

## ARTICLE

# UNDERSTANDING THE WEAKNESS IN WORLD TRADE



*Annual world import growth has remained below its pre-crisis long-term average for the past three years, making it the second-longest period of weak growth in over 40 years. Moreover, world trade growth has not been weak in absolute terms alone; it is also weak when set against economic activity. Whereas trade grew at almost twice the rate of global GDP in the 25 years prior to 2007, it has been growing, on average, at a rate below that of global GDP since the second half of 2011.*

*Both cyclical and structural factors are responsible for this weakness in trade. Weak demand and the demand composition of global GDP are important determinants of world trade. Model-based evidence shows that the decline in the growth of global GDP can, to a large extent, explain the decline in the growth of world trade. Structural factors also appear to play a role, with a potential slowdown in the expansion of global value chains likely to have a persistent dampening impact.*

*Going forward, cyclical headwinds affecting trade are expected to dissipate partially. Global economic activity is expected to continue along the gradual path to recovery, which, in turn, will support world trade growth. Meanwhile, the influence of structural factors may persist over the longer term. The ratio of world trade growth to that of GDP is thus expected to recover, but is likely to remain below its pre-crisis long-term average.*

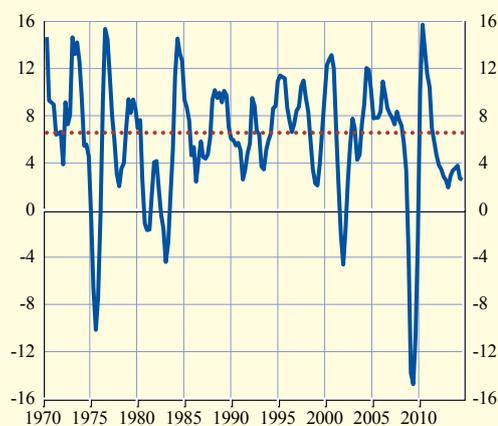
## INTRODUCTION

**Over the past three years, world trade growth has been exceptionally weak.** Annual growth in world imports, in particular, has remained below its long-term average for thirteen consecutive quarters, and there are few signs of the gap closing in the near term. While such long stretches of below-average growth are not entirely unprecedented, the current episode of low growth is the second-longest period of weak trade in over 40 years (see Chart 1). This raises the question as to the extent to which world trade growth is temporarily dampened as a result of cyclical factors, and as to how far the current weakness is due, at least in part, to potentially longer-term structural changes.

**This article will assess developments in world trade in the post-crisis period and examine the main factors behind the weak dynamics.** While world trade fell markedly in annual terms during the Great Recession, in particular in 2009, it subsequently recovered to above long-term average growth rates in 2010. The period of protracted weakness in trade did not begin until the third quarter of 2011, when world import growth declined sharply, falling below its long-term average, and it has remained at low levels since. This article therefore focuses on the period since the third quarter of 2011.

Chart 1 World import growth

(annual percentage changes; quarterly data)



Sources: OECD and national data, and ECB staff calculations.  
Notes: Imports of goods and services. The dashed line shows the pre-crisis average over the period 1970-2007. The last observation refers to the third quarter of 2014.

**Table 1 Ratios of world trade growth to global activity growth**

Sample period	Ratio <sup>1)</sup>	Trade variable	Output variable
1981Q1-2007Q4	1.9	Imports of goods and services	GDP <sup>2)</sup>
2011Q3-2014Q3	0.9		
1981Q1-2007Q4	2.1	Imports of goods and services	GDP <sup>3)</sup>
2011Q3-2014Q3	1.1		
1951-2007	1.6	Merchandise exports	Merchandise production
1981-2007	1.9		
2011-2013	1.4		
1951-2007	1.6	Manufacturing exports	Manufacturing production
1981-2007	2.1		
2011-2013	1.5		

Sources: World Trade Organisation, national data, Haver, IMF and ECB staff calculations.

Notes:

1) Imports and GDP: quarterly data; exports and production: annual data.

2) At purchasing power parity.

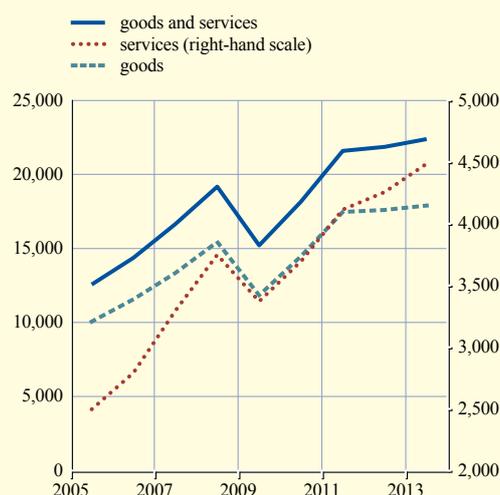
3) At market exchange rates.

**World trade has been weak not only in terms of growth, but also when set against economic activity.** Since the 1980s, world imports have grown at almost twice the rate of global GDP. Since the third quarter of 2011, however, the ratio of world import growth to global GDP growth has declined to around one. The ratio of average growth of trade to that of output is also known as the gross income elasticity of trade.<sup>1</sup> The significant decline observed in this elasticity after 2011 is robust to different aggregation methods and different sectoral classifications (see Table 1).<sup>2</sup> The weakness in trade was primarily due to lower growth in trade in goods, as growth in trade in services remained broadly stable (see Chart 2). The decline in elasticity appears smaller when looking at pre-crisis elasticity dating back to 1951, implying that trade elasticity may not be invariant over time.<sup>3</sup>

**This article explores the causes of the weakness in world trade growth and the decline in the global income elasticity of trade.** Section 1 studies the geographical origins of that weakness and discusses the role of intra-European trade dynamics on global aggregates. Section 2 presents empirical evidence on the role played by cyclical factors in explaining the weakness in trade growth. The potential influence of structural factors is explored in Section 3. Section 4 concludes with the outlook for world trade.

**Chart 2 World imports of goods and services**

(billions current USD; annual data)



Source: World Bank.

Note: The last observation refers to 2013.

1 See, for example, the article entitled “The dynamic effects of trade liberalization: an empirical analysis”, *US International Trade Commission Publication*, No 3069, Washington, D.C., October 2007.

2 The quantification of elasticity based on the period 2011-14 can only be indicative, as the sample size is rather limited.

3 See the box entitled “Understanding global trade elasticities: what has changed?”, *Monthly Bulletin*, ECB, July 2014.

## I THE REGIONAL PERSPECTIVE

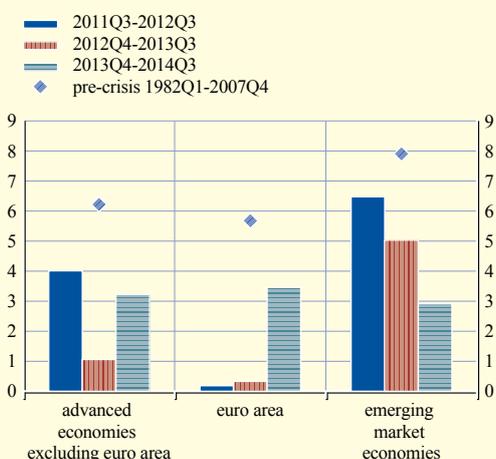
**The recent slowdown in world trade has been broad-based.** In 2011, the post-crisis rebound came to an end, and the annual world import growth rate fell below its pre-crisis average. Overall, world trade growth almost halved in the period between 2011 and 2014, as compared with pre-crisis levels, although the dynamics varied significantly across countries. Growth was weaker in advanced economies than in emerging market economies between 2011 and 2013. Since 2013, trade has lost momentum in emerging market economies, but has partially rebounded in advanced economies (see Chart 3).

**Trade weakness in advanced economies was largely governed by the situation in the euro area,** where annual import growth slowed substantially in the last quarter of 2011 and remained exceptionally weak until 2013. In other advanced economies, trade growth was more resilient, supported by sound economic growth in the United States and by an increase in imports to Japan in the aftermath of the natural disaster in early 2011. After a period of weakness at the end of 2012, trade in advanced economies rebounded at the end of 2013, driven by stronger economic growth in both the euro area and the United States.

**In emerging market economies, the trade slowdown was dominated by dynamics in China.** Average annual import growth in China more than halved to around 7%, year on year, between the third quarter of 2011 and the third quarter of 2014, as compared with average pre-crisis growth rates. More recently, a series of idiosyncratic shocks in a number of emerging market economies has led to a further deterioration in trade growth momentum: Argentina's economy has been very weak since the end of 2013, but when the country defaulted on its debt in July 2014, growth was undermined still further; Brazil entered into recession in 2014, as a result of low domestic demand; and Russia has been subject to international sanctions stemming from the conflict with Ukraine and has also suffered from the recent fall in oil prices (see Chart 4).

### Chart 3 Import growth across regions

(annual percentage changes; quarterly data)

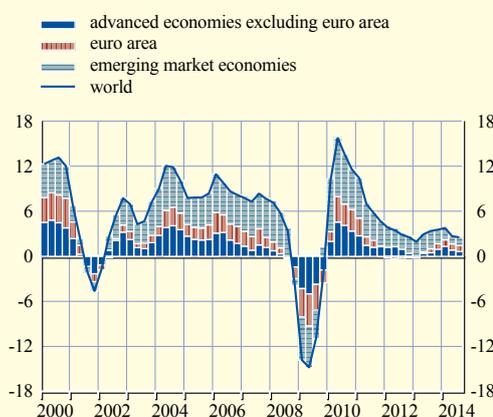


Sources: National data, Haver, IMF, OECD and ECB staff calculations.

Notes: Imports of goods and services. Import growth for emerging market economies before 1995 is proxied by world import growth excluding OECD countries.

### Chart 4 Contribution to world import growth

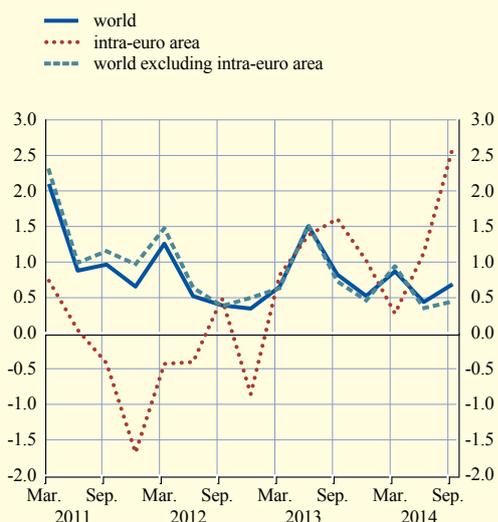
(annual percentage changes; percentage points; quarterly data)



Sources: National data, Haver, IMF and ECB staff calculations.  
Notes: Imports of goods and services. The last observation refers to the third quarter of 2014.

**Chart 5 Import growth**

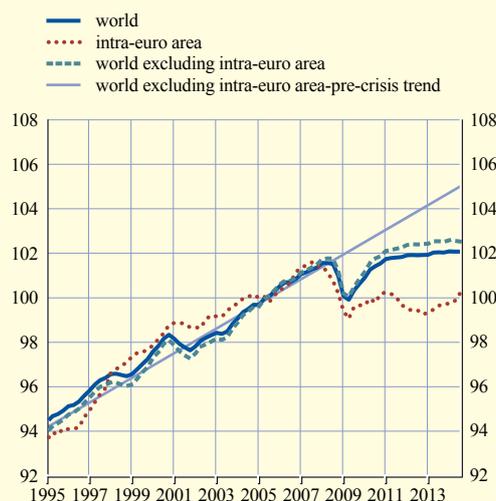
(quarter-on-quarter percentage changes; quarterly data)



Sources: National data, Haver, Eurostat, IMF and ECB staff calculations.  
Notes: Imports of goods and services. The last observation refers to the third quarter of 2014.

**Chart 6 Share of imports of goods and services in real global GDP**

(in logs; quarterly data; GDP at market exchange rates)



Sources: OECD, Eurostat and ECB staff calculations.  
Notes: Intra-euro area trade is calculated by using the shares of intra-euro area trade in goods in total euro area trade in goods. The last observation refers to the third quarter of 2014. All ratios are expressed as a share of global GDP.

**The weakness in euro area trade has gradually dissipated.** The weakness of late 2011 and 2012 was due, in part, to low domestic demand growth and, in particular, weak investment dynamics. In this period, growth in trade between euro area countries slowed markedly, and turned negative, in quarterly terms, over the period between the third quarter of 2011 and the third quarter of 2012 (see Chart 5). Since the second half of 2013, however, intra-euro area trade has grown on average at rates above the world aggregate.

**The weakness in intra-euro area trade had a negative, although rather limited, impact on world trade growth.** Indeed, world trade elasticity excluding intra-euro area trade was only 0.1 percentage point higher than the total world trade elasticity since the the third quarter of 2011 (see Table 2 and Chart 6). This suggests that the slowdown in intra-euro area trade accounts for only a small fraction of the reduction in world trade elasticity.<sup>4</sup> Results are similar when the European Union, rather than just the euro area, is considered.

**Table 2 Ratios of world trade growth to global GDP growth**

(quarterly data; GDP at market exchange rates)

	World trade	World excluding intra euro area trade	World excluding intra-EU trade
1995Q2-2007Q4	2.2	2.3	2.3
2011Q3-2014Q3	1.1	1.2	1.2

Sources: National data, Haver, Eurostat, IMF and ECB staff calculations.  
Notes: Trade refers to the average of imports and exports of goods and services. Intra-euro area trade is calculated by using the share of intra-euro area trade in goods in total euro area trade in goods. Shares are calculated as ratios of the average import growth rate to the average GDP growth rate in the given period.

4 These results are robust to defining trade as an average of exports and imports rather than as imports only, and to using GDP aggregated with purchasing power parity weights.

## 2 HOW FAR IS THE RECENT DROP IN TRADE GROWTH RELATED TO THE DECLINE IN GLOBAL ACTIVITY?

The descriptive analysis of recent data suggests that the decline in trade growth can be explained, to a significant extent, by sluggish economic activity. The post-crisis decline in world import growth coincided with a gradual slowing of global real GDP growth (see Chart 7). However, trade growth remains very subdued by historical standards, as compared with growth in global activity, indicating that the explanation for the recent trade slowdown may lie beyond cyclical developments. A more formal econometric analysis is conducted to quantify more precisely the extent to which the weakness in trade is consistent with cyclical developments.<sup>5</sup>

Chart 7 World import growth and global GDP growth

(annual growth rates; quarterly data; GDP at market exchange rates)



Sources: National data and ECB staff calculations.  
Note: Last observation refers to the third quarter of 2014.

An analysis based on a bivariate Bayesian vector autoregressive (BVAR) model confirms that the recent decline in trade growth is primarily, but not exclusively, associated with the decline in economic activity. The two variables included in the model are global GDP and world imports.<sup>6</sup> The BVAR model is estimated over the pre-crisis sample period (between the first quarter of 1981 and the fourth quarter of 2007) in order to abstract from possible post-crisis structural changes in trade elasticity.<sup>7</sup> The model is then used to produce projections of world imports (solid red line in Chart 8), conditional on the observed path of global GDP.<sup>8</sup> This counterfactual trade path is compared with the observed path of world trade (solid blue line) over the period from the first quarter of 2011 to the third quarter of 2014. If the paths of conditional forecasts based on pre-crisis regularities are higher than the observed trade path, it would suggest that changes in the economic relationships linking trade and global GDP and, in particular, changes in the elasticity of trade to global GDP play a role in explaining the observed weakness in trade dynamics.

5 See Constantinescu, C., Mattoo, A. and Ruta, M., “The Global Trade Slowdown: Cyclical or Structural?”, *IMF Working Papers*, No 15/6, IMF, January 2015 for quantitative estimates of the cyclical factor in the recent trade slowdown.

6 The bivariate BVAR model used in this article includes quarterly data on global GDP and world imports. The model is estimated in (log-) levels, with five lags to capture potential long-run relationships and complex dynamics between the two variables. The estimation method and the methodology used to set the relative weight of the data and the priors are described in Giannone, D., Lenza, M. and Primiceri, G. E., “Prior selection for vector autoregressions”, *Review of Economics and Statistics*, forthcoming.

7 See Stock, J. and Watson, M., “Disentangling the channels of the 2007-2009 recession”, *Brookings Papers on Economic Activity*, 2012, pp. 81-135; Giannone, D., Lenza, M. and Reichlin, L., “Money, credit, monetary policy and the business cycle in the euro area”, *Discussion Papers*, No 8944, Centre for Economic Policy Research, 2012; and Aastveit, K., Carriero, A., Clark, T. and Marcellino, M., “Have standard VARs remained stable since the crisis?”, *Federal Reserve Bank of Cleveland Working Papers*, No 1411, September 2014 for applications of this method to examine the post-crisis stability of economic relationships in the United States and the euro area.

8 The conditional forecasts are computed by employing the Kalman filter-based methodology described in Banbura, M., Giannone, D. and Lenza, M., “Conditional forecasts and scenario analysis with vector autoregressions for large cross-sections”, *International Journal of Forecasting*, forthcoming.

Chart 8 shows that the projections of world imports, conditional on observed GDP, hover at around 5% and that the actual path of world imports is permanently below the projections. This evidence suggests that changes in the elasticity of trade to GDP may indeed partly explain the recently observed weakness of trade growth. However, the projections in Chart 8 involve an element of (forecast and estimation) uncertainty. In order to provide a more comprehensive statistical measure of how unusual the observed trade path really is, Chart 8 also shows the 16th and 84th quantiles of the conditional forecast distribution (dashed red lines).<sup>9</sup> Once uncertainty around the projections is taken into consideration, it transpires that the sluggishness of economic activity goes some way towards accounting for the weakness of world trade growth.

**However, the observed path of world trade remains consistently in the lower part of the forecast distribution, which suggests that the developments in real activity are not the only explanation for the weakness in trade.** Indeed, the evidence described in Box 1 shows that the BVAR estimates imply a post-crisis decline in the elasticity of world trade to global GDP from a value of 1.6 (sample: first quarter of 1981 to fourth quarter of 2007) to 1.3 (first quarter of 1981 to third quarter of 2014).<sup>10</sup> The next section is devoted to a discussion of the possible causes of changes in trade elasticity.

<sup>9</sup> The practice of reporting the 16th and 84th quantiles of the distribution is standard in Bayesian econometrics. Note that, for normally distributed variables, the 16th and the 84th quantiles are one standard deviation away from the mean, meaning that this range also conveniently provides a rough measure of the standard deviation.

<sup>10</sup> The results shown are based on global GDP aggregated with purchasing power parity weights. The model results, showing a post-crisis decline in world trade elasticity, are robust to the use of GDP at market exchange rates.

**Chart 8 Projected and observed world import growth**

(annual growth rates; quarterly data)



Sources: National data and ECB staff calculations.  
Note: The dashed red lines refer to the 16th and 84th quantiles of the BVAR distribution of the conditional forecasts of global imports.

### Box 1

#### THE BVAR-BASED ESTIMATE OF THE ELASTICITY OF WORLD TRADE TO GLOBAL GDP

**This box describes a BVAR-based methodology for estimating the extent to which world trade and global GDP are linked in the long run, i.e. a measure of the elasticity of world trade to global GDP.** The BVAR model is estimated in log-levels and the estimates are consistent with the existence of a potential long-run relationship between world trade and global GDP.

**An empirical measure of the potential link between world trade and global GDP in the long run is obtained by looking at the ratio of the long-run forecasts of trade to those of global GDP.** The idea is that, if global GDP and world trade follow the same trends well into the future,

when the effects of transitory shocks have faded, then the ratio of the respective forecasts should reflect the relationship between the trends in the two variables.

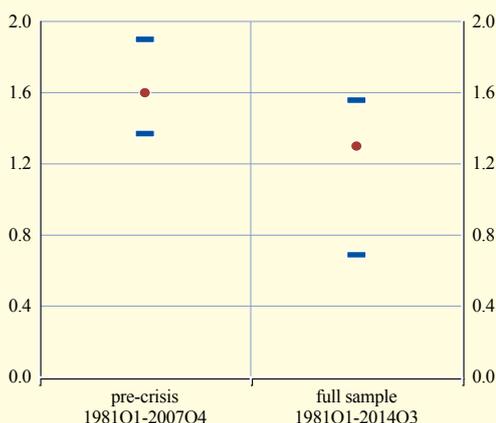
**Elasticity is estimated for two different sample periods, in order to assess whether or not the relationship between global GDP and world trade has changed over time.**

First, the model is applied to data from the period between the first quarter of 1981 and the fourth quarter of 2007 in order to capture the long-run elasticity in the pre-crisis period. Then, the model is applied to the full sample period (from the first quarter of 1981 to the third quarter of 2014), which includes both the global financial crisis and the euro area sovereign debt crisis and in which, as argued in previous sections, elasticity may have declined by comparison with the pre-crisis sample

period. The analysis is carried out on the full period rather than only on the post-2008 period because the latter is too short to provide reliable estimation results. The forecasting horizon chosen for the analysis is five years ahead (results obtained by using horizons of three years and eight years are highly similar). The chart above shows the outcome of the analysis.

**The results show that the elasticity of world trade to global GDP appears to have decreased when the post-crisis period is included. In particular, the BVAR-based point estimate of elasticity drops from 1.6 to 1.3.**

**BVAR estimate of long-run elasticity of world trade to global GDP**



Source: ECB staff calculations.  
Note: The red circles refer to the point estimate of elasticity, while the blue lines refer to the 16th and 84th quantiles of the distribution of trade elasticity based on the BVAR.

### 3 STRUCTURAL FACTORS BEHIND THE DECLINE IN TRADE GROWTH

**One possible explanation for the decline in trade elasticity relates to shifts in the relative importance of GDP components.** If the slowdown in GDP growth is driven primarily by demand components with a higher import content, such as investment, then a given decline in GDP growth would cause the growth rate of trade to fall to a more marked extent than would be the case if the same decline in GDP is driven by less trade-intensive demand components, such as government spending. Therefore, changes in the composition of demand can lead to changes in trade elasticity.<sup>11</sup> For advanced economies, the share of investment in GDP has fallen below pre-crisis levels in recent years (see Chart 9). For emerging market economies, the evidence is less conclusive, as the investment share had been rising significantly prior to the crisis; however, this increase in the investment share has been partially reversed in recent years in a broad set of emerging market economies (although, notably, this is not the case in China).

<sup>11</sup> See Bussière, M., Callegari, G., Ghironi, F., Sestieri, G. and Yamano, N., “Estimating Trade Elasticities: Demand Composition and the Trade Collapse of 2008-2009”, *American Economic Journal: Macroeconomics*, No 5(3), 2013, pp. 118-151; and Anderton, R. and Tewolde, T., “The global financial crisis: trying to understand the global trade downturn and recovery”, *Working Paper Series*, No 1370, ECB, August 2011. Both papers suggest that movements in investment and exports have a bigger impact on import growth than that captured by movements in other GDP components.

**The development of global value chains (GVCs) is also likely to have played a role.**

GVCs have supported world trade growth over the last 20 years. First, the international fragmentation of production chains should have a positive effect on the economic performance of participating countries, boosting productivity, and increasing economies of scale. Moreover, the rise in GVCs boosted world trade elasticity in the pre-crisis period. This is due to the difference in measures, as trade is measured in gross terms, whereas GDP is measured in value-added terms. The gross measure used for trade results in the “double counting” of intermediate inputs to trade, which would not be taken into account in the value-added approach.<sup>12</sup> The gap between the gross and the value-added measures of trade should reflect the level of outsourced inputs in total world trade and can therefore also be used as a proxy for measuring the expansion of GVCs.<sup>13</sup>

**Data from the World Input Output Database (WIOD) show that the gap between the gross**

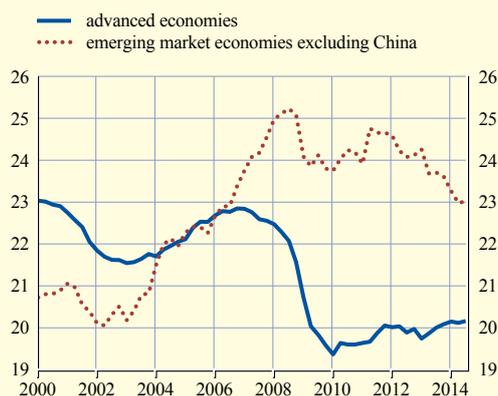
**and the value-added measures of trade increased from around 33% in 1995 to 51% in 2008.**

A comparison of the implied gross and value-added measures of trade-to-GDP ratios suggests that the increase in GVCs added 0.2 percentage point to world trade elasticity over this period. However, the WIOD data show that the level of outsourced inputs in total world trade fell significantly in 2009 and remained broadly unchanged thereafter, suggesting that the expansion of GVCs has stagnated in the post-crisis period. Furthermore, recent anecdotal evidence suggests that in the wake of the earthquake in Japan in 2011, firms have been striving to minimise the risks that arise from the complexity and length of the production chains.<sup>14</sup>

**In addition, more recent data on merchandise trade by end-use category show that the growth of imports of intermediate goods was the main driver of trade growth in the pre-crisis period.** However this stalled in 2012 and 2013 (see Chart 10).<sup>15</sup> Given that increases in the trade of intermediate goods can be closely linked to increases in vertical specialisation, the recent flattening suggests that a slowdown in the expansion of GVCs may be taking place, which could be contributing to the recent reduction in world trade elasticity.

**Chart 9 Share of investment in GDP**

(percentages)



Sources: National data, Haver and ECB staff calculations.  
Notes: Data in nominal terms. The advanced economies group refers to the United States, Japan, the United Kingdom, Canada, Australia, New Zealand, the euro area, Switzerland, Norway, Denmark and Sweden. Emerging market economies include Poland, Hungary, the Czech Republic, Romania, Russia, India, South Korea, Indonesia, Taiwan, Thailand, Hong Kong, Malaysia, Brazil, Mexico, Turkey and South Africa. The last observation refers to the third quarter of 2014. In view of the data available, only the period from 2000 onwards is considered, in order to ensure the completeness of the country aggregates.

12 See, e.g., Nagengast, A. and Stehrer, R., “Collateral imbalances in intra-European trade? Accounting for the differences between gross and value added trade balances”, *Working Paper Series*, No 1695, ECB, July 2014; further related work by the Competitiveness Research Network (CompNet); and Koopman, R., Powers, W., Wang, Z. and Wei, S.-J., “Give credit where credit is due: tracing value added in global production chains”, *NBER Working Paper*, No 16426, September 2010.

13 Meanwhile, world trade in value-added terms, as measured by the World Input Output Database, is subject to a number of important caveats, including assumptions made in mapping national input-output tables to global ones.

14 See, for example, “Global value chains: Managing the risks”, *Interconnected Economies: Benefiting from Global Value Chains*, OECD Publishing, 2013.

15 The data come from the OECD STAN Bilateral Trade Database by Industry and End-use category, which includes, among others, bilateral data on nominal trade in goods with a breakdown by intermediate and final consumer goods.

**Trade protectionism may also have played a small but non-negligible role in the decline in world trade elasticity in the recent post-crisis period.**

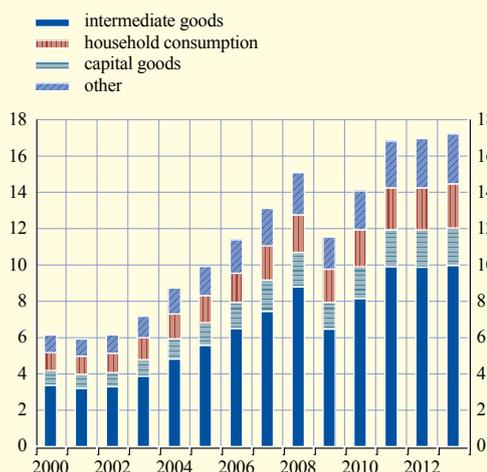
Protectionism in response to the 2008-2009 world trade collapse was limited, in contrast to what had occurred during previous crisis episodes.<sup>16</sup> This may have been a result of a higher level of trade integration in the world economy than in the past and of more developed global value chains, which have created an environment in which imposing trade-restrictive measures has more significant negative repercussions for the country that does so. Nevertheless, recent data and reports point to a certain increase in trade protectionism over the last five years.<sup>17</sup> While the World Trade Organization reports only traditional trade policy measures, such as tariffs or trade defence, so-called “murky” measures also exist. Although they do not breach international agreements, they do have the potential to harm foreign commercial interests (for example, bail-outs or breaches of health and safety regulations).

The Global Trade Alert<sup>18</sup> points to an increase in the number of “murky” measures introduced between 2012 and 2013, in comparison with those introduced between 2009 and 2011. While different sources of data point to a recent increase in trade protectionism, most of the available data cover only the period after the crisis, and thus cannot be used to assess differences in pre-crisis and post-crisis world trade elasticity. Recent research on trade protectionism shows that the countercyclical relationship between growth, competitiveness and trade protectionism was not broken in the recent crisis episode, but may have been weakened as a result of one-off factors, which implies a risk that trade protectionism could rise if trade remains weak.<sup>19</sup>

**Finally, developments in the supply of trade finance, a source of disruption to world trade growth during the Great Recession, do not seem to have played a significant role in the decline in trade elasticity since 2011.** A recent study by the Bank for International Settlements<sup>20</sup> finds that, while the shortage of bank-intermediated trade financing during the world trade collapse accounted for up to one-fifth of the world trade slowdown in that period, trade financing does not seem to have had a significant impact on world trade in other, more recent, periods.

**Chart 10 World imports of goods by end-use category**

(trillions of current USD)



Sources: OECD STAN database and ECB staff calculations.  
Notes: Data cover 105 countries which constituted around 92% of total world imports in 2013 based on the IMF World Economic Outlook data. The category “other” consists of mixed end-use and miscellaneous goods.

16 See Bown, C. (ed.), *The Great Recession and import protection*, CEPR and the World Bank, London, 2011, Ch. 1, pp. 1-51; and World Trade Organization, “Overview of developments in the international trading environment”, *Annual Report*, November 2014.

17 See, e.g., World Trade Organization Report on G-20 trade measures, November 2014; and European Commission, 11th Report on potentially trade-restrictive measures, June 2014.

18 The Global Trade Alert is an independent source of data on policy measures affecting trade. It includes both traditional and “murky” measures.

19 See, e.g., Georgiadis, G. and Gräß, J., “Growth, real exchange rates and trade protectionism since the financial crisis”, *Working Paper Series*, No 1618, ECB, November 2013.

20 See “Trade finance: developments and issues”, *Committee on the Global Financial System Paper*, No 50, Bank for International Settlements, 2014.

#### 4 OUTLOOK FOR TRADE

**Looking ahead, the cyclical headwinds to world trade are expected to wane.** With global economic activity expected to recover gradually, world trade growth will be bolstered as well. A recovery of the share of investment in global GDP would also be likely to lead to a partial reversal of the decline in the trade-to-GDP growth ratio. At the same time, trade elasticity, although rising from its current low level, is expected to remain below pre-crisis levels over the coming years, reflecting the assumption that some structural factors, such as lower expansion rates for GVCs, will persist over the medium term.