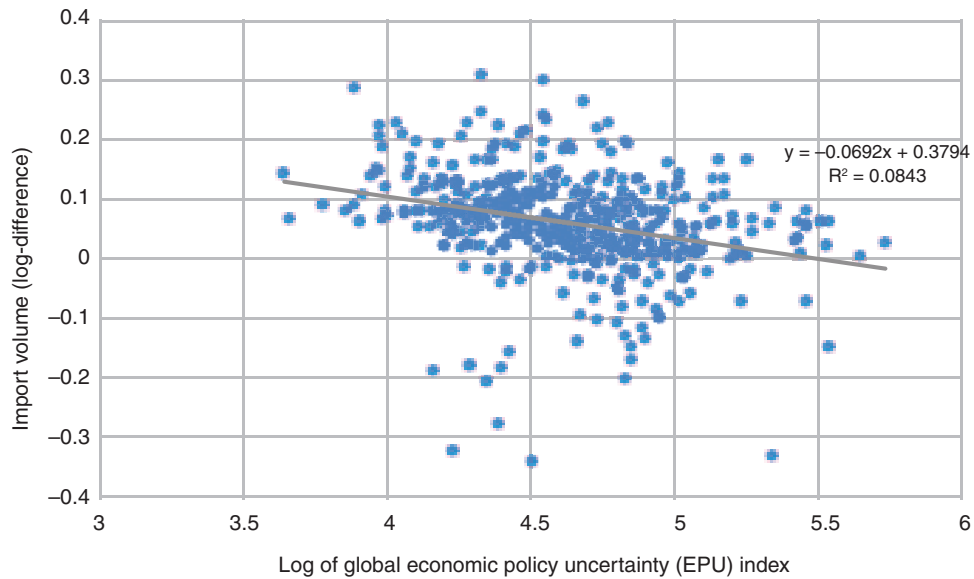
Source: International Monetary Fund World Economic Outlook, World Trade Organization, www.PolicyUncertainty.com, Baker, Bloom and Davis (forthcoming), and authors' calculations.
Notes: Data for 18 countries from 1985 to 2015.

10

in uncertainty is associated with a 0.02-percentage point reduction in goods and services trade volume growth (see table A1 for estimation details).

*A back-of-the-envelope calculation based on our regression analysis indicates that policy uncertainty may explain 75 percent of 2016's decline in trade growth relative to 2015.* Knowing that the global economic policy uncertainty (EPU) index increased by approximately 30 percent during November 2015–October 2016 relative to the same period in the previous year, we obtain that increased policy uncertainty may have reduced growth in goods and services import volumes by 0.6 percentage points (i.e., 30*0.02). The most recent revisions and estimates by the IMF World Economic Outlook suggest a difference of –0.8 percentage points between the growth rates of global goods and services import volumes in 2015 and 2016, which implies that the policy uncertainty may explain 75 percent of the last year's decline in trade growth.

Protectionism cannot explain the trade pattern in 2016, but it is likely that trade policy uncertainty contributed to the surge in overall policy uncertainty. According to the WTO, the flow of new trade-restrictive measures for the first 10 months of 2016 was in line with that of previous years (figure 8). This evidence suggests that it is not a surge in protection that accounts for the exceedingly weak performance of world trade in 2016 although trade policy may have been a contributing factor in two ways. First, the stockpile of trade-restrictive measures is undergoing a steady increase that may be clogging world trade. Second, although there is no direct evidence on trade policy uncertainty in 2016, it is likely that the spike in economic policy uncertainty in part reflected uncertainty in international trade relations.

FIGURE 8: Trade-restrictive measures

a. Trade-restrictive measures, excluding trade remedies (average per month)
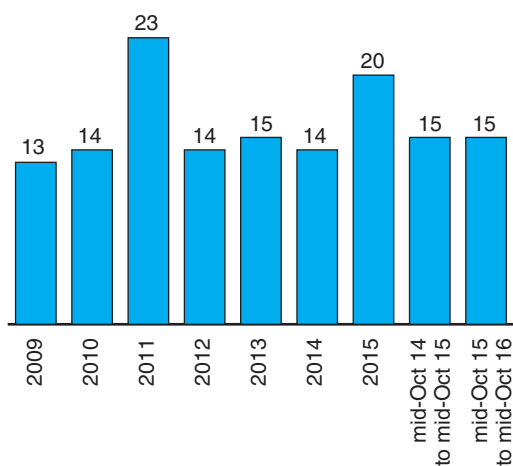
b. Stockpile of trade-restrictive measures
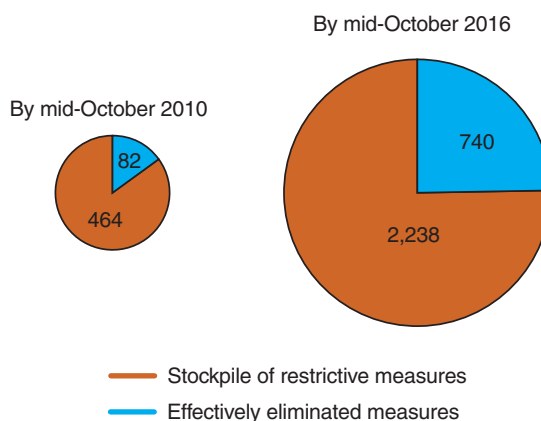
Source: World Trade Organization 2016.

11

Box 1: How much have trade agreements contributed to the growth of world trade?[9]

This box investigates the extent to which trade agreements have contributed to the growth of world trade since 1995. The key finding is that if no trade agreements had been signed in the last two decades, the annual average growth rate of world trade would have been close to 2 percentage points lower.

Drawing on Mattoo, Mulabdic, and Ruta (2017), we use trade data from the World Input-Output Database (WIOD) and World Bank data on the content of preferential agreements[10] to estimate a gravity equation augmented with a measure of depth for the period from 1995 to 2014. By including dummies identifying the year of entry of a country into the WTO, we can also quantify the effect of trade agreements separately from that of WTO membership. We find that the deepest preferential trade agreements have more than doubled trade between members over the period. WTO membership increased trade by 65 percent.

We then used these estimates to build counterfactual scenarios. Specifically, we assumed that, no trade agreement was signed and no new member joined the WTO from 1995 to 2014 and analyzed what the effect on world trade would have been. We found that trade agreements (preferential and multilateral) accounted for approximately 40 percent of world trade growth for the period (table 1). We can break this number down to account separately for the effect of WTO membership and preferential trade agreements. The annual growth rate of world trade for this period was 6.5 percent. If no new member had joined to the WTO during this period (e.g., if China had not entered the WTO in 2001), world trade would have grown 1 percentage point less between 1995 and 2014. If no new preferential trade agreements had been signed (e.g., if no Eastern or Central European countries had joined the European Union in 2004), world trade growth would have been 0.8 percentage points less. The combined effect of no preferential trade agreements and no new WTO members would have been to reduce the annual growth rate of world trade from the actual 6.5 percent to 4.7 percent.

TABLE 1: Contribution of trade agreements to world trade growth: 1995–2014

Growth Rate of World Trade	Observed	No New WTO Members and No Change in Preferential Trade Agreements	No Change in Preferential Trade Agreements	No New WTO Members
1995–2014	232	142	200	175
Annual	6.53	4.76	5.95	5.46

Source: Mattoo, Mulabdic, and Ruta (2017).
Note: Counterfactuals are based on a gravity model estimated using Poisson Pseudo-Maximum Likelihood that includes country-pair, exporter-year, and importer-year fixed effects in addition to a depth variable and a World Trade Organization (WTO) dummy, for both of which we include lagged variables for up to 10 years to capture dynamic effects.

---

[9] This box has been prepared in collaboration with Alen Mulabdic.
[10] The data on the content of trade agreements can be accessed at http://data.worldbank.org/data-catalog/deep-trade-agreements.

Chapter 2: Trade and Productivity Slowdowns: The Role of Global Value Chains

We are witnessing a decline in the growth of trade and productivity. World trade grew at approximately 3 percent per year from 2012 to 2016, which is much lower than the pre-crisis average of 7 percent for 1994 to 2008. Productivity growth also has declined, to 1 percent per year after the crisis from an average of 2 percent from 1994 to 2008 (figure 9).

FIGURE 9: Growth in global labor productivity and trade volume, percent
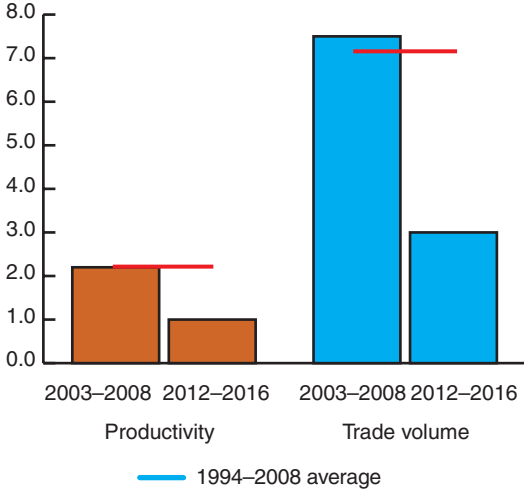
Source: The Total Economy Database (November 2016), International Monetary Fund World Economic Outlook, and authors' calculations.
Note: Trade refers to goods and services. Productivity is measured as gross domestic product in constant U.S. dollars per hour worked.

Consider now the development of global value chains (GVCs) over broadly the same period.[11] One measure of the importance of GVCs is the share of foreign value added embodied in gross exports. Data on this measure from the recent update of the World Input-Output Database (WIOD 2016) point to stalled or even negative growth in vertical specialization since 2011 (figure 10). World GVC participation had been increasing throughout the 2000s but at a slower rate than in the 1990s. The share of import content in manufacturing exports, an alternative measure of vertical specialization computed using a simplified methodology applied to trade data from UN Comtrade (via WITS) and sectoral output data from WIOD, suggests a similar dynamic.

Previous research has demonstrated that the slowing expansion in GVCs can partially explain the current trade slowdown (World Bank Group 2015; Constantinescu, Mattoo and Ruta 2015). Specifically, research has shown, first, that world trade is growing slowly not only because GDP

---

[11] GVC-related data are only available from 1995 to 2014.

FIGURE 10: Measures of world vertical specialization, 1995–2014

Foreign value added (% of exports), WIOD 2013 (1995–2011)
Foreign value added (% of exports), WIOD 2016 (2000–2014)
Import content, % of manufacturing exports (WITS, WIOD)
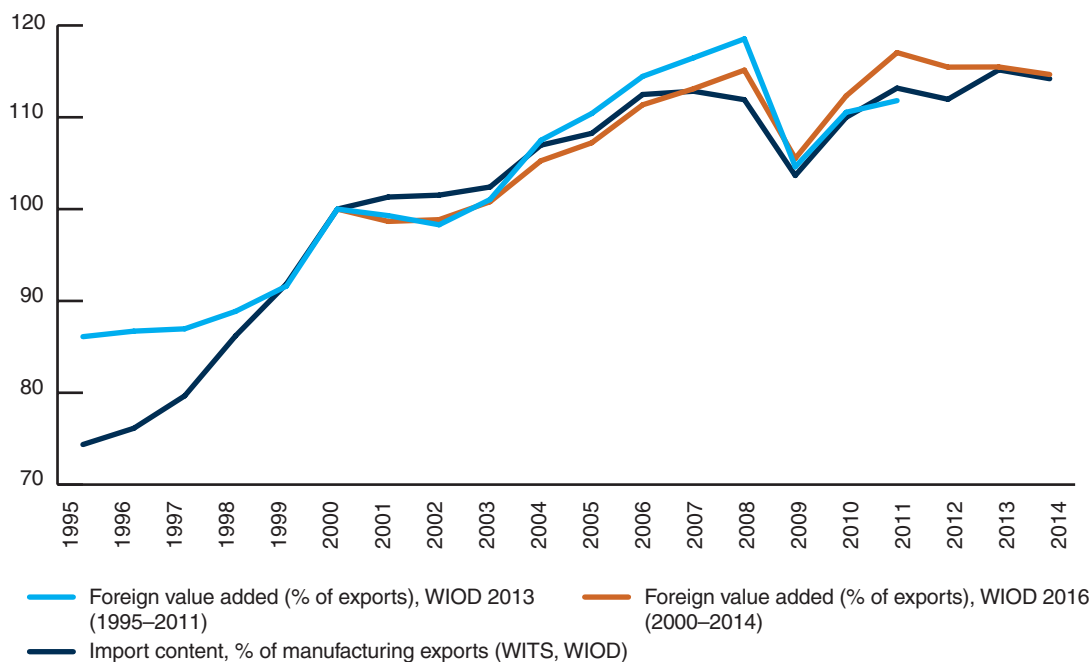
Sources: The 2013 and 2016 releases of World Input-Output Database (WIOD 2013 and WIOD 2016) (Timmer et al. 2015), UN Comtrade (World Integrated Trade Solution (WITS)), and authors' calculations.
Notes: The measures of vertical specialization based on WIOD 2013 and 2016 data are shares of foreign value added in gross exports of goods and services. The third measure relies on manufacturing trade data from the UN Comtrade (obtained via WITS) and output data from WIOD.

growth is sluggish, but also because the long-run relationship between trade and GDP is changing. The elasticity of world trade to GDP was greater than 2 in the 1990s but closer to 1 and declining throughout the 2000s. Second, the varying pace of the expansion of GVCs is a key contributing factor of the changing long-run relationship between world trade and GDP. Changes in GVC participation from 1990 to 2014 at the world level account for approximately half of the decline in trade elasticity to income.[12]

This chapter investigates whether changes in vertical specialization, as manifested in GVCs, can help explain the current productivity slowdown. Trade in general can lead to productivity gains through multiple channels that are the object of a large body of research.[13] As far as participation in GVCs is concerned, recent theoretical models have shown that productivity gains associated with offshoring and GVCs may accrue from the finer international division of labor, which is isomorphic to factor-augmenting technical change (Grossman and Rossi-Hansberg 2008), as well as from increased

---

[12] Recent studies by Haugh et al. (2016), Al-Haschimi et al. (2016), and Timmer et al. (2016) confirm this earlier finding.
[13] See IMF (2016), Chapter 2, for a brief survey.

competition, greater diversity in input varieties, learning externalities, and technology spillovers (Li and Liu 2014; Baldwin and Robert-Nicoud 2014). Despite this wealth of arguments, empirical research in support of the theoretical predictions linking GVCs to productivity is limited.[14]

We begin by inspecting whether manufacturing data by country and year reveal a link between labor productivity and GVCs. Labor productivity is computed as real value added divided by number of persons employed. Vertical specialization in manufacturing industries is defined as the sum of the foreign value added embodied in exports (backward linkages) and the domestic value added in exports that the direct importer exports further or that returns home as imports (forward linkages). The data (figure 11) indicate a positive association between growth in real labor productivity per employee in manufacturing according to country and year and growth in vertical specialization.

FIGURE 11: Manufacturing industries: vertical specialization and labor productivity, 1995–2009
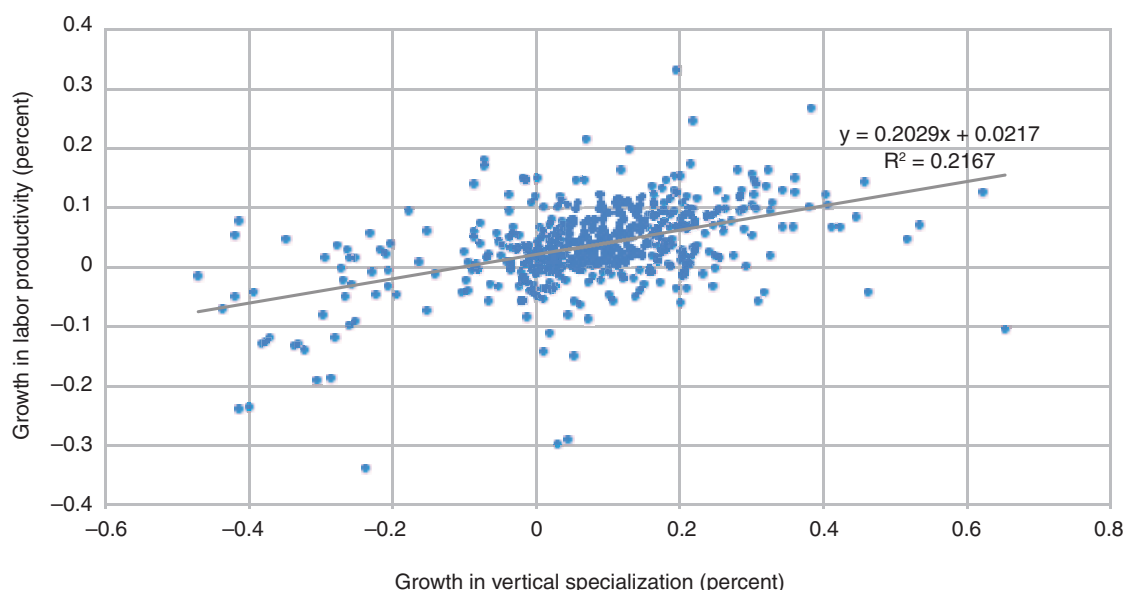
Source: Constantinescu, Mattoo and Ruta (2017) based on data from the 2013 Release of the World Input-Output Database (WIOD 2013) (Timmer et al. 2015).
Notes: Each dot represents a country–year combination. Petrochemicals are excluded from the manufacturing aggregate. Labor productivity is computed as the real value added divided by the number of persons employed. Vertical specialization in manufacturing for each country and year includes the foreign value added embodied in exports (backward linkages) as well as the domestic value added embodied in exports that the direct importer exports further or that returns home as imports (forward linkages).

---

[14] Contributions include older strands of work focusing on benefits to countries that initiate offshoring (Feenstra and Hanson 1996; Egger and Egger 2006; Amit and Wei 2009; Winkler 2010) but also recent efforts that analyze the effect of vertical specialization on all countries participating in the GVC (Formai and Vergara Caffarelli 2016; Kummritz 2016; Taglioni and Winkler 2016).

Although suggestive, the correlation in figure 11 does not demonstrate a causal relationship. Therefore, drawing on Constantinescu, Mattoo and Ruta (2016b, 2017), we report the findings of a more formal econometric analysis of this relationship. Results based on a panel estimation covering 13 sectors in 40 countries over 15 years suggest that participation in GVCs is a significant driver of labor productivity. An increase of 10 percent in the level of GVC participation increased average productivity by 1.7 percent.

To obtain these results, we empirically investigate the link between GVC participation and productivity, by regressing labor productivity on variables capturing the intensity of GVC integration while controlling for a number of other determinants of productivity.[15] Two conventionally used indicators are considered as measures of vertical specialization (Hummels, Ishii and Yi 2001; Koopman, Wang and Wei 2014). The first captures the extent of backward participation in GVCs and consists of the foreign value added embodied in gross exports. The second indicator captures the forward participation in GVCs and includes the domestic value added embodied in gross exports that direct importers export further or that returns home as imports.

The first step of the analysis determines that labor productivity is significantly associated with overall imports and overall exports of goods and services. This result is consistent with the literature, which identifies multiple routes through which trade affects productivity: enhanced competition through imports at the same stage of production, greater access to better-quality or more-diverse imported inputs (e.g., Amiti and Konings 2007; Goldberg et al. 2010), and learning by exporting (De Loecker 2013). Next, we split imports and exports according to types of goods and services. The results reported in figure 12 highlight the relative importance of the imported input channel. A 10 percent increase in the level of imports of intermediates increases labor productivity by 2 percent.[16] Coefficients of other types of trade are not significant or weakly significant.[17]

---

[15] The two main sources of the data are the 2013 Release of the World Input-Output Database (WIOD 2013) and WIOD Socioeconomic accounts (Timmer et al. 2015). WIOD 2013 covers 40 countries, 35 sectors (ISIC rev. 3), and 17 years (1995–2011). Estimations are based on a subsample of 13 manufacturing industries, and span 1995 to 2009 because missing real capital stock caused 2010 and 2011 to be dropped from the sample. All trade-related measures were deflated to eliminate price effects. The analysis focuses on the productivity of manufacturing industries because these are more GVC intensive. The fact that the participation of services industries in GVCs is more difficult to quantify fully further motivated their exclusion.

[16] The magnitude of the effect is the result of averaging across countries and sectors that vary widely in their propensity to import intermediates. These compositional aspects may explain why country-specific and firm-level studies typically find larger effects (Amiti and Konings 2007; Blaum, Lelarge and Peters 2014).

[17] The lack of significance of final goods imports and exports of intermediates may result from multicollinearity because imports of intermediates embodied in exports are included in the import and export covariates.

FIGURE 12: **Implied effect of a 10 percent increase in intermediate import volumes on labor productivity, overall and according to place of absorption**
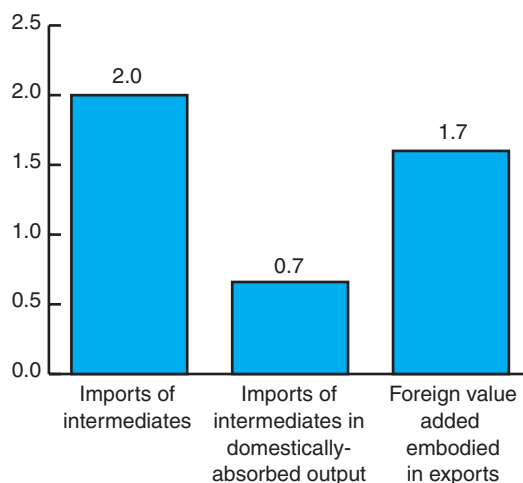
Source: Constantinescu, Mattoo and Ruta (2017) based on data from the 2013 Release of the World Input-Output Database (WIOD 2013) (Timmer et al. 2015).
Notes: Based on panel regressions of log of real value added per employee, by industry, country, and year, on log of real capital stock per employee, log of price-deflated trade indicators (lagged 1 year), and fixed effects. Robust standard errors corrected for clustering at country-industry level are used. The coefficient reported for foreign value added embodied in exports is an instrumental variable (IV) estimate.

Finally, we dig deeper into the relationship between intermediate imports and labor productivity by separating GVC-related imported inputs from non-GVC-related imported inputs. As discussed, the proxy for GVC-related imports of inputs is the foreign value added embodied in exports, the conventional measure of backward vertical specialization. For imports that are not related to GVCs, we use the foreign value added absorbed domestically. Results suggest that imported inputs that are GVC-related matter for productivity. Specifically, a 10 percent increase in the level of GVC-related imports of intermediates increases labor productivity by 1.7 percent.

This chapter provides evidence that GVCs increases productivity. Although many factors determine the rate of productivity growth, this evidence suggests that the slower pace of GVC expansion is contributing to slower world productivity growth. In turn, the slowing down of GVC expansion may in part be the result of policy choices, as the benefits of past trade reforms have matured and new reforms have languished. Indeed, recent research shows that the deepening of trade agreements has underpinned the rise of GVCs in the last quarter century by reducing trade costs and providing the institutional infrastructure for the smooth functioning of cross-border value chains (Osnago et al. 2016). Preserving and expanding the reach of trade agreements, rather than backtracking on existing commitments, would help to sustain the growth of productivity.
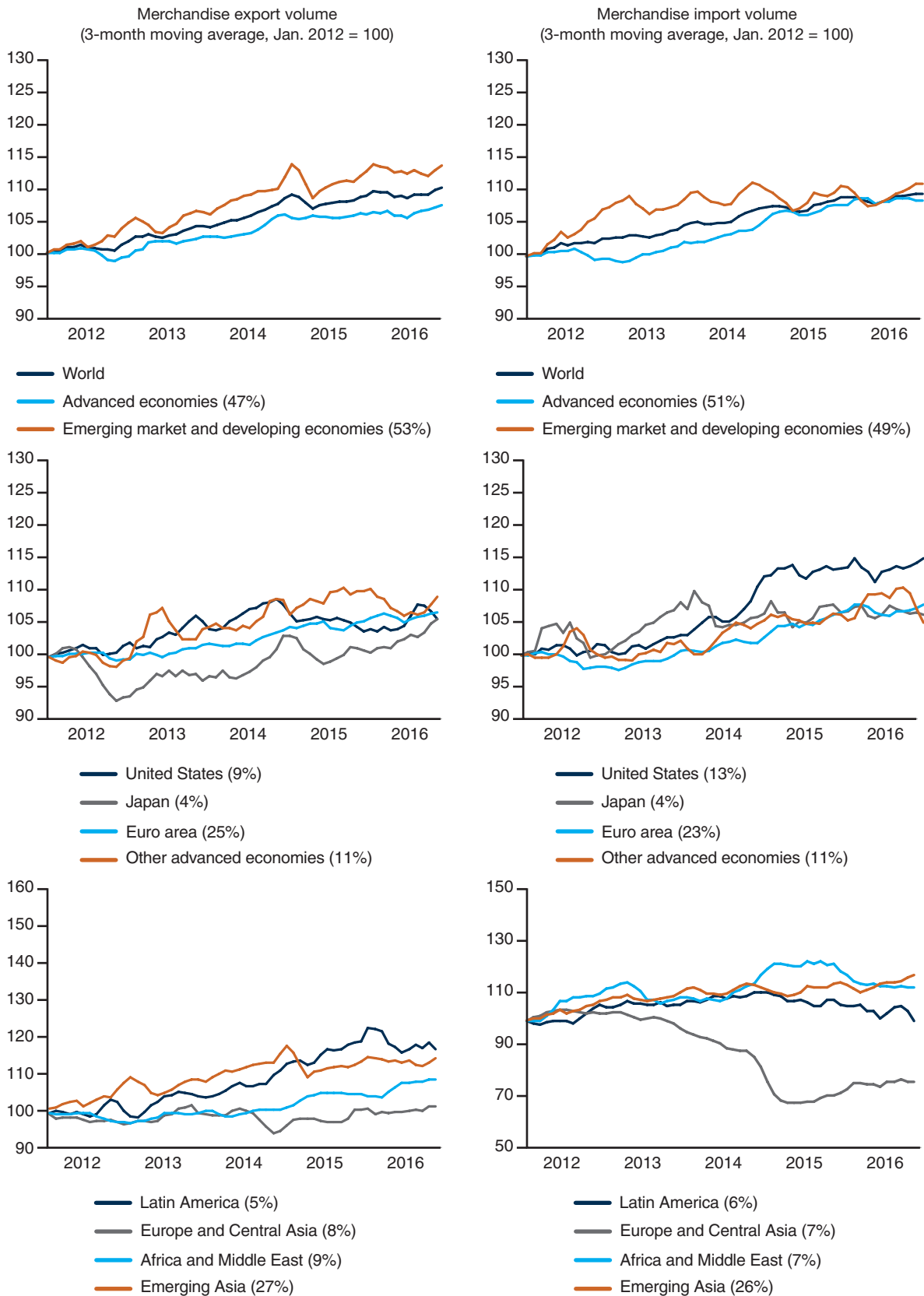
References

Al-Haschimi, A., M. Gächter, D. Lodge, W. Steingress. 2016. "The Great Normalization of Global Trade", VoxEU.org, October 14.

Amiti, M. and J Konings. 2007. "Trade Liberalization, Intermediate Inputs, and Productivity." American Economic Review 97 (5): 1611–1638.

Amiti, M and S.-J. Wei. 2009. "Service Offshoring and Productivity: Evidence from the US." The World Economy 32 (2): 203–220.

Baker, S. R., N. Bloom, and S. J. Davis. Forthcoming. "Measuring Economic Policy Uncertainty." Quarterly Journal of Economics.

Baldwin, R. and F. Robert-Nicoud. 2014. "Trade-in-goods and Trade-in-tasks: An Integrating Framework", Journal of International Economics 92 (1): 51–62.

Blaum, J., C. Lelarge, and M. Peters. 2014. "Estimating the Productivity Gains from Importing." Unpublished.

Constantinescu, C., A. Mattoo, and M. Ruta. 2015. "The Global Trade Slowdown: Cyclical or Structural?" World Bank Policy Research Working Paper No. 7158.

———. 2016a. "Global Trade Watch: Trade Developments in 2015." Washington, DC.: World Bank Group.

———. 2016b. "Does the Global Trade Slowdown Matter?" Journal of Policy Modeling 38 (4): 711–722.

———. 2017. "Does Vertical Specialization Increase Productivity?" World Bank Policy Research Working Paper No. 7978.

De Loecker, J. 2013. "Detecting Learning by Exporting." American Economic Journal: Microeconomics 5 (3): 1–21.

Egger, H. and P. Egger. 2006. "International Outsourcing and the Productivity of Low-skilled Labour in the EU." Economic Inquiry 44 (1): 98–108.

Feenstra, R. C. and G. H. Hanson. 1996. "Globalization, Outsourcing, and Wage Inequality." American Economic Review 86 (2): 240–45.

Formai, S. and F. Vergara Caffarelli. 2015. "Quantifying the Productivity Effects of Global Value Chains." Rome, Italy: Banca d'Italia.

Goldberg, P., A. Khandelwal, N. Pavcnik, and P. Topalova, 2010. "Imported Intermediate Inputs and Domestic Product Growth: Evidence from India." Quarterly Journal of Economics 125 (4): 1727–1767.

Grossman, G M and E Rossi-Hansberg. 2008. "Trading Tasks: A Simple Theory of Offshoring." American Economic Review 98 (5): 1978–1997.

Handley, K., and N. Limao. 2015. "Trade and Investment under Policy Uncertainty: Theory and Firm Evidence," American Economic Journal Policy 7 (4): 189–222.

Haugh, D., A. Kopoin, E. Rusticelli, D. Turner, and R. Dutu. 2016. "Cardiac Arrest or Dizzy Spell: Why is World Trade So Weak and What Can Policy Do About It?" OECD Economic Policy Paper no. 18. Organization of Economic Cooperation and Development. September.

Hummels, D., J. Ishii and K.-M. Yi. 2001. "The nature and growth of vertical specialization in world trade." Journal of International Economics 54: 75–96.

IMF. 2016. "World Economic Outlook: Subdued Demand: Symptoms and Remedies." Washington, D.C.: International Monetary Fund. October.

Koopman, R., Z. Wang and S.-J. Wei. "Tracing Value-Added and Double Counting in Gross Exports." 2014. American Economic Review 104 (2): 459–499.

Kummritz, V. 2016. "Do Global Value Chains Cause Industrial Development?" CTEI Working Paper No. 2016–01.

Li, B. and Y. Liu. 2014. "Moving up the Value Chain." Boston, MA: Boston College.

Mattoo, Aaditya, Alen Mulabdic and Michele Ruta (2017) "Trade Creation and Trade Diversion in Deep Agreements", mimeo, World Bank.

OECD. 2016. OECD Economic Outlook, Volume 2016, Issue 2. Paris: OECD Publishing. http://dx.doi.org/10.1787/eco_outlook-v2016-2-en

Osnago, A., N. Rocha, and M. Ruta. 2016. "Deep Trade Agreements and Global Value Chains." Washington, D.C.: World Bank.

Taglioni, D. and D. Winkler. 2016. "Making Global Value Chains Work for Development." Trade and Development Series. Washington, D.C.: World Bank.

Timmer, M. P., E. Dietzenbacher, B. Los, R. Stehrer, and G. J. de Vries. 2015. "An Illustrated User Guide to the World Input–Output Database: the Case of Global Automotive Production." Review of International Economics 23: 575–605.

Timmer, M., B. Los, R. Stehrer, and G. de Vries. 2016. "Research Memorandum Number 162: An Anatomy of the Global Trade Slowdown based on the WIOD 2016 Release." Groningen, the Netherlands: Groningen Growth and Development Centre.

Winkler, D. 2010. "Service Offshoring and Its Impact on Productivity and Employment: Evidence from Germany, 1995-2006." The World Economy 33(12): 1672–1701.

World Bank Group. 2015. "Global Economic Prospects, January 2015: Having Fiscal Space and Using It." Washington, D.C.: World Bank.

World Bank Group. 2017. Global Economic Prospects, January 2017. Weak Investment in Uncertain Times. Washington, D.C.: World Bank.

World Trade Organization. 2016. Overview of Developments in the International Trading Environment, Annual Report by the Director-General (Mid-October 2015 to mid-October 2016), WT/TPR/OV/19, World Trade Organization, Geneva.

Annex

Merchandise export volume
(3-month moving average, Jan. 2012 = 100)

Merchandise import volume
(3-month moving average, Jan. 2012 = 100)

- World
- Advanced economies (47%)
- Emerging market and developing economies (53%)

- World
- Advanced economies (51%)
- Emerging market and developing economies (49%)

- United States (9%)
- Japan (4%)
- Euro area (25%)
- Other advanced economies (11%)

- United States (13%)
- Japan (4%)
- Euro area (23%)
- Other advanced economies (11%)

- Latin America (5%)
- Europe and Central Asia (8%)
- Africa and Middle East (9%)
- Emerging Asia (27%)

- Latin America (6%)
- Europe and Central Asia (7%)
- Africa and Middle East (7%)
- Emerging Asia (26%)

Source: CPB Netherlands Bureau of Economic Policy Analysis, WTO, and authors' calculations.
Notes: Seasonally adjusted data. In parentheses: share in world trade values in 2014. Group composition in Data Notes.

FIGURE A2

Merchandise export value
(3-month moving average, Jan. 2012 = 100)

Merchandise import value
(3-month moving average, Jan. 2012 = 100)

— World
— Advanced economies (47%)
— Emerging market and developing economies (53%)

— World
— Advanced economies (51%)
— Emerging market and developing economies (49%)

— United States (9%)
— Japan (4%)
— Euro area (25%)
— Other advanced economies (11%)

— United States (13%)
— Japan (4%)
— Euro area (23%)
— Other advanced economies (11%)

— Latin America (5%)
— Europe and Central Asia (8%)
— Africa and Middle East (9%)
— Emerging Asia (27%)

— Latin America (6%)
— Europe and Central Asia (7%)
— Africa and Middle East (7%)
— Emerging Asia (26%)

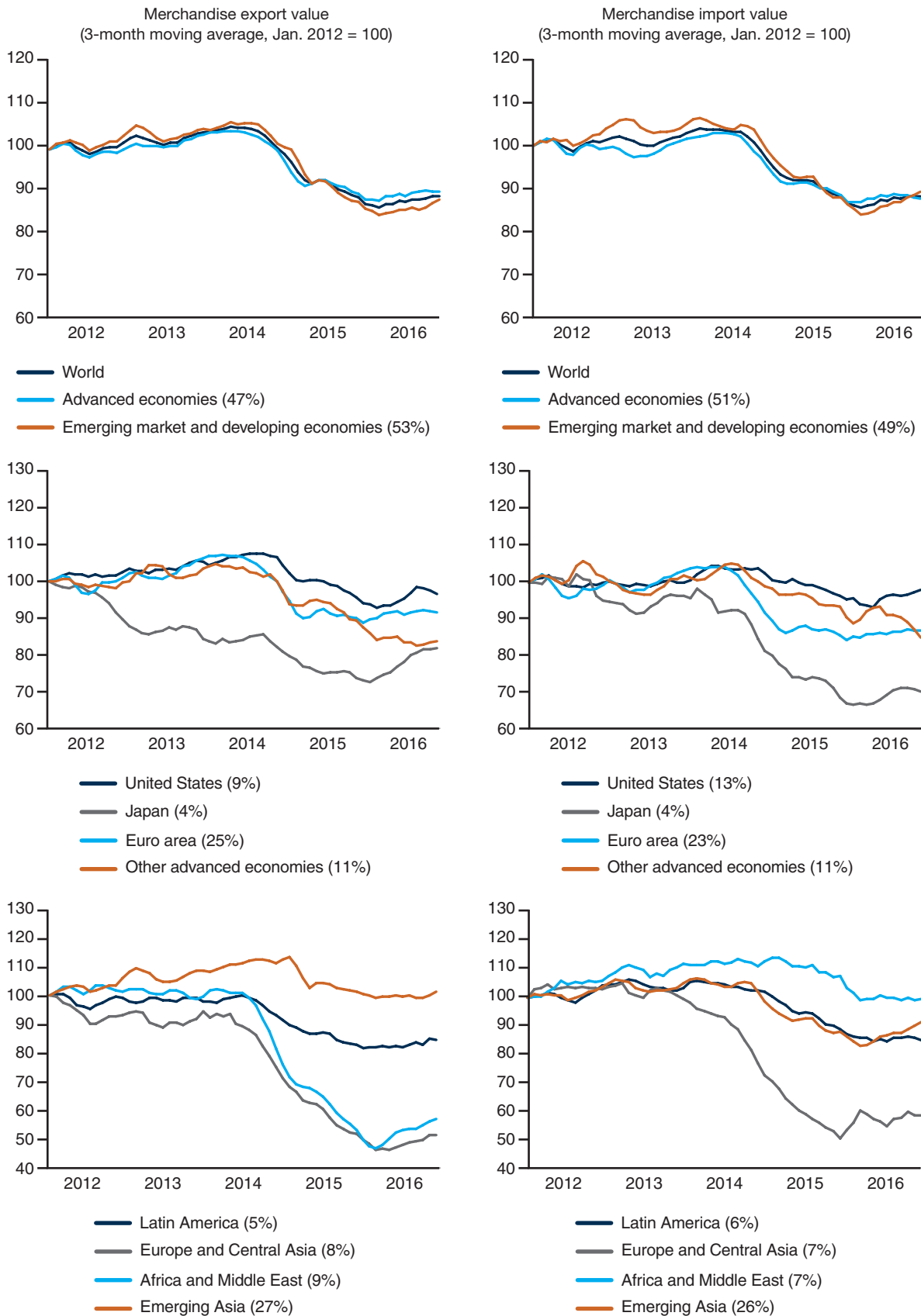*Source:* CPB Netherlands Bureau of Economic Policy Analysis, WTO, and authors' calculations.
Notes: Seasonally adjusted data. In parentheses: share in world trade values in 2014. Group composition in Data Notes.
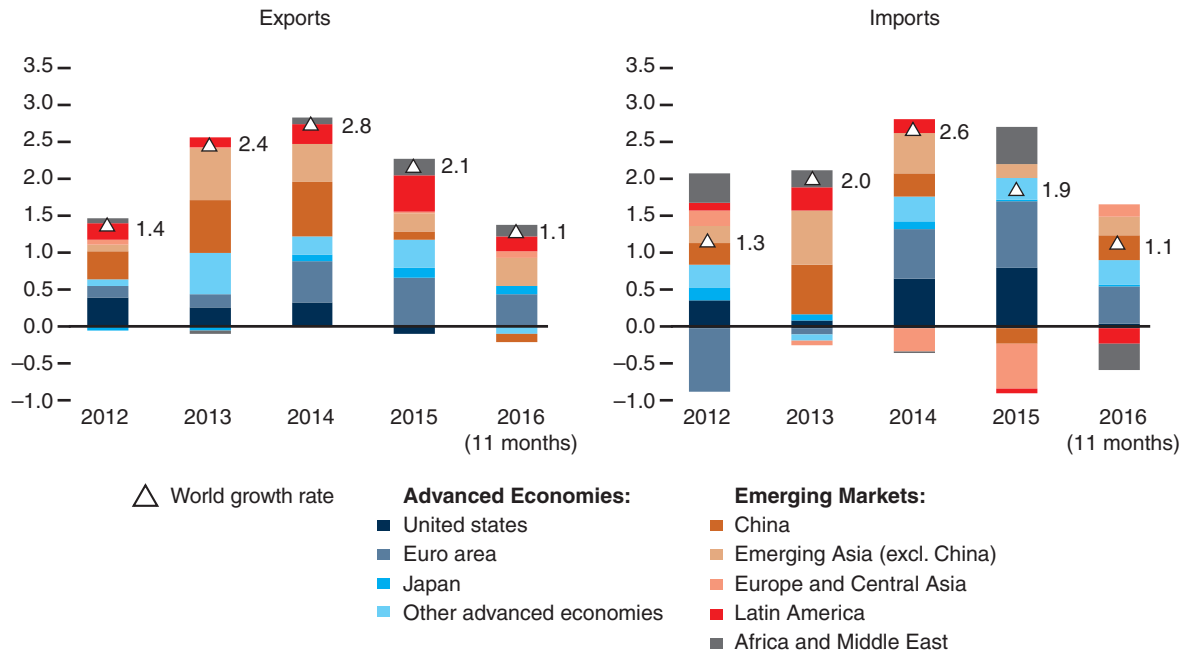
FIGURE A3: Contributions to growth in global merchandise trade volumes according to region

Exports

Imports

△ World growth rate

Advanced Economies:
- United states
- Euro area
- Japan
- Other advanced economies

Emerging Markets:
- China
- Emerging Asia (excl. China)
- Europe and Central Asia
- Latin America
- Africa and Middle East

Source: CPB Netherlands Bureau of Economic Policy Analysis, World Bank Global Economic Monitor and authors' calculations.

Notes: Seasonally adjusted data. Group composition in Data Notes below.

TABLE A1: Results of estimations using quarterly data of economic policy uncertainty and import volume growth

Dependent variables:	Growth in goods and services import volume		Growth in goods import volume	
	(1a)	**(1b)**	**(2a)**	**(2b)**
Log of global Economic Policy Uncertainty (EPU) index	–0.0190*	–0.0209*	–0.0264**	–0.0284**
	(0.0108)	(0.0108)	(0.0126)	(0.0126)
Growth in real GDP	1.461***	1.461***	1.454***	1.456***
	(0.206)	(0.206)	(0.253)	(0.252)
Growth in real effective exchange rate	0.366***	0.365***	0.392***	0.391***
	(0.0990)	(0.0990)	(0.105)	(0.105)
Constant	0.159***	0.166***	0.188***	0.196***
	(0.0534)	(0.0529)	(0.0662)	(0.0650)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
R-squared	0.719	0.720	0.691	0.692
Number of observations	323	323	323	323

Source: International Monetary Fund World Economic Outlook, International Monetary Fund International Financial Statistics, www.PolicyUncertainty.com, Baker, Bloom and Davis (forthcoming), and authors' calculations.

Notes: Robust standard errors are reported in parentheses. * $p<0.10$; ** $p<0.05$; *** $p<0.01$. Panel covers 16 countries and period 1995–2015. Growth indicators are computed as log-differences. A lag effect is allowed in specifications (1b) and (2b).

Data Notes

Group country composition follows that are used in the World Trade Monitor issued by the CPB Netherlands Bureau of Economic Policy and Analysis:

Advanced Economies: United States, Japan, Euro area, other advanced economies.

Euro area: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovak Republic, Slovenia, Spain.

Other advanced economies: Australia, Bulgaria, Canada, Croatia, Denmark, Hungary, Iceland, Latvia, Lithuania, Macedonia, New Zealand, Norway, Poland, Romania, Sweden, Switzerland, Turkey, United Kingdom.

Emerging economies: Emerging Asia, Europe and Central Asia, Latin America and the Caribbean, Africa and the Middle East.

Emerging Asia: China, Hong Kong SAR, China, India, Indonesia, Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Taiwan, China, Thailand, Vietnam.

Europe and Central Asia: Belarus, Kazakhstan, Russian Federation, Ukraine.

Latin America and the Caribbean: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Mexico, Paraguay, Peru, Uruguay.

Africa and the Middle East: Algeria, Islamic Republic of Iran, Iraq, Israel, Kenya, Kuwait, Morocco, Oman, Qatar, Saudi Arabia, South Africa, Tanzania.